# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: I[st]**
**Subject: Mathematical Methods for Power Engineering**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100111(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To make the students understand that Linear algebra is powerful method for transformations.
- To provide the knowledge of Fourier series analysis which is a powerful method where the formulas are integrals and to have knowledge of expanding periodic functions that explore variety of applications of Fourier series.
- To have thorough knowledge of Optimization techniques which arise in mathematical descriptions of situations in Engineering?
- To provide a sound background of Operations on Random Variables to perform thorough investigation of major variables and to apply these ideas to a wide range of problems those include the evaluation of complex processes.

**Unit – I Linear Algebra**
Vector spaces, subspaces, Linear dependence, Basis and Dimension, Linear transformations, Kernels and Images, Matrix representation of linear transformation, Change of basis, Eigen values and Eigen vectors of linear operator

**Unit – II Fourier Series**
Fourier Trigonometric series: Periodic function as power signals – Convergence of series – Even and odd function: cosine and sine series – Non-periodic function: Extension to other intervals – Power signals: Exponential Fourier series – Parseval's theorem and power spectrum – Eigen value problems and orthogonal functions – Regular Sturm-Liouville systems – Generalized Fourier series

**Unit – III Optimisation Methods I**
Mathematical formulation of Linear Programming Problems, Simplex Method, Duality in Linear Programming, Dual Simplex method.

**Unit – IV Optimisation Methods II**
Non Linear Programming preliminaries, Unconstrained Problems, Search methods, Fibonacci Search, Golden Section Search, Constrained Problems, Lagrange method, Kuhn-Tucker conditions

**Unit – V Operations on Random Variables**
Random Variables, Distributions and Density functions, Moments and Moment generating function, Independent Random Variables, Marginal and Conditional distributions, Conditional Expectation, Elements of stochastic processes, Classification of general stochastic processes.

**Course Outcomes:** After studying the contents of the syllabus in detail the students will be able to:

- Define linear algebra, transformations, representations of linear transformations and applications.
- Define Fourier trigonometric series, power signals and variety of applications.
- Solve different problems using optimization methods.

**Text Books:**

1. Erwin Kreyszig,' Introductory Functional Analysis with Applications', John Wiley & Sons, 2004.
2. Hillier F S and Liebermann G J, 'Introduction to Operations Research', 7th ed., McGraw Hill, 2001
3. A Papoulis, 'Probability, Random Variables and Stochastic Processes', 3rd ed., McGraw Hill, 2002

**Reference Books:**

1. Grewal, B.S., Higher Engineering Mathematics, 42nd edition, Khanna Publishers, 2012.
2. Simmons D M, 'Non Linear Programming for Operations Research', PHI, 1975.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:15:45 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: I[st]**
**Subject: High Voltage Engineering & Measurement**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100112(024)**
**Total Tutorial Periods: 12**

**Course Objectives**:

- The course is an advanced course in high voltage technology and electrical insulating materials. It deals with basic gaseous, liquid and solid dielectric breakdown theories. It also contains important experimental methods of high voltage generation and measurement. The course makes the students familiar with various applications where high voltage field is used.

**Unit - I Generation of high voltages**

Direct voltages, A.C. to D.C. conversion, Electrostatic generators, Alternating voltages, Testing transformers, Series resonant circuits, Impulse voltages, Impulse voltage generator circuits, Operation, design and construction of impulse generators, Control systems

**Unit - II Measurement of High Voltages**

Peak voltage measurements by spark gap, Sphere gaps, Reference measuring systems, Uniform field gaps, Rod gaps, Electrostatic voltmeters, Ammeter in series with high ohmic resistors and high ohmic resistor voltage dividers, Generating voltmeters and field sensors, The measurement of peak voltages, The Chubb–Fortescue method, Voltage dividers and passive rectifier circuits, Active peak-reading circuits, High-voltage capacitors for measuring circuits, Voltage dividing systems and impulse voltage measurements, Generalized voltage generation and measuring circuit, Demands upon transfer characteristics of the measuring system, Fundamentals for the computation of the measuring system, Voltage dividers, Interaction between voltage divider and its lead, The divider's low-voltage arm, Fast digital transient recorders for impulse measurements

**Unit - III Measurement of High Current**

Direct Currents- Resistive Shunt with miliammeter, Hall Effect Generators, Magnetic links, Alternative Currents (power Frequency) – Resistive Shunts, Electromagnetic Current transformers, High Frequency ac impulse and rapidly changing currents – Magnetic Potentiometers or Rogowski coils, Magnetic links, Hall effect generators.

**Unit - IV Breakdown of Gaseous dielectric materials**

Classical gas laws, Ionization and decay processes, Townsend first ionization coefficient, Photoionization, Ionization by interaction of metastables with atoms, Thermal ionization, Cathode processes – secondary effects, Transition from non-self-sustained discharges to breakdown, The Townsend mechanism, The streamer or 'Kanal' mechanism of spark, The sparking voltage–Paschen's law, Penning effect, The breakdown field strength (Eb), Breakdown in non-uniform fields, Effect of electron attachment on the breakdown criteria, Partial breakdown, corona discharges, Surge breakdown voltage–time lag, Breakdown under impulse voltages, Volt–time characteristics

**Unit - V Breakdown of liquid and solid dielectrics**

Breakdown in Liquids - Electronic Breakdown, Suspended solid particle mechanism, Cavity breakdown, Stressed oil volume theory

Breakdown in Solids – Intrinsic breakdown, Electromechanical breakdown, Breakdown due to treeing & tracking, Thermal breakdown, Electrochemical breakdown, Breakdown due to internal discharges.

**Course Outcomes**:

Students should be able to:

- Describe the generating methods for high DC, AC, and impulse voltage.
- Describe the measuring methods for high DC, AC and impulse voltage.
- Describe the measuring methods for high DC, AC and impulse currents.
- Describe the various breakdown theories for gaseous, liquid and solid dielectric.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:16:09 -08'00'

**Text Books:**

1. 1. Dieter Kind, Kurt Feser, "High Voltage Test Techniques", SBA Electrical Engineering Series, New Delhi, 1999.
2. Naidu M.S. and Kamaraju V., "High voltage Engineering", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2009.
3. Kuffel E., Zaengl W.S. and Kuffel J., "High Voltage Engineerin Fundamentals", Elsevier India P Ltd, 2005

**References:**

1. Dieter Kind, Kurt Feser, "High Voltage Test Techniques", SBA Electrical Engineering Series, New Delhi, 1999.
2. Naidu M.S. and Kamaraju V., "High voltage Engineering", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2009.
3. Kuffel E., Zaengl W.S. and Kuffel J., "High Voltage Engineering Fundamentals", Elsevier India P Ltd, 2005.
4. Gallagher T.J. and Pearmain A., "High Voltage Measurements, Testing and Design", John Willey & Sons, New York, 1983.
5. IS, IEC and IEEE standards for Dielectric Testing of High Voltage Apparatus. Nelson W., "Applied Life Data Analysis", John Wiley and Sons, New York, 1982.
6. Kennedy W., "Recommended Dielectric Tests and Test Procedures for Converter Transformer and Smoothing Reactors", IEEE Transactions on Power Delivery, Vol.1, No. 3, pp. 161-166, 1986.



DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:16:36 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: I[st]**
**Subject: Power System Protection**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100113(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To understand the principle of protective schemes and various faults in the Power System Scenario.
- To study the various types of the circuit breakers, the arc quenching phenomena and the protection against over voltages.
- To explain the students protection systems used for electric machines, transformers, bus bars, overhead and underground feeders.

**Unit - I Protective Relaying**

Protective Relaying - Qualities of relaying, Definitions, Codes, Standards, Characteristic Functions, Classification, analog-digital- numerical, schemes and design, factors affecting performance, zones and degree of protection, faults types and evaluation, Instrument transformers for protection.

**Unit - II Static Relays**

Basic static relay units, sequence networks, fault sensing data processing units, FFT and Wavelet based algorithms, Phase& Amplitude Comparators, Duality, Zero Crossing/Level Defectors, Relay Schematics and Analysis, Over Current Relay, Instantaneous/Inverse Time –IDMT Characteristics; Directional Relays; Differential Relays, Restraining Characteristics; Distance Relays: Types, Characteristics;

**Unit - III Protection of Power System Equipment**

Protection of Power System Equipment, Generator, Transformer, Generator, Transformer Units, Transmission Systems, Bus-bars, Motors; Pilot wire and Carrier Current Schemes; System grounding, ground faults and protection, Load shedding and frequency relaying, Out of step relaying, Re-closing and synchronizing.

**Unit - IV Numerical Relays**

Numerical relays, Characteristics, Functional Diagrams, architecture, algorithms, Microprocessor & DSP based relays, sampling, aliasing, filter principles, Integrated and multifunction protection schemes, SCADA based protection systems, FTA, Testing of Relays.

**Unit - V AC Circuit Breakers**

AC Circuit Breakers : Current interruption, Transient Recovery Voltage (TRV) , Rate of rise of TRV, Resistance switching, Damping of TRV, Opening Resistors, Inductive & Capacitive current interruptions , Current chopping , Rated characteristics of Circuit breakers, Types of Circuit Breakers, Testing of High Voltage AC Circuit Breakers

**Course Outcomes**: At the end of the course, students will be able to

- Design the relevant protection systems for the main elements of a power system.
- Analyze overcurrent, differential, and ratio protection devices and their application in a coordinated protection scheme.
- Understand the stability problems and clearing of faults to mitigate these problems.

**Text Books:**

1. C.R. Mason, The art and science of protective relaying, John Wiley & Sons.
2. A.R.Warrington, Protective Relays, Vol .1&2, Chapman and Hall.

**References:**

1. T.S.Madhav Rao, Power system protection static relays with microprocessor applications, Tata McGraw Hill Publication.
2. Power System Protection Vol. I, II , III&IV, The Institution Of Electrical Engineers, Electricity Association Services Ltd., 1995
3. Helmut Ungrad , Wilibald Winkler, Andrzej Wiszniewski, Protection techniques in electrical energy systems, Marcel Dekker, Inc.
4. Badri Ram , D.N. Vishwakarma, Power system protection and switch gear, Tata McGraw Hill.
5. Blackburn, J. Lewis , Protective Relaying, Principles and Applications, Marcel Dekker, Inc., 1986.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:16:50 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: I[st]**
**Subject: High Voltage AC/DC Transmission**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100114(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To understand the sequential Impedances of AC systems in the present power senario.
- To study the various types of DC power transmission technologies.
- To explain the students HVDC converters, modern methods of reactive power control.

**Unit - I Sequential Impedances**

Sequential impedances of AC systems EHVAC transmission over voltages, insulation design of lightning and switching over voltages, High voltage testing of AC equipments, Reactive Power compensation of EHV AC lines.

**Unit - II DC Power Transmission Technology**

DC Power Transmission Technology: Application of DC Transmission, Description of DC Transmission System, Planning for HVDC Transmission, Modern Trends in DC Transmission, Thyristor Device, Thyristor Valve, Valve Tests, Recent Trends in valves. Comparison of EHV AC & DC transmission.

**Unit - III HVDC Converters**

HVDC Converters: Pulse Number, Choice of Converter Configuration, Simplified Analysis of Graetz Circuit, Converter Bridge Characteristics. Characteristics of a Twelve Pulse Converter, Detailed Analysis of Converters HVDC System Control: Principal of DC Link Control, Converter Control Characteristics, System Control Hierarchy, Firing Angle Control, Current and Extinction Angle Control, Starting and Stopping of DC Link, Power Control, Higher Level Controllers, and Telecommunication Requirements

**Unit - IV HVDC Converters**

Converter Faults and Protection: Converter Faults , Protection Against Overcurrents, Over voltages in a Converter Station , Surge Arresters, Protection Against Over voltages. Smoothing Reactor and DC Line: Smoothing Reactors, DC Line, Transient over Voltages In DC Line, Protection of DC Line, DC Breakers, Monopolar Operation, Effects of Proximity of AC and DC Transmission Lines

**Unit - V Reactive Power Control**

Reactive Power Control: Reactive Power Requirements in Steady State, Sources of Reactive Power, Static VAR Systems, Reactive Power Control during Transients Harmonics and Filters: Generation of Harmonics, Design of AC Filters, DC Filters, Carrier Frequency and RI Noise

**Course Outcomes**: At the end of the course, students will be able to

- Design the relevant insulators for lightning and switching overvoltages, HV testing equipments and reactive power compensators.
- Analyze HVDC power converters, HVDC system control, DC link control and telecommunication requirements.
- Understand the reactive power control problems and filters.

**Text: Book:**

1. HVDC Power Transmission System: K.R. Padiyar , Wiley Eastern Limited.

**Reference Book:**

1. Power System Stability and Control by Prabha Kundur- EPRI. Mc Graw Hill Inc.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:17:02 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: I[st]**
**Subject: Power Electronics for Renewable Sources**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100131(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To understand the Environment aspects of electrical energy conversion
- To study the various types of electrical machines for Renewable Energy Conversion.
- To explain the students about power Converters, wind and PV systems.
- To provide a sound background of Hybrid Renewable Energy Systems.

**Unit – I Introduction**

Environment aspects of electrical energy conversion: impacts of renewable energy generation on environment (cost – GHG Emission), Qualitative study of different renewable energy resources ocean, Biomass, Hydrogen energy systems, Operating principles and characteristics of: Solar PV, Fuel cells, Wind electrical systems – control strategy, operating area.

**Unit – II Electrical Machines For Renewable Energy Conversion**

Review of reference theory fundamentals- principle of operation and analysis: IG, PMSG, SCIG and DFIG.

**Unit – III Power Converters**

Solar: Block diagram of solar photo voltaic system: line commutated converters (inversion mode) - Boost and buck-boost converters- selection of inverter, battery sizing, array sizing. Wind: three phase AC voltage controllers- AC-DC-AC converters: uncontrolled rectifiers, PWM Inverters, Grid Interactive Inverters-matrix converters.

**Unit – IV Analysis of Wind and PV Systems**

Standalone operation of fixed and variable speed wind energy conversion systems and solar system-Grid connection Issues - Grid integrated PMSG and SCIG Based WECS-Grid Integrated solar system.

**Unit – V Hybrid Renewable Energy Systems**

Need for Hybrid Systems- Range and type of Hybrid systems- Case studies of Wind - PV Maximum Power Point Tracking (MPPT).

**Course Outcomes**: At the end of the course, students will be able to

- Design the relevant Power converters, PV systems and grid connections.
- Analyze Wind and PV systems and Grid connection issues.
- Understand the need of hybrid renewable energy systems..

**Text Book**

1. S.N. Bhadra, D. Kastha, & S. Banerjee "Wind Electricaal Systems", Oxford University Press, 2009

**References:**

1. Rashid .M. H "power electronics Hand book", Academic press, 2001.
2. Rai. G.D, "Non conventional energy sources", Khanna publishes, 1993.
3. Rai. G.D," Solar energy utilization", Khanna publishes, 1993.
4. Gray, L. Johnson, "Wind energy system", prentice hall linc, 1995.
5. Non-conventional Energy sources B.H.Khan Tata McGraw-hill Publishing Company, New Delhi



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:17:15 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: I[st]**
**Subject: Physics for Dielectrics**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100132(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To understand the concept of material classifications, material science and material properties..
- To provide students with the fundamental knowledge about the Bonding in solids.
- To provide students with the fundamental knowledge of different types of structures of solid.
- To provide students with the fundamental knowledge about the Non crystalline structure and phase diagrams

**Unit – I Materials Classification**

Materials Classification: Engineering materials and their classification: metals/ ceramics /polymers, Structure-property-processing co-relationship as a theme of materials science, Different levels of structures. Material Properties: Mechanical, electrical, thermal, dielectric, semi-conducting properties of materials.

**Unit – II Bonding in Solids**

Bonding in Solids: Primary and secondary bonds, Mixed bonding, Potential energy vs bond length criteria, Concept of bond length and nature of bonding Madelung energy, Variation in materials properties with bonding character.

**Unit – III Structure of Solids**

Structure of Solids: Crystal structure, Space lattice, Bravais lattice and reciprocal lattice concept; Miller Indices of directions and planes for cubic and hexagonal system; Metallic, ionic and covalent solids; Crystal structures of NaCl, CsCl, Diamond cubic, Zinc Blende, Wurtzite, Rutile, Flourite, Fullerenes, Spinel, Perovskite etc.,

**Unit – IV Non-Crystalline Structure**

Non-crystalline Structures: General features and classification, Structure and properties of metallic glass and amorphous semiconductors. Crystal Imperfections: Point imperfections, Burger vector, Dislocations (edge and screw) and Surface imperfections,

**Unit – V Phase Diagram**

Phase Diagrams: Phase rule and phase diagrams, Solid solutions, Hume Rothery rules, Intermediate phases and compounds, Unary and binary systems, Isomorphous and eutectic systems, Lever rule, Various phase reactions, Introduction to different phase diagrams, Ternary system, cooling curve and its use for drawing phase diagrams, Zone refining.

**Course Outcomes:**

- Student can understand the use of materials as per the properties.
- Student would be able to differentiate between solid materials as per the crystalline and Non crystalline structure.
- Student would be able to draw the phase diagrams as per the rules.

**Text Books:**

1. Smallman, R.E., and Bishop, R.J., Metals and Materials, Butterworth-Heinemann, Oxford University Press (1995).
2. Raghvan, V., Materials Science & Engineering, PHI (1998).

**References:**

1. Callister, W.D., Materials Science & Engineering: An Introduction, Wiley & Sons (2001).
2. Smith, W., Principles of Materials Science and Engineering. McGraw Hill (1990).



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:17:28 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: I[st]**
**Subject: Analysis of Electrical Machines**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100133(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To study the principles of electromagnetic energy conversion.
- To study the dynamic characteristics of DC machines.
- To study the reference frame theory, phase and commutator transformation.
- To provide the students about Characteristics of Induction and synchronous machines.

**Unit - I Principles of Electromagnetic Energy Conversion**
Magnetic circuits, permanent magnet, stored magnetic energy, co-energy - force and torque in singly and doubly excited systems – machine windings and air gap mmf - winding inductances and voltage equations.

**Unit - II DC Machines**
Elementary DC machine and analysis of steady state operation - Voltage and torque equations – dynamic characteristics of permanent magnet and shunt d.c. motors – Time domain block diagrams - solution of dynamic characteristic by Laplace transformation – digital computer simulation of permanent magnet and shunt d.c. machines.

**Unit - III Reference Frame Theory**
Historical background – phase transformation and commutator transformation – transformation of variables from stationary to arbitrary reference frame - variables observed from several frames of reference.

**Unit - IV Induction Machines**
Three phase induction machine, equivalent circuit and analysis of steady state operation – free acceleration characteristics – voltage and torque equations in machine variables and arbitrary reference frame variables – analysis of dynamic performance for load torque variations – digital computer simulation.

**Unit - V Synchronous Machines**
Three phase synchronous machine and analysis of steady state operation - voltage and torque equations in machine variables and rotor reference frame variables (Park's equations) – analysis of dynamic performance for load torque variations – digital computer simulation.

**Course Outcomes:** At the end of the course the students should be able to:

- Explain the principles of electromagnetic energy conversion.
- Analyze the performance of DC machines.
- Understand the characteristics of Induction machines and synchronous machines.

**Text Books:**

1. Paul C.Krause, Oleg Wasyzczuk, Scott S, Sudhoff, "Analysis of Electric Machinery and Drive Systems", John Wiley, Second Edition, 2010.

**References:**

1. P S Bimbhra, "Generalized Theory of Electrical Machines", Khanna Publishers, 2008.
2. A.E, Fitzgerald, Charles Kingsley, Jr, and Stephan D, Umanx, " Electric Machinery", Tata McGraw Hill, 5th Edition, 1992.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:17:48 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: I[st]**
**Subject: Power System Dynamics & Control**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100134(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To understand the concept of Power system structure, components, standards and models.
- To provide students with the fundamental knowledge about the control of power and frequency.
- To provide students with the fundamental knowledge of control of voltage and reactive power.
- To provide students with the fundamental knowledge about the stability and its improvement techniques.

**Unit - I Power System Structure**

Power System Structure: Operating states, control problem, control loops. Power System Stability – classification, terms and definitions.

Power system components: Hydraulic and steam turbine, Effect of exciter and governor. Excitation system - requirements, functions, types and modeling of excitation systems, IEEE standards and models.

**Unit - II Control of Power and Frequency**

Control of Power and Frequency: Power, Frequency characteristics, Division of load, Load frequency control, Generator, load and Prime mover models, Governor models, AGC in a two area system, AGC in a multi area system parameter setting constants, Tie- line bias control, AGC with optimal dispatch of Generation, AGC including Excitation system, Conventional PI and PID controllers for AGC, AI applications automatic generation control.

**Unit - III Control of Voltage and Reactive Power**

Control of voltage and Reactive Power: Relation between voltage, power and reactive power, Generation and absorption of reactive power, voltage control and voltage stability analysis, V-Q curves and sensitivity analysis, Voltage stability indices, Factors affecting voltage instability and voltage collapse.

**Unit - IV Stability Studies**

Stability Studies: Concepts, steady state and transient stability, small signal stability analysis, excitation system, Dynamic and transient stability analysis of single machine and multi -machine systems, power system stabilizer design and analysis for stability problem. Transient Stability: Solution of swing equations, swing curves, stability criterion.

**Unit - V Stability Improvement**

Techniques for the improvement of stability: operation under abnormal and distressed condition, Enhancement of small signal stability: use of power system stabilizers, supplementary control of Static VAr compensators, supplementary control of HVDC links, Techniques for improvement of transient stability, Integrated analysis of Voltage and Angle stability, Control of voltage instability, concepts of load shedding.

**Course Outcomes:**

- Student can understand the use of CT power system components as per the standards.
- Student would be able to select proper control techniques of various Electrical parameters.
- Student would be able to control voltage and reactive power.
- Student can understand about stability and its improvement techniques.

**Text Books:**

1. Prabha Kundur, "Power System Stability and Control" Mc-Graw Hill Inc, New York, 1993.
2. Taylor C.W. ," Power System Voltage Stability" Mc-Graw Hill Inc, New York, 1993.

**Reference Books:**

1. K.R.Padiyar,.Power System Dynamic . Stability and Control., Inter Publishing (P) Ltd., Bangalore, 1999 .
2. P.S.R. Murthy , " Power System Operation and Control," Tata Mc-Graw ,New Delhi 1984.
3. Nagrath IJ, Kothari ., " Power System Engineering ," Tata Mc-Graw ,New Delhi 1994.
4. Weedy B.M. " Electric Power System" John Wiley and Sons ,3r d edition .
5. O.1 Elgerd," Electric Energy System Theory : an Introduction ," Mc-Graw Hill, NX, 1983 ( Mainy for Unit –II ).



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:18:04 -08'00'

**FEASIBILITY FOR CONDUCTING THE EXPERIMENT(s)**

1. **Name of The Lab- High Voltage Engineering Lab - I** **Subject Code: 5100121(024)**

| S. No. | Name of Experiment |
|---|---|
| 01. | Measurement Of Air Breakdown Strength By AC-DC Test. |
| 02. | Mapping Of Electric Field Lines Between Two Charges Using Matlab. |
| 03. | Simulation Of Impulse Voltage Generation Circuits Using Pspice/PSCAD. |
| 04. | Measurement Of Insulation Resistance Of Cable. |
| 05. | Travelling Wave Characteristics With Different Line Terminations Using Pscad.. |
| 06. | Oil Breakdown Test Using Oil Test Kit. |
| 07. | Preparation Of Epoxy Nano composite. |
| 08. | Dielectric Characteristics Of Solid Insulating Material Using Impedance Analyzer. |
| 09. | Capacitance and Tang measurement of Insulator. |
| 10. | Impulse Breakdown Test Of Insulator. |



DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:18:18 -08'00'

**2. Name of The Lab- Power System Protection - Lab** **Subject Code: 5100122(024)**

| S. No. | Name of Experiment |
|---|---|
| 01. | Ratio Test of a C.T and determination of error. |
| 02. | Determination of knee point voltage of a CT. |
| 03. | Summation Transformer characteristics. |
| 04. | Study of CT Connection for E/F protection |
| 05. | Study of Open delta PT Connection for earth fault indication. |
| 06. | Protection of 3 ph. Alternator (simulation study). |
| 07. | Protection of 3 ph. Induction Motor (simulation study). |
| 08. | Over current / under voltage / Negative seq Relay Characteristics. (simulation study). |
| 09. | Simulation of Transmission line protection. |
| 10. | Study of differential protection of transformer (simulation study). |

------00------



DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:18:30 -08'00'

# Chhattisgarh Swami Vivekanand Technical University (CSVTU), Bhilai (CG)

## Scheme of Teaching and Examination

### Courses of Study and Scheme of Examination of M. Tech. (High Voltage Engineering)

**Semester – II**

| S. No. | Board of Study | Subject Code | Subject | Periods per Week | | | Scheme of Exam Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Electrical Engineering | 5100211(024) | Optimization Techniques | 3 | 1 | - | 100 | 20 | 20 | 140 | 4 |
| 2 | Electrical Engineering | 5100212(024) | High Voltage Testing Techniques | 3 | 1 | - | 100 | 20 | 20 | 140 | 4 |
| 3 | Electrical Engineering | 5100213(024) | Computer Aided Power System | 3 | 1 | - | 100 | 20 | 20 | 140 | 4 |
| 4 | Electrical Engineering | 5100214(024) | Advanced High Voltage Protection System | 3 | 1 | - | 100 | 20 | 20 | 140 | 4 |
| 5 | Refer Table-II | | Elective-II | 3 | 1 | - | 100 | 20 | 20 | 140 | 4 |
| 6 | Electrical Engineering | 5100221(024) | High Voltage Engineering Lab-II | - | - | 3 | 75 | - | 75 | 150 | 2 |
| 7 | Electrical Engineering | 5100222(024) | Computer Aided Power System Lab | - | - | 3 | 75 | - | 75 | 150 | 2 |
| **Total** | | | | **15** | **5** | **6** | **650** | **100** | **250** | **1000** | **24** |

**Table – II**

| Elective-II | | | |
|---|---|---|---|
| **S. No.** | **Board of Study** | **Subject Code** | **Subject** |
| 1 | Electrical Engineering | 5100231(024) | Computation of Electromagnetics |
| 2 | Electrical Engineering | 5100232(024) | Distribution System Planning, Management and Automation |
| 3 | Electrical Engineering | 5100233(024) | Substation Designing |
| 4 | Electrical Engineering | 5100234(024) | Electrical Power Quality Analysis |

L-Lecture, T-Tutorial, P-Practical, ESE-End Semester Exam, CT- Class Test, TA-Teacher's Assessment

**Note:** 1. 1/4th of total strength of students subject to minimum of four students is required to offer an elective in the college in a Particular academic session.
2. Choice of elective course once made for an examination can be changed in future examinations



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:18:53 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: II[nd]**
**Subject: Optimization Techniques**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100211(024)**
**Total Tutorial Periods: 12**

**Course Objective:**

- To develop a Deep Understanding about the Optimization Problem and its applications
- To familiarize with Integer Programming and Parametric Programming and its Application to Engineering Problems
- To develop the ability to solve unconstrained Minimization Problem using Geometric Programming
- To achieve an Understanding of different Statistical tools and its application to Electrical Engineering Problems
- To familiarize with AI Techniques and their application in Engineering Problems

**Unit - I Introduction to Optimization**

Introduction, Engineering Applications of Optimization, Statement of an Optimization Problem, Classification of Optimization Problems, Optimization Techniques.

**Unit - II Integer Programming**

Integer programming cutting plane method, Branch & Bound method, Sensitivity analysis – Changes in bi, changes in cj, changes in aij. Parametric Programming – Parametric variation in cj, bi &aij, simultaneous parametric variations. Goal Programming.

**Unit - III Unconstrained Minimization**

Introduction, Unconstrained Minimization Problem and its solution, Primal, Dual and Sufficiency Conditions in Unconstrained case, Constrained Minimization Problem and its solution, Geometric Programming with Mixed Inequality constraints, Complementary Geometric Programming.

**Unit - IV Statistical Tools**

Taguchi Technique – Introduction to DOE, ANOVA, F-Test, Response surface Methodology. Markov chain.

**Unit - V AI-Techniques**

Introduction to modern Oplimization Technique- ANN, Fuzzy logic, Genetic Algorithms. Memetic Algorithms, Antz colony Algorithm, Tabu Search.

**Course Outcome:**

- Describe clearly a problem, identify its parts and analyze the individual functions.
- Becoming a mathematical translation of the verbal formulation of an optimization problem
- Understand optimization techniques using algorithms.
- Investigate, study, develop, organize and promote innovative solutions for various applications.
- Feasibility study for solving an optimization problem

**Text Books:**

1. Neural Networks & Fuzzy System- Bart Kosko- PHI publications.
2. Engineering Optimization, Theory & Practice, 3[rd] Edition- Singiresu S Rao.-New Age International Publishers.

**Reference Books:**

1. Operation Research Principles and Practice- Ravindran, Phillips, solbers Wiley Publication.
2. Established Quality Control- EngeneL.Grant, Richard. S. Leaven Worth- TMH 3. Neural Engineering – Computation, Representation and Dynamics in Neurobiological systems.- Chris Eliasmith and Charles H. Anderson.- EEE
4. Quantitative Technique in Management – N.D. Vohra, - TMH Publication.
5. Neural Network in Computer intelligence – Li Min Fu - TMH.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:19:09 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: II[nd]**
**Subject: High Voltage Testing Techniques**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100212(024)**
**Total Tutorial Periods: 12**

**Course Objective:**

- To familiarize with High Voltage Testing Techniques and their Objectives.
- To understand the Statistical Analysis and its application to High Voltage Measurement.
- To familiarize the students with different testing techniques of Electrical Equipment.
- To familiarize about the Non-Destructive techniques of Electrical Equipment and their Uses.
- To understand about the designing of High Voltage Lab and safety issues associated with it.

**Unit - I Introduction**
Objectives of high voltage testing, classification of testing methods- self restoration and non-self restoration systems-standards and specifications, measurement techniques, Diagnostic testing – online measurement, standard test cells.

**Unit - II Statistical Evaluation of Measured Results**
Determination of probability values, Distribution function of a measured quantity, confidence limits of the mean values of disruptive discharges - 'Up and Down' method for determining the 50% disruptive discharge voltage, multi stress ageing, life data analysis.

**Unit - III Testing Techniques for Electrical Equipment**
Testing of insulators, bushings, air break switches, isolators, circuit breakers, power transformers, voltage transformers, current transformers, surge diverters ,cable –testing methodology-recording of oscillograms - interpretation of test results.

**Unit – IV Non-Destructive Insulation Test Techniques**
Dynamic properties of dielectrics-dielectric loss and capacitance measurement-partial discharge measurements-basic partial discharge (PD) circuit – PD currents- PD quantities -Digital PD instruments and measurements, acoustic emission technique and UHF Techniques for PD identification, Corona and RIV measurements on line hardware.

**Unit - V Pollution Tests and Design Of High Voltage Lab**
Artificial Pollution tests- salt-fog method, solid layer method, Dimensions of High voltage laboratory, equipment- fencing, earthing and shielding, circuits for high voltage experiments.

**Course Outcome:**

- Students are able to classify about different standards and can prepare machine specification.
- Understand about measured quantity and their significance.
- Describe clearly about the switchyard equipment's and their response during impulse and surge.
- Able to describe about the use of non-destructive testing and their applications.
- Understand about the different types of pollutants and their place of production in HVE.

**Text Books:**

1. Dieter Kind, Kurt Feser, "High voltage test techniques", SBA Electrical Engineering Series, New Delhi,1999.
2. Gallagher, T.J., and Pearmain A., "High Voltage Measurements, Testing and Design", John Willey & Sons, New York, 1983.
3. Naidu M.S. and Kamaraju V., "High voltage Engineering", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2004.

**References Books:**

1. Kuffel, E., Zaengl, W.S. and Kuffel J., "High Voltage Engineering Fundamentals",Elsvier India P Ltd, 2005.
2. IS, IEC and IEEE standards for "Dielectric Testing of High Voltage Apparatus"
W.Nelson, Applied Life Data Analysis, John Wiley and Sons, New York, 1982.
3. W.Kennedy, "Recommended Dielectric Tests and Test Procedures for ConverterTransformer and Smoothing Reactors", IEEE Transactions on Power Delivery, Vol.1,No.3, pp 161-166, 1986.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:19:41 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: II[nd]**
**Subject: Computer Aided Power System Analysis**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100213(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To introduce computer applications in the analysis of power systems.
- To understand the solution methods and techniques used in power system studies.
- To familiarize about the load flow study and its applications.
- To understand about the transient stability and their applications.
- To understand about the power system securities and their need.

**Unit - I Network Equations**

Network equations, graph theory, Bus admittance matrix by step by step method, primitive network, businicidence matrix, formation of Ybus by singular transformation, bus impedance matrix by inversion of Ybus,algorithm for bus impedance matrix, addition of a branch, addition of link, modification of Zbus by changesin primitive network. Concept of using these matrices for load flow study and fault study.

**Unit - II Fault Analysis**

Fault Analysis, [ZBUS] Building algorithm, sequence matrices, Symmetrical And Unsymmetrical Short-Circuit Analysis of Large Power Systems, Phase Shift in sequence quantities due to transformers.

**Unit - III Load Flow Study**

Load flow study, introduction, power system equations, solution technique ie Gauss Seidel, NewtonRaphson and fast decoupled load flow, incorporation of voltage controlled busses, representation oftransformer , introduction to optimal load flow technique..

**Unit - IV Transient Stability Studies**

Transient stability studies, introduction, swing equation, machine equations, power system equations,solution techniques, example of transient stability calculations, exciter and governor control system,description of transient stability program.

**Unit - V Power System Security**

Power System Security, Factors affecting Security, State Transition Diagram, Contingency Analysis UsingNetwork Sensitivity Method and AC Power Flow Method, Correcting the Generation Dispatch UsingSensitivity Methods, Introduction to State Estimation.

**Course Outcomes:**

- The students will gain the ability to critically analyze the solution methods used in power system studies.
- Students are able to understand about different types of fault analysis in power system.
- Can simulate and analyze the electrical load flow using computers.
- Can able to calculate the transient analysis involved in electrical power system.
- Can able to describe transient stability program and their solutions.

**Text Books:**

1. George L. Kusic, .Computer Aided Power System Analysis. Prentice Hall of India (P) Ltd., New Delhi,1989.
2. J. Arrilaga, C.P. Arnold, B.J. Harker, .Computer Modelling of Electric Power Systems.
3. G. W. Stagg and A. H. El- Abiad, Computer methods in Power System Analysis, Mc -Graw HillKogakusha Ltd 1968.

**References Books:**

1. A.K. Mahaianabis, D.P. Kothari, S.I. Ahson, .Computer Aided Power System Analysis & Control. TataMcGraw Hill, New Delhi, 1988.
2. O.I. Elgard, .Electric Energy System Theory : An Introduction., 2 nd Edition, McGraw Hill, New York, 1982.
3. A. Sadat, .Power System Analysis., McGraw Hill Co. Ltd., India, 2000.
4. I.J. Nagarath, D.P. Kothari, .Modern Power System Analysis., Tata McGraw Hill Publishing Co. Ltd., NewDelhi, 994.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:20:02 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: II[nd]**
**Subject: Advance High Voltage Protection System**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100214(024)**
**Total Tutorial Periods: 12**

**Course Objective:**

- To familiarize with various types of comparators using static circuits.
- To Understand the over current, distance and differential protection schemes.
- To understand the current and voltage measurements.
- To familiarize with digital relays for protection of transmission lines, transformers.
- To Identify the new developments in protective relaying and applications.

**Unit - I Protective Relaying**
Protective Relaying - Qualities of relaying - Definitions - Codes- Standards; Characteristic Functions; Classification – analog - digital- numerical; schemes and design-factors affecting performance –zones and degree of protection; faults-types and evaluation; Instrument transformers for protection.

**Unit - II Digital Protection**
Basic elements of digital protection –signal conditioning- conversion subsystems- relay units sequence networks-fault sensing data processing units- FFT and Wavelet based algorithms: least square and differential equation based algorithms-travelling wave protection schemes; Relay Schematics and Analysis- Over Current Relay-Instantaneous/Inverse Time –IDMT Characteristics; Directional Relays; Differential Relays- Restraining Characteristics; Distance Relays: Types Characteristics. Relay coordination- Relay setting calculations. Primary and backup protection, application and philosophy with applied relay engineering examples.

**Unit - III Digital Protection for Power System Apparatus**
Digital Protection of power system apparatus – protection of generators – Transformer protection- magnetizing inrush current – Application and connection of transformer differential relays – transformer over current protection. Bus bar protection - line protection - distance protection–long EHV line protection - Power line carrier protection Motors protection; Pilot wire and Carrier Current Schemes; Reactor protection – Protection of boosters - capacitors in an interconnected power system. System grounding –ground faults and protection; Load shedding and frequency relaying; Out of step relaying; Re-closing and synchronizing.

**Unit - IV Integrated and multifunction protection**
Integrated and multifunction protection schemes -SCADA based protection systems- Fault Tree Analysis; Testing of Relays-Field test procedures for protective relays. Adaptive relaying-AI & Fuzzy Based Protection, Intelligent Transmission Line Relaying Fault Detection

**Unit - V Review of Codes**
Review of IEEE, IEC and CBIC codes for Digital Protection, different types of digital protection schemes used in Hydro, Thermal and nuclear power stations, Application of FACTS as a digital power system

**Course Outcome:-**

- Understand the various types of comparators and their realization using static circuits.
- Understand the realization of over current, distance and differential relays using comparators.
- Estimate the current and voltage magnitudes from the sampled measurements.
- Realize the various dynamic characteristics of digital relays for protection of transmission lines, transformers.
- Identify the new developments in protective relaying and applications.

**References:**

1. A T John and A K Salman, Digital protection for power systems-IEE power series-15, Peter Peregrines Ltd,UK,1997
2. C.R. Mason, The art and science of protective relaying, John Wiley &sons, 2002
3. Donald Reimert, Protective relaying for power generation systems, Taylor & Francis-CRC press 2006.
4. Gerhard Ziegler, Numerical distance protection, Siemens, 2nd ed, 2006



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:20:19 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: II[nd]**
**Subject: Electrical Power Quality Analysis**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100234(024)**
**Total Tutorial Periods: 12**

**Course Objective:**

- Review definitions and standards of common power quality phenomena.
- Understand power quality monitoring and classification techniques.
- Investigate different power quality phenomena causes and effects.
- Understand different techniques for power quality problems mitigation.
- Grounding and power quality effects.

**Unit - I Introduction to Power Quality**

Introduction - power quality, voltage quality, overview of power quality phenomena, classification of power quality issues, power quality measures and standards, THD -TIF-DINC-message weights-flicker factor-transient phenomena, occurrence of power quality problems, power acceptability curves, IEEE guides, standards and recommended practices.

**Unit - II Harmonics & Load Modeling**

Harmonics, individual and total harmonic distortion, RMS value of a harmonic waveform, triplex harmonics, important harmonic introducing devices, SMPS, Three phase power converters, arcing devices, saturable devices, harmonic distortion of fluorescent lamps, effect of power system harmonics on power system equipment and loads. Modeling of networks and components under non-sinusoidal conditions, transmission and distribution systems, shunt capacitors, transformers, electric machines, ground systems, loads that cause power quality problems, power quality problems created by drives and its impact on drives

**Unit - III Filter and FACTS**

Power factor improvement, Passive Compensation, Passive Filtering, Harmonic Resonance, Impedance Scan Analysis, Active Power Factor Corrected Single Phase Front End, Control Methods for Single Phase APFC, Three Phase APFC and Control Techniques, PFC Basedon Bilateral Single Phase and Three Phase Converter. Static VAR compensators, SVC andSTATCOM.

**Unit - IV Active Power Filter**

Active Harmonic Filtering, Shunt Injection Filter for single phase, three -phase three -wire and three-phase four-wire systems, d-q domain control of three phase shunt active filters uninterruptible power supplies-constant voltage transformers, series active power filtering techniques for harmonic cancellation and isolation . Dynamic Voltage Restorers for sag ,swell and flicker problems.

**Unit - V Grounding Techniques**

Grounding and wiring, introduction, NEC grounding requirements, reasons for grounding, typical grounding and wiring problems, solutions to grounding, and wiring problems.

**Course Outcome:**

- The ability to analyze, and determine the PQ characteristics.
- The ability to select the suitable component for a better PQ.
- The ability to control the PQ standards
- Can able to design & modify the existing system to achieve better quality.
- Typical wiring and grounding problems affecting power quality 2 6 and its solution

**Text books:-**

1. Electric power quality by g.t.heydt
2. Understanding Power Quality Problems by Math H. Bollen

**References:**

1. J. Arrillaga, .Power System Quality Assessment., John wiley, 2000
2 J. Arrillaga, B.C. Smith, N.R. Watson & A. R.Wood ,.Power system Harmonic .Analysis, Wiley, 1997'Selected Topics in Power
Quality and Custom Power', Course book for STTP, 2004, Ashok S.Surya Santoso, H. Wayne Beaty, Roger C. Dugan, Mark F.
McGranaghan, Electrical Power System Quality , MC Graw Hill, 2002.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:20:37 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: II[nd]**
**Subject: Distribution System Planning, Management and Automation**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100232(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- Modeling of loads and their characteristics.
- Understand design of substations
- Compare voltage drops for uniformly distributed loads and concentrated load.
- Illustrate compensation methods for voltage drops and pf improvements
- Analyze the Coordination of Protective Devices.

**Unit - I Introduction**

Introduction to Electrical Distribution System, Components Of Distribution System Substation And Busbar Layouts, Components of Distribution System And Feeder Configuration, Nature Of Loads In A Distribution System, Load Allocation In A Distribution System

**Unit - II Distribution System Planning**

Factors Effecting Planning, Present Distribution System Planning Techniques, Planning Models, Planning In The Future, Future Nature Of Distribution Planning, Role Of Computer In Distribution Planning.

**Unit - III Distribution System Design**

Sub-transmission, Distribution Substation, Bus Schemes, Substation Location, Rating Of Substation, Power Capacitor In Distribution Systems, Effects Of Series And Shunt Capacitors, Power Factor Correction, Application Of Capacitors, Best Capacitor Location.

**Unit - IV Design Considerations Of Primary And Secondary Systems**

Primary Feeder, Radial Type, Loop Type, Primary Network, Voltage Levels, Loading, Tie Lines, Rectangular Type Distribution Feeder, Radial Type Distribution Feeder, Radial Feeders With Uniformly Distributed Load, Radial Feeders With Non-uniformly Distributed Load, ABCD General Circuit Constants, Design Of Radial Primary Distribution Systems.

**Unit - V Distribution Automation**

Definition, Communication Techniques, Sensors, Architecture And Subsystems Of SCADA, SCADA Functions At Various Hierarchical Level.

**Course Outcomes:**

- Differentiate the types of loads and their characteristics.
- Recognize the necessity of distribution system protection and devices available for discriminating faults.
- Design a suitable capacitance for voltage control in a Distribution System
- Design a radial and loop type distribution feeder
- Can able to implement SCADA, and other automation software in an Industry.

**References:**

1. James Northcote – Green, Robert Wilson, "Control and Automation of Electrical Power Distribution Systems", CRC Press, New York, 2007.
2. TuranGonen: .Electric Power Distribution System Engineering. McGraw Hill Company. 1986
3. M.V Deshpande: .Electrical Power System Design. Tata-McGraw Hill, 1966
4. W. H. Kresting, Distribution System Modeling and Analysis, CRC Press, New York, 2002.
5. A. A. Sallam and O. P. Malik, Electric Distribution System, IEEE Press, Piscataway, NJ, 2011.
6. J. M. Gers, Distribution System Analysis and Automation, IET Power and Energy Series, 68, London, 2013
7. Pansini, Electrical Distribution Engineering, The Fairmont Press, Inc., 2007
8. Pabla H S.: .Electrical Power Distribution Systems.. Tata McGraw Hill. 2004



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:20:54 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: II[nd]**
**Subject: Computation of Electromagnetics**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100231(024)**
**Total Tutorial Periods: 12**

**Course Objectives:**

- To provide the basic skills required to understand, develop, and design various engineering applications involving electromagnetic fields.
- Basic understanding of finite-difference and finite element methods, and integral equation solvers used for numerical characterization of electromagnetic fields.
- To familiarize about the 1D and 2D Planar and symmetry problem.
- To familiarize about the applications of Insulator used in Different Electrical Machines.
- To understand about the different types of Electromagnetic Devices.

**Unit - I Review of Field Theory**
Review of basic field theory – electric and magnetic fields – Maxwell's equations –Laplace, Poisson and Helmoltz equations – principle of energy conversion – force/torque calculation – Electro thermal formulation.

**Unit - II Characterization of Electromagnetic Field**
Limitations of the conventional design procedure need for the field analysis based design, problem definition and solution by analytical methods-direct integration method – variable separable method – method of images, solution by numerical methods- Finite Difference Method.

**Unit - III Finite Element Method**
Finite element method (FEM) – Differential/ integral functions – Variational method –Energy minimization – Discretisation – Shape functions –Stiffness matrix –1D and 2D planar and axial symmetry problem.

**Unit - IV Design Applications**
Design Applications: Insulators- Bushings – Cylindrical magnetic actuators – Transformers – Rotating machines.

**Unit - V Analysis of Electromagnetic Devices**
Eddy Current and Heating as field problems. Solution of these problems by analytical and numerical methods. Simulation methods for the solution of field problems. Inductance calculation for various types of electromagnetic devices.

**Course Outcome:**

- Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems.
- Examine the phenomena of wave propagation in different media and its interfaces
- Variation formulation in electromagnetics and Rayleigh-Ritz method for deriving finite element discretization.
- Can able to design Insulating materials for HVE applications by fixing Electromagnetic waves associated with it.
- On completion of this course, students should have the ability to apply the theory to solve engineering problems

**References:**

1. Karl E. Lonngren, Sava V. Savov, Randy J. Jost, "Fundamentals of Electromagnetics with MATLAB", 2nd edition, SciTech Publishing, Inc., 2007.
2. George W. Pan, "Wavelets in Electromagnetics and Device Modeling", Wiley.
3. JaanKiusalaas, " Numerical Methods in Engineering with Python", Cambridge University Press.
4. Chen, Cao and Mittra , "Multiresolution Time Domain Scheme for Electromagnetic Engineering".
5. A Daniel G. Swanson, Wolfgang J. R. Hoefer , "Microwave circuit modeling using electromagnetic field simulation".
6. Sergey N. Makarov , "Antenna and EM Modeling with Matlab".



DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:21:10 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

**Semester: II[nd]**
**Subject: Substation Designing**
**Total Theory Periods: 40**
**Total Marks in End Semester Exam: 100**
**Minimum number of class test to be conducted: 02**

**Specialization: High Voltage Engineering**
**Branch: Electrical Engineering**
**Subject Code: 5100233(024)**
**Total Tutorial Periods: 12**

**Course Objective:**

- To familiarize with AIS and GIS Substation.
- To familiarize with Major Equipment used in AIS & GIS Substation
- To familiarize about the Electricity Codes used in Sub-station design.
- To have a deep understanding of grounding used in Sub-station.
- To familiarize with Electrical transient involved in Sub-stations.

**Unit - I Introduction to AIS & GIS**
Introduction – characteristics – comparison of Air Insulated Substation (AIS) and Gas Insulated Substation (GIS) – main features of substations, Environmental considerations, Planning and installation.

**Unit - II Major Equipment and Layout of AIS & GIS**
Major equipment – design features – equipment specification, types of electrical stresses, and mechanical aspects of substation design.

**Unit - III Insulation Coordination of AIS & GIS**
Introduction – stress at the equipment – insulation strength and its selection – standard BILs – Application of simplified method – Comparison with IEEE and IEC guides

**Unit - IV Grounding and Shielding**
Definitions – soil resistivity measurement – ground fault currents – ground conductor – design of substation grounding system – shielding of substations – Shielding by wires and masts.

**Unit - V Fast Transients Phenomenon in AIS & GIS**
Introduction – Disconnector switching in relation to very fast transients – origin of VFTO – propagation and mechanism of VFTO – VFTO characteristics – Effects of VFTO.

**Course Outcome:**

- Knowledge of various AIS & GIS System
- Ability to design various Equipment layout and Sub-station planning.
- Ability to understand different grid codes and their applications to AIS & GIS modeling.
- Ability to design Grounding system for substation.
- Modeling the power system for transient analysis

**References:**

1. Andrew R. Hileman, "Insulation coordination for power systems", Taylor and Francis, 1999.
2. M.S. Naidu, "Gas Insulation Substations", I.K. International Publishing House Private Limited, 2008.
3. Klaus Ragallar, "Surges in high voltage networks" Plenum Press,New York, 1980. "Power Engineer's handbook", TNEB Association.
4. PritindraChowdhuri, "Electromagnetic transients in power systems", PHI Learning Private Limited, New Delhi, Second edition, 2004.
5. "Design guide for rural substation", United States Department of Agriculture, RUS Bulletin, 1724E-300, June 2001.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:21:26 -08'00'

**1. Name of The Lab–Computer Aided Power System (Lab)** **Subject Code: 5100221(024)**

| Sl. No. | Name of Experiment | Availability of Instrument/ Software | Remarks |
|---|---|---|---|
| 01. | Introduction to MATLAB and other Simulation software | YES | NA |
| 02. | Z-bus and Y-bus formulation and their inversion | YES | NA |
| 03. | Load flow studies (Gauss-Siedle method, Newton Raphson method) | YES | NA |
| 04. | Flow study with Fast Decoupled Method | YES | NA |
| 05. | Fault analysis (balanced and unbalanced) | YES | NA |
| 06. | Solution of Swing equations by modified Euler's method. | YES | NA |
| 07. | Simulating Power Systems with Simulink | YES | NA |
| 08. | Solution of Power System equations using Modified Euler's Method. | YES | NA |
| 09. | Solution of Swing equations using Runge – Kutta method (RK4). | YES | NA |
| 10. | Power system simulation by MATLAB using the Sim Power Systems Toolbox | YES | NA |

**2. Name of The Lab – High Voltage Lab-II** **Subject Code: 5100222(024)**

| S. No. | Name of Experiment |
|---|---|
| 01. | Reactive Power Control by Excitation System (Simulation Study) |
| 02. | Simulation and study of a Power System Stabilizer |
| 03. | Simulation of Impulse Voltage Generator & Testing using MATLAB |
| 04. | Microprocessor based load frequency control.(Simulation study) |
| 05. | Study of a HVDC Transmission system and its simulation |
| 06. | Study of a characteristic of a 12-pulse convertor |
| 07. | Characteristic of long transmission Line and compensation. |
| 08. | Transient stability analysis of a multimachine system. |
| 09. | Automatic Generation Control in a Restructured Power system. |
| 10. | Simulation of Power quality disturbance using MATLAB/SIMULATION. |



DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:21:45 -08'00'

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

**Courses of Study and Scheme of Examination of B.E. First Year (2012-13)**
**Common to all branches of Engineering except Bio-Tech. & Bio-Medical Engg.**

## SECOND SEMESTER

| S. No | Board of Study | Subject Code | Subject | Periods Per Week | | | Scheme of Examination Theory | | | Total Marks | Credit [L+[T+P]] 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Basic Sciences | 300214(14) | Applied Mathematics-II | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2 | Civil Engg. | 300212(20) | Environment & Ecology | 4 | - | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Basic Sciences | 300218(15) | Applied Physics (New) | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4 | Civil Engg. | 300216(20) | Basic Civil Engineering | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 5 | Mechanical Engg. | 300219(37) | Fundamental of Mechanical Engineering (New) | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 6 | Basic Sciences | 300228(15) | Applied Physics (Lab) | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 7 | Mechanical Engg. | 300229(37) | Mechanical Engineering (Lab) | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8 | Humanities | 300221(46) | Communication Skills (Lab) | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 9 | Humanities | 300220(46) | Library & Seminar | - | - | 1 | - | - | 20 | 20 | 1 |
| **TOTAL** | | | | **20** | **4** | **8** | **520** | **100** | **180** | **800** | **29** |

L-Lecture, T-Tutorial, P-Practical, ESE – End Semester Exam, CT- Class Test, TA- Teacher's Assessment

Note:

(i) The teaching in the 1st and 2nd semester will be divided in two groups consisting of various branches as shown below: P1-GROUP: Electronics & Communication, Information Technology, Electronics & Instrumentation, Electrical, Chemical, Electrical & Electronics; Q1-GROUP: Computer Science, Mechanical, Civil, Mining and Applied Electronics & Instrumentation, Metallurgy, Mechatronics.

(ii) Applied Mathematics-II will be taught to both the groups in the second semester.

(iii) Library & seminar will be conducted by the relevant discipline/humanities as decided by the Principal.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:22:00 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **IInd**
Subject: **Applied Mathematics-II**
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

**Branch**: Common to All Branches
**Code**: **300214 (14)**
Total Tutorial Periods: 12

**UNIT – I**
Complex Numbers: De Moivre's theorem, roots of complex numbers; separtion into real & imaginary parts of circular, hyperbolic, logarithmic & exponential function; summation of trigonometric series by C+iS method.

**UNIT – II**
Differential Equations of higher order: Linear differential equations of higher order with constant coefficients, method of variation of parameters; Cauchy's & Legendre's linerar equations; simultaneous linear equations with constant coefficients.

**UNIT – III**
Multiple Integrals: Double & triple integrals, change of order of integration; Beta & Gamma functions; application to area & volume.

**UNIT – IV**
Vector Calculus: Vector operator $\nabla$; directional derivative, gradient, divergence & curl; line, surface & volume integrals, Green's, Gauss's & Stoke's theorem (without proof) & applications.

**UNIT – V**
Theory of Equations: Roots of polynomial equations, relations between roots and coefficients; transformation of equations, removal of terms; solution of cubic & biquadratic equatins-Cardon's & Ferrari's methods.

**TEXT BOOKS:**

1. Higher Engg. Mathematics by B.S. Grewal (38th edition)-Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig (8th edition) – John Wiley & Sons.

**REFERNECE BOOKS:**

1. Higher algebra by H.S. Hall & S.R. Knight – A.I.T.B.S. Publishers.
2. Integral Calculus by Gorakh Prasad – Pothishala Private Limited.
3. Advanced Engg. Mathematics by R.K. Jain & S.R.K. Iyengar – Narosa Publishing House.
4. Applied Mathematics by P.N. Wartikar & J.N. Wartikar Vol. (I&II) – Pune Vidhyarthi Griha Prakashan, Pune.
5. Applied mathematics for Engineers & Physicists by Louis A. Pipes – Mc Graw Hill.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:22:14 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **IInd**
Subject: **Environment & Ecology**
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Branch: Common to All Branches
**Code: 300212 (20)**

**UNIT – I**
General: Environmental segments, environmental degradation, environmental impact assessment.
Concept of Ecosystem: Fundamental of Ecology and Ecosystem, components of ecosystem, food-chain, food-web, trophic levels, energy flow, cycling of nutrients, major ecosystem types (forest, grass land and aquatic ecosystem).

**UNIT – II**
Air Pollution: Atmospheric composition, energy balance, classification of air pollutants, source and effect of pollutants – Primary (CO, SOx, NOx, particulates, hydrocarbons), Secondary [photochemical smog, acid rain, ozone, PAN (Peroxy Acetyl Nitrate)], green house effect, ozone depletion, atmospheric stability and temperature inversion, Techniques used to control gaseous and particulate pollution, ambient air quality standards.

**UNIT – III**
Water Pollution: Hydrosphere, natural water, classification of water pollutants, trace element contamination of water, sources and effect of water pollution, types of pollutants, determination and significance of D.O., B.O.D., C.O.D. in waste water, Eutrophication, methods and equipment used in waste water treatment preliminary, secondary and tertiary.

**UNIT – IV**
Land Pollution & Noise Pollution: Lithosphere, pollutants (agricultural, industrial, urban waste, hazardous waste), their origin and effect, collection of solid waste, solid waste management, recycling and reuse of solid waste and their disposal techniques (open dumping, sanitary land filling, thermal, composting).
Noise Pollution: Sources, effect, standards and control.

**UNIT – V**
Environmental Biotechnology: Definition, current status of biotechnology in environmental protection, bio-fuels, bio-fertilize, bio-surfactants, bio-sensor, bio-chips, bio-reactors.
Pollution Prevention through Biotechnology: Tannery industry, paper and pulp industry, pesticide industry, food and allied industry.

**TEXT BOOKS:**

1. Environment and Ecology by Piyush Kant Pandey and Dipti Gupta (Sum India Publication)
2. A Textbook of Environmental Chemistry and Pollution Control by S.S. Dara (S. Chand and Company)

**REFERENCE BOOKS:**

1. Masters, G.M. Introduction to Environment Engineering and Science (Prentice Hall of India).
2. Environmental Chemistry by A.K. Dey (Eastern Ltd.).
3. Environmental Chemistry by B.K. Sharma (Krishna Prakashan).
4. Nebel B.J. Environmental Science (Prentice Hall of India-1987).
5. Environmental Biotechnology by S.N. Jogdand (Himalaya Publishing House).
6. Introduction to Environmental Biotechnology by A.K. Chatterji (Prentice Hall of India).

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:22:31 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **B.E 1st & 2nd Semester**
Subject: **Applied Physics (New)**
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Branch: Common to All Branches
Code – 300218 (15)
Total Tutorial Periods: 12

**Unit -1.Theory of Relativity**
Space, time and motion, frame of reference, Galilean Transformation Outline of relativity, Michelson-Morley experiment, Special theory of Relativity, transformation of space and time, Time dilation, Doppler effect ,length contraction, addition of velocities, Relativistic mass: variation of mass with velocity, kinetic energy, equivalence of mass and energy, Relation between energy and momentum.

**Unit -2.Nuclear Physics**
Controlled and uncontrolled chain reaction, criteria of critical mass, nuclear reactor and its site selection & numericals ,nuclear forces, Nuclear fusion in stars . Introduction of elementary particles.
Electron ballistic: Motion of charged particles in electric and magnetic field. Aston and Bainbridge mass spectrograph

**Unit-3.Geometrical Optics:**
Cardinal points of coaxial system of thin lenses, equivalent focal length, location and properties of cardinal points. eye piece (Ramsden & Hygen`s)
**Acoustics**
Magnetostriction oscillator and Piezo-electric oscillator for production of ultrasonic waves ,
wavelength of Ultrasonic waves and its engineering applications
Basic requirements for an acoustically good hall. Reverberation and Sabine's formula for reverberation time, Absorption coefficient and its measurement, Factors affecting architectural acoustics and their remedy.

**Unit -4 .Wave Optics**
wedge shaped films, Interferences by division of amplitude: Newton's rings and its applications
Interference by division of wave front: Fresnel's bi prism, fringe width, diffraction grating, resolving power of grating ,

**Unit- 5.Lasers**
Temporal and spatial coherence of light wave Principle of laser, Laser characteristics, components of laser, Principle of Ruby, He-Ne & Nd -YAG lasers, application, basic concepts of Holography (only introductory part, No detail derivation)
Fiber optics:
Optical fibers; introduction & advantages, structure & classification, Option of propagation in fiber, attenuation & distortion, acceptance angle and cone, numerical aperture (only introductory part, No detail derivation).

**TEXT BOOKS:**
1. Gaur and Gupta "Engineering Physics"
2. Avadhanulu and Kshirsagar "Engineering Physics".

**REFERENCE BOOKS:**
1. Jenkins and White: "Optics", Mc Graw-Hill Book Company.
2. Singh R.B. : "Physics of Oscillations and Waves"
3. Ghatak A.K.: "Optics"
4. Mani and Mehta: "Modern Physics", Affiliated East-West Press Pvt. Ltd, 1998.
5. Sanjeev Puri: Modern Physics, Narosa Pub. Co. 2004.
6. Kaplan: Nuclear Physics, Narosa Publishing, 1987.
7. Tyagrajan and Ghatak, "Laser", Mac Millan ,2001
8. Brijlal and Subramaniam"Atomic and Nuclear Physics"

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:22:50 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **IInd**
Subject: **Basic Civil Engineering**
Total Theory Periods:50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Branch: Common to All Branches
Code: **300216 (20)**
Total Tutorial Periods: 12

**UNIT – I**

**BUILDING MATERIAL**

Bricks: Nominal and actual dimensions of modular and traditional bricks. Frog. Good brick earth, moulding, characteristics of good bricks, compression test and absorption test, classification of bricks.

Cement: Raw materials, wet process for manufacture of Portland cement, intial and final setting times, use of Vicat needle apparatus, distinctions between ordinary Portland cement, Pozzolana cement and slag cement, grades of cement, uses of white cement. Stone: Geological, physical and chemical classification of stone, important stones, uses of stone.Steel: Different between Cast-iron, wrought iron and steel, mild steel and Tor-steel.

UNIT – II

**BUILDING CONSTRUCTION**

Mortar: Proportions of cement mortar for various uses.

Concreate: Ingredients of concrete. Meaning of M-10, M-15 and M-20 grades, and nominal mix proportions for them. Common w/c ratios. Workability. Slump test. Compression test. Curing. Aggregate: Coarse and Fine aggregates, grading curve and fineness moduls.

Building Plans: Reading and comprehending a building plan and section. Convention of assuming the cutting plane at window sill level. Conventional symbols for representing doors etc. and electrical and sanitary fittings. Identification of footing, plinth, lintel, slab, chajja etc. on a given cross-section.

UNIT – III

**SURVEYING**

Chain Survey: Instruments used. Selection of survey-stations. Chain-lines, Off-sets, Oblique-offsets, Tie-lines, Check-lines. Ranging. Field-Book, Plotting, Survey of India Topo-sheets. Their scales and conventional symbols.

Compass Survey: The prismatic compass. Definition and types of meridian. Dip and Declination. Whole circle bearing, Fore bearing and Back bearing. Local attraction. Calculation of included angles for closed and open traverses.

UNIT – IV

**LEVELLING**

Levelling: Various parts of a Dumpy level, Temporary adjustments, Interrelationship of Bubble Tube Axis, Line of Collimation and Vertical Axis, Leveling staff, technical terms used in Levelling. Fly leveling. Profile leveling. Level field book. Arthmetical checks and problems on leveling.

Contours: Definition, Contour value. Identification of ridge, valley and other geographical features on a contoured plan.

UNIT – V

**FOUNDATION**

Bearing Capacity: Necessity of foundations, definitions of safe bearing capacity, ultimate bearing capacity and factor of safety, considerations of failure of soil and settlement of foundation for deciding ultimate bearing capacity. Load bearing and framed construction: Load bearing wall type and framed types of constructions. Types of foundations: Sketches of spreads footing for walls, rectangular R.C.C. footing for columns and raft-foundations for a group of columns. Foundation Soils: Black cotton soil, its expansion and shrinkage, building cracks due to it, use of framed construction or under-reamed pile for B.C. soil, Good soils for foundation viz., moorum, yellw soil or silt and rock.

**BOOKS RECOMMENDED**

1. Comprehensive Basic Civil Engineering B.C. Punmia
2. Basic Civil Engineering by Ramamurutham
3. Surveying Vols I by B.C. Punmia
4. Building construction by Ahuja and Birdi

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:23:05 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

**Semester: B.E 1st /2nd Semester**
**Subject: Fundamentals of Mechanical Engineering (New)**
**Total Theory Periods: 50**
**Total Marks in End Semester Exam: 80**
**Minimum number of class tests to be conducted: 02**

**Branch: Common to All Branches**
**Code - 300219 (37)**
**Total Tutorial Periods: 12**

**Unit – I**
**Resultant and Equilibrium Analysis:**
Basic concepts and laws of mechanics, system of forces, free body diagram, Resultant and equilibrium of concurrent, parallel and non-concurrent co-planar force system. General numerical applications.

**Unit – II**
**(a) ANALYSIS OF PLANE TRUSSES**
Perfect truss, basic assumptions for perfect truss, analysis of axial forces in the members by method of joint and method of sections. General numerical applications.
**(b) FRICTION**
Static, dynamic and limiting friction, Law of limiting friction, Angle of friction, Angle of Repose, Cone of Friction, Wedge friction. General numerical applications

**Unit –III**
**Properties of Surfaces**
Centre of Gravity, Second moment of area, determination of second moment of area by integration, polar moment of inertia, radius of gyration of area, Parallel axis theorem, Moment of inertia of composite areas, determination of Product of inertia by integration.

**UNIT –IV**
**Kinetics of Particles**
(a) D'Alembert's principle applied to bodies having rectilinear motion.
(b) Principle of work and Energy: General numerical applications
(c) Principle of Impulse and momentum: General numerical applications

**UNIT – V**
**FIRST LAW OF THERMODYNAMICS**
(a) Thermodynamic System, properties, process, cycle, thermodynamic equilibrium, Quasi-static Process, Zeroth Law of thermodynamics, Work and Heat transfer, flow work, general numerical application.
(b) First Law of thermodynamics, internal energy, proof of internal energy as a point function, general numerical application of first law to non-flow process and steady flow process.

**Name of the Text Books:**
1. Engineering Mechanics (Statics and Dynamics) ; A. K. Tayal ,Umesh Pub., Delhi
2. 2. Engineering Mechanics : S. Timoshenko and D.H. Young,TMH
3. 5. Engineering Thermodynamics: P.K.Nag, TMH
4. 6 Engineering Thermodynamics: C.P.Arora, TMH

**Name of the Reference Books:**
1. Engineering Mechanics (Statics and Dynamics): R.C.Hibbeler, Pearson
2. Engineering Mechanics:Meriam and Kreige ,John Wiley and sons
3. Thermodynamics: Cengel and Boles, TMH
4. Essentials of Engg Mechanics: S.Rajasekharan& G.Shankara Subramaniyam, Vikas Publications
5. Engineering Mechanics: Basudeb Bhatytacharya , Oxford

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:23:18 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: B.E 1st & 2nd Semester
Subject: **Applied Physics (Lab)**
Total Practical Periods: 24
Total Marks in End Semester Exam: 40

Branch: Common to All Branches
Code: **300228 (15)**

## LIST OF EXPERIMENTS

(*Any ten experiments can be performed)*

1. To determine the surface tension by Capillary/Jager's method.
2. To determine the wave length of light by Newton's rings method.
3. To determine the wave length of light by Fresnel's Biprism.
4. To determine the focal length of combination of two thin lenses by nodal slide assembly and its verification.
5. To determine specific resistance of a wire by Carry Foster's Bridge.
6. To determine the Hall coefficient of semiconductor.
7. To determine e/m by Thomson's method.
8. Study of Photo – Cell and determination of Planck's constant.
9. Determination of wavelength of a spectral line using diffraction grating.
10. Determination of divergence of LASER beam.
11. Determination of grating element of a diffraction grating using LASER beam.
12. To determine the coefficients of viscosity of a liquid by capillary flow/Stoke's method.
13. To determine the frequency of A.C. mains using sonometer.
14. To determine the moment of inertia of flywheel.
15 To determine the forbidden energy gap of semiconductor diode.
16. To determine the mechanical equivalent of heat (J) by Calender & Barne's method.
17. To determine the numerical aperture (NA) of the given fiber cables.
18. To study the characteristics of LDR.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:23:31 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

**Semester - B.E - 1st/2nd Semester**
**Branch: Common to all Branches**
**Subject - Mechanical Engineering (Lab)**
**Subject Code: 300229 (37)**
**Total Practical Period: 28**
**Total Marks in End Semester Exam: 40**

## LIST OF EXPERIMENTS

1. To verify law of triangle of forces.
2. To verify the Lami's theorem.
3. To verify the law of polygon of forces.
4. To verify the law of lever.
5. To determine the support reactions of a simply supported beam subjected to point loads.
6. To draw the variation of bending moment at a given section in a simply supported beam under a moving point load.
7. To find the coefficient of friction between surfaces of wooden plane and following blocks:
   i) Aluminum ii) Tin iii) Glass iv) Asbestos v) Teak ply vi) Sand paper
   vii) card board .
8. To determine the coefficient of friction between
   (i) Belt and pulley
   (ii) Rope and pulley.
9. To study simple jib crane and to determine the internal forces in members of jib crane.
10. To determine the stiffness of helical compression spring.
11. To study lifting machine.
12. To study the lifting machine "second order pulley system" and to draw the following characteristic diagram:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

    Also to determine the law of machine and the maximum efficiency of machine.
13. To study the lifting machine "Wheel and Differential axle" and to draw the

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:23:48 -08'00'

following characteristic diagram:

i. Load-effort diagram
ii. Load- ideal effort diagram
iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

14. To study the lifting machine "Worm and worm wheel" and to draw the following characteristic diagram:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

15. To study the lifting machine "Simple screw jack" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

16. To study the lifting machine "Modified screw jack" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

17. To study the lifting machine "Geared Jib crane" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

18. To study the lifting machine "Single Purchase Winch crab" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

19. To study the lifting machine "Double Purchase Winch crab" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

**Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:24:03 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **1st & 2nd**
Subject: **Communication Skills (Lab)**
Total Practical Periods: 36

Branch: Common to All Branches
Code: 300221 (46)

**Communication Skills (Practical)**

List of exercises to be performed as practical work in language lab to train the students to be proficient in communication.

- Formal (Extempore and mock interviews) and Informal Speaking(Situational dialogues and Rate play)
- Elementary Phonetics (Pronunciation of words; Intonation and Word Accent)
- Paralinguistic features of speaking (voice modulation, pitch, tone, etc.)
- Paper Presentation (Non-Technical & current Affairs)
- Use of Audio-Visual aids: Preparation of transparencies, slides, power point presentation etc.
- Body Language (Gestures / Postures during Role Play/Speaking and JAM (Just-a-Minute) Session.
- Exercises on Listening Comprehension.
- Exercises on Reading Comprehension.
- Effective Writing (Business Letters, Covering Letter, Resume on Word Document.
- Telephoning (Telephonic Conversations)
- Internet exploration. (learn to browse, download and save information)

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:24:18 -08'00'

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

**Courses of Study and Scheme of Examination of B.E. First Year (2012-13)**
**Common to all branches of Engineering except Bio-Tech. & Bio-Medical Engg.**

## SECOND SEMESTER

| S. No | Board of Study | Subject Code | Subject | Periods Per Week | | | Scheme of Examination Theory | | | Total Marks | Credit [L+[T+P]] 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Basic Sciences | 300214(14) | Applied Mathematics-II | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2 | Civil Engg. | 300212(20) | Environment & Ecology | 4 | - | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Basic Sciences | 300218(15) | Applied Physics (New) | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4 | Civil Engg. | 300216(20) | Basic Civil Engineering | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 5 | Mechanical Engg. | 300219(37) | Fundamental of Mechanical Engineering (New) | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 6 | Basic Sciences | 300228(15) | Applied Physics (Lab) | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 7 | Mechanical Engg. | 300229(37) | Mechanical Engineering (Lab) | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8 | Humanities | 300221(46) | Communication Skills (Lab) | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 9 | Humanities | 300220(46) | Library & Seminar | - | - | 1 | - | - | 20 | 20 | 1 |
| **TOTAL** | | | | **20** | **4** | **8** | **520** | **100** | **180** | **800** | **29** |

L-Lecture, T-Tutorial, P-Practical, ESE – End Semester Exam, CT- Class Test, TA- Teacher's Assessment

Note:

(i) The teaching in the 1st and 2nd semester will be divided in two groups consisting of various branches as shown below: P1-GROUP: Electronics & Communication, Information Technology, Electronics & Instrumentation, Electrical, Chemical, Electrical & Electronics; Q1-GROUP: Computer Science, Mechanical, Civil, Mining and Applied Electronics & Instrumentation, Metallurgy, Mechatronics.

(ii) Applied Mathematics-II will be taught to both the groups in the second semester.

(iii) Library & seminar will be conducted by the relevant discipline/humanities as decided by the Principal.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:24:32 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **IInd**
Subject: **Applied Mathematics-II**
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

**Branch**: Common to All Branches
**Code**: **300214 (14)**
Total Tutorial Periods: 12

**UNIT – I**
Complex Numbers: De Moivre's theorem, roots of complex numbers; separtion into real & imaginary parts of circular, hyperbolic, logarithmic & exponential function; summation of trigonometric series by C+iS method.

**UNIT – II**
Differential Equations of higher order: Linear differential equations of higher order with constant coefficients, method of variation of parameters; Cauchy's & Legendre's linerar equations; simultaneous linear equations with constant coefficients.

**UNIT – III**
Multiple Integrals: Double & triple integrals, change of order of integration; Beta & Gamma functions; application to area & volume.

**UNIT – IV**
Vector Calculus: Vector operator $\nabla$; directional derivative, gradient, divergence & curl; line, surface & volume integrals, Green's, Gauss's & Stoke's theorem (without proof) & applications.

**UNIT – V**
Theory of Equations: Roots of polynomial equations, relations between roots and coefficients; transformation of equations, removal of terms; solution of cubic & biquadratic equatins-Cardon's & Ferrari's methods.

**TEXT BOOKS:**

1. Higher Engg. Mathematics by B.S. Grewal (38th edition)-Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig (8th edition) – John Wiley & Sons.

**REFERNECE BOOKS:**

1. Higher algebra by H.S. Hall & S.R. Knight – A.I.T.B.S. Publishers.
2. Integral Calculus by Gorakh Prasad – Pothishala Private Limited.
3. Advanced Engg. Mathematics by R.K. Jain & S.R.K. Iyengar – Narosa Publishing House.
4. Applied Mathematics by P.N. Wartikar & J.N. Wartikar Vol. (I&II) – Pune Vidhyarthi Griha Prakashan, Pune.
5. Applied mathematics for Engineers & Physicists by Louis A. Pipes – Mc Graw Hill.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:24:55 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **IInd**
Subject: **Environment & Ecology**
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Branch: Common to All Branches
**Code: 300212 (20)**

**UNIT – I**
General: Environmental segments, environmental degradation, environmental impact assessment.
Concept of Ecosystem: Fundamental of Ecology and Ecosystem, components of ecosystem, food-chain, food-web, trophic levels, energy flow, cycling of nutrients, major ecosystem types (forest, grass land and aquatic ecosystem).

**UNIT – II**
Air Pollution: Atmospheric composition, energy balance, classification of air pollutants, source and effect of pollutants – Primary (CO, SOx, NOx, particulates, hydrocarbons), Secondary [photochemical smog, acid rain, ozone, PAN (Peroxy Acetyl Nitrate)], green house effect, ozone depletion, atmospheric stability and temperature inversion, Techniques used to control gaseous and particulate pollution, ambient air quality standards.

**UNIT – III**
Water Pollution: Hydrosphere, natural water, classification of water pollutants, trace element contamination of water, sources and effect of water pollution, types of pollutants, determination and significance of D.O., B.O.D., C.O.D. in waste water, Eutrophication, methods and equipment used in waste water treatment preliminary, secondary and tertiary.

**UNIT – IV**
Land Pollution & Noise Pollution: Lithosphere, pollutants (agricultural, industrial, urban waste, hazardous waste), their origin and effect, collection of solid waste, solid waste management, recycling and reuse of solid waste and their disposal techniques (open dumping, sanitary land filling, thermal, composting).
Noise Pollution: Sources, effect, standards and control.

**UNIT – V**
Environmental Biotechnology: Definition, current status of biotechnology in environmental protection, bio-fuels, bio-fertilize, bio-surfactants, bio-sensor, bio-chips, bio-reactors.
Pollution Prevention through Biotechnology: Tannery industry, paper and pulp industry, pesticide industry, food and allied industry.

**TEXT BOOKS:**

1. Environment and Ecology by Piyush Kant Pandey and Dipti Gupta (Sum India Publication)
2. A Textbook of Environmental Chemistry and Pollution Control by S.S. Dara (S. Chand and Company)

**REFERENCE BOOKS:**

1. Masters, G.M. Introduction to Environment Engineering and Science (Prentice Hall of India).
2. Environmental Chemistry by A.K. Dey (Eastern Ltd.).
3. Environmental Chemistry by B.K. Sharma (Krishna Prakashan).
4. Nebel B.J. Environmental Science (Prentice Hall of India-1987).
5. Environmental Biotechnology by S.N. Jogdand (Himalaya Publishing House).
6. Introduction to Environmental Biotechnology by A.K. Chatterji (Prentice Hall of India).

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:25:12 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **B.E 1st & 2nd Semester**
Subject: **Applied Physics (New)**
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Branch: Common to All Branches
Code – 300218 (15)
Total Tutorial Periods: 12

**Unit -1.Theory of Relativity**
Space, time and motion, frame of reference, Galilean Transformation Outline of relativity, Michelson-Morley experiment, Special theory of Relativity, transformation of space and time, Time dilation, Doppler effect ,length contraction, addition of velocities, Relativistic mass: variation of mass with velocity, kinetic energy, equivalence of mass and energy, Relation between energy and momentum.

**Unit -2.Nuclear Physics**
Controlled and uncontrolled chain reaction, criteria of critical mass, nuclear reactor and its site selection & numericals ,nuclear forces, Nuclear fusion in stars . Introduction of elementary particles.
Electron ballistic: Motion of charged particles in electric and magnetic field. Aston and Bainbridge mass spectrograph

**Unit-3.Geometrical Optics:**
Cardinal points of coaxial system of thin lenses, equivalent focal length, location and properties of cardinal points. eye piece (Ramsden & Hygen`s)
**Acoustics**
Magnetostriction oscillator and Piezo-electric oscillator for production of ultrasonic waves ,
wavelength of Ultrasonic waves and its engineering applications
Basic requirements for an acoustically good hall. Reverberation and Sabine's formula for reverberation time, Absorption coefficient and its measurement, Factors affecting architectural acoustics and their remedy.

**Unit -4 .Wave Optics**
wedge shaped films, Interferences by division of amplitude: Newton's rings and its applications
Interference by division of wave front: Fresnel's bi prism, fringe width, diffraction grating, resolving power of grating ,

**Unit- 5.Lasers**
Temporal and spatial coherence of light wave Principle of laser, Laser characteristics, components of laser, Principle of Ruby, He-Ne & Nd -YAG lasers, application, basic concepts of Holography (only introductory part, No detail derivation)
Fiber optics:
Optical fibers; introduction & advantages, structure & classification, Option of propagation in fiber, attenuation & distortion, acceptance angle and cone, numerical aperture (only introductory part, No detail derivation).

**TEXT BOOKS:**
1. Gaur and Gupta "Engineering Physics"
2. Avadhanulu and Kshirsagar "Engineering Physics".

**REFERENCE BOOKS:**
1. Jenkins and White: "Optics", Mc Graw-Hill Book Company.
2. Singh R.B. : "Physics of Oscillations and Waves"
3. Ghatak A.K.: "Optics"
4. Mani and Mehta: "Modern Physics", Affiliated East-West Press Pvt. Ltd, 1998.
5. Sanjeev Puri: Modern Physics, Narosa Pub. Co. 2004.
6. Kaplan: Nuclear Physics, Narosa Publishing, 1987.
7. Tyagrajan and Ghatak, "Laser", Mac Millan ,2001
8. Brijlal and Subramaniam"Atomic and Nuclear Physics"

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:25:25 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **IInd**
Subject: **Basic Civil Engineering**
Total Theory Periods:50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Branch: Common to All Branches
Code: **300216 (20)**
Total Tutorial Periods: 12

**UNIT – I**

**BUILDING MATERIAL**

Bricks: Nominal and actual dimensions of modular and traditional bricks. Frog. Good brick earth, moulding, characteristics of good bricks, compression test and absorption test, classification of bricks.

Cement: Raw materials, wet process for manufacture of Portland cement, intial and final setting times, use of Vicat needle apparatus, distinctions between ordinary Portland cement, Pozzolana cement and slag cement, grades of cement, uses of white cement. Stone: Geological, physical and chemical classification of stone, important stones, uses of stone.Steel: Different between Cast-iron, wrought iron and steel, mild steel and Tor-steel.

UNIT – II

**BUILDING CONSTRUCTION**

Mortar: Proportions of cement mortar for various uses.

Concreate: Ingredients of concrete. Meaning of M-10, M-15 and M-20 grades, and nominal mix proportions for them. Common w/c ratios. Workability. Slump test. Compression test. Curing. Aggregate: Coarse and Fine aggregates, grading curve and fineness moduls.

Building Plans: Reading and comprehending a building plan and section. Convention of assuming the cutting plane at window sill level. Conventional symbols for representing doors etc. and electrical and sanitary fittings. Identification of footing, plinth, lintel, slab, chajja etc. on a given cross-section.

UNIT – III

**SURVEYING**

Chain Survey: Instruments used. Selection of survey-stations. Chain-lines, Off-sets, Oblique-offsets, Tie-lines, Check-lines. Ranging. Field-Book, Plotting, Survey of India Topo-sheets. Their scales and conventional symbols.

Compass Survey: The prismatic compass. Definition and types of meridian. Dip and Declination. Whole circle bearing, Fore bearing and Back bearing. Local attraction. Calculation of included angles for closed and open traverses.

UNIT – IV

**LEVELLING**

Levelling: Various parts of a Dumpy level, Temporary adjustments, Interrelationship of Bubble Tube Axis, Line of Collimation and Vertical Axis, Leveling staff, technical terms used in Levelling. Fly leveling. Profile leveling. Level field book. Arthmetical checks and problems on leveling.

Contours: Definition, Contour value. Identification of ridge, valley and other geographical features on a contoured plan.

UNIT – V

**FOUNDATION**

Bearing Capacity: Necessity of foundations, definitions of safe bearing capacity, ultimate bearing capacity and factor of safety, considerations of failure of soil and settlement of foundation for deciding ultimate bearing capacity. Load bearing and framed construction: Load bearing wall type and framed types of constructions. Types of foundations: Sketches of spreads footing for walls, rectangular R.C.C. footing for columns and raft-foundations for a group of columns. Foundation Soils: Black cotton soil, its expansion and shrinkage, building cracks due to it, use of framed construction or under-reamed pile for B.C. soil, Good soils for foundation viz., moorum, yellw soil or silt and rock.

**BOOKS RECOMMENDED**

1. Comprehensive Basic Civil Engineering B.C. Punmia
2. Basic Civil Engineering by Ramamurutham
3. Surveying Vols I by B.C. Punmia
4. Building construction by Ahuja and Birdi

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:25:43 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

**Semester: B.E 1st /2nd Semester**
**Subject: Fundamentals of Mechanical Engineering (New)**
**Total Theory Periods: 50**
**Total Marks in End Semester Exam: 80**
**Minimum number of class tests to be conducted: 02**

**Branch: Common to All Branches**
**Code - 300219 (37)**
**Total Tutorial Periods: 12**

**Unit – I**
**Resultant and Equilibrium Analysis:**
Basic concepts and laws of mechanics, system of forces, free body diagram, Resultant and equilibrium of concurrent, parallel and non-concurrent co-planar force system. General numerical applications.

**Unit – II**
**(a) ANALYSIS OF PLANE TRUSSES**
Perfect truss, basic assumptions for perfect truss, analysis of axial forces in the members by method of joint and method of sections. General numerical applications.
**(b) FRICTION**
Static, dynamic and limiting friction, Law of limiting friction, Angle of friction, Angle of Repose, Cone of Friction, Wedge friction. General numerical applications

**Unit –III**
**Properties of Surfaces**
Centre of Gravity, Second moment of area, determination of second moment of area by integration, polar moment of inertia, radius of gyration of area, Parallel axis theorem, Moment of inertia of composite areas, determination of Product of inertia by integration.

**UNIT –IV**
**Kinetics of Particles**
(a) D'Alembert's principle applied to bodies having rectilinear motion.
(b) Principle of work and Energy: General numerical applications
(c) Principle of Impulse and momentum: General numerical applications

**UNIT – V**
**FIRST LAW OF THERMODYNAMICS**
(a) Thermodynamic System, properties, process, cycle, thermodynamic equilibrium, Quasi-static Process, Zeroth Law of thermodynamics, Work and Heat transfer, flow work, general numerical application.
(b) First Law of thermodynamics, internal energy, proof of internal energy as a point function, general numerical application of first law to non-flow process and steady flow process.

**Name of the Text Books:**
1. Engineering Mechanics (Statics and Dynamics) ; A. K. Tayal ,Umesh Pub., Delhi
2. 2. Engineering Mechanics : S. Timoshenko and D.H. Young,TMH
3. 5. Engineering Thermodynamics: P.K.Nag, TMH
4. 6 Engineering Thermodynamics: C.P.Arora, TMH

**Name of the Reference Books:**
1. Engineering Mechanics (Statics and Dynamics): R.C.Hibbeler, Pearson
2. Engineering Mechanics:Meriam and Kreige ,John Wiley and sons
3. Thermodynamics: Cengel and Boles, TMH
4. Essentials of Engg Mechanics: S.Rajasekharan& G.Shankara Subramaniyam, Vikas Publications
5. Engineering Mechanics: Basudeb Bhatytacharya , Oxford

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:25:57 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: B.E 1st & 2nd Semester
Subject: **Applied Physics (Lab)**
Total Practical Periods: 24
Total Marks in End Semester Exam: 40

Branch: Common to All Branches
Code: **300228 (15)**

## LIST OF EXPERIMENTS

(*Any ten experiments can be performed)*

1. To determine the surface tension by Capillary/Jager's method.
2. To determine the wave length of light by Newton's rings method.
3. To determine the wave length of light by Fresnel's Biprism.
4. To determine the focal length of combination of two thin lenses by nodal slide assembly and its verification.
5. To determine specific resistance of a wire by Carry Foster's Bridge.
6. To determine the Hall coefficient of semiconductor.
7. To determine e/m by Thomson's method.
8. Study of Photo – Cell and determination of Planck's constant.
9. Determination of wavelength of a spectral line using diffraction grating.
10. Determination of divergence of LASER beam.
11. Determination of grating element of a diffraction grating using LASER beam.
12. To determine the coefficients of viscosity of a liquid by capillary flow/Stoke's method.
13. To determine the frequency of A.C. mains using sonometer.
14. To determine the moment of inertia of flywheel.
15 To determine the forbidden energy gap of semiconductor diode.
16. To determine the mechanical equivalent of heat (J) by Calender & Barne's method.
17. To determine the numerical aperture (NA) of the given fiber cables.
18. To study the characteristics of LDR.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:26:11 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

**Semester - B.E - 1st/2nd Semester**
**Branch: Common to all Branches**
**Subject - Mechanical Engineering (Lab)**
**Subject Code: 300229 (37)**
**Total Practical Period: 28**
**Total Marks in End Semester Exam: 40**

## LIST OF EXPERIMENTS

1. To verify law of triangle of forces.
2. To verify the Lami's theorem.
3. To verify the law of polygon of forces.
4. To verify the law of lever.
5. To determine the support reactions of a simply supported beam subjected to point loads.
6. To draw the variation of bending moment at a given section in a simply supported beam under a moving point load.
7. To find the coefficient of friction between surfaces of wooden plane and following blocks:
   i) Aluminum ii) Tin iii) Glass iv) Asbestos v) Teak ply vi) Sand paper
   vii) card board .
8. To determine the coefficient of friction between
   (i) Belt and pulley
   (ii) Rope and pulley.
9. To study simple jib crane and to determine the internal forces in members of jib crane.
10. To determine the stiffness of helical compression spring.
11. To study lifting machine.
12. To study the lifting machine "second order pulley system" and to draw the following characteristic diagram:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

    Also to determine the law of machine and the maximum efficiency of machine.
13. To study the lifting machine "Wheel and Differential axle" and to draw the

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:26:25 -08'00'

following characteristic diagram:

i. Load-effort diagram
ii. Load- ideal effort diagram
iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

14. To study the lifting machine "Worm and worm wheel" and to draw the following characteristic diagram:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

15. To study the lifting machine "Simple screw jack" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

16. To study the lifting machine "Modified screw jack" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

17. To study the lifting machine "Geared Jib crane" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

18. To study the lifting machine "Single Purchase Winch crab" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii. Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

19. To study the lifting machine "Double Purchase Winch crab" and to draw the following characteristic diagrams of the machine:
    i. Load-effort diagram
    ii. Load- ideal effort diagram
    iii Load-efficiency diagram

Also to determine the law of machine and the maximum efficiency of machine.

**Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED**

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:26:39 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G.)*

Semester: **1st & 2nd**
Subject: **Communication Skills (Lab)**
Total Practical Periods: 36

Branch: Common to All Branches
Code: 300221 (46)

**Communication Skills (Practical)**

List of exercises to be performed as practical work in language lab to train the students to be proficient in communication.

- Formal (Extempore and mock interviews) and Informal Speaking(Situational dialogues and Rate play)
- Elementary Phonetics (Pronunciation of words; Intonation and Word Accent)
- Paralinguistic features of speaking (voice modulation, pitch, tone, etc.)
- Paper Presentation (Non-Technical & current Affairs)
- Use of Audio-Visual aids: Preparation of transparencies, slides, power point presentation etc.
- Body Language (Gestures / Postures during Role Play/Speaking and JAM (Just-a-Minute) Session.
- Exercises on Listening Comprehension.
- Exercises on Reading Comprehension.
- Effective Writing (Business Letters, Covering Letter, Resume on Word Document.
- Telephoning (Telephonic Conversations)
- Internet exploration. (learn to browse, download and save information)

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:26:53 -08'00'

# ChhattisgarhSwamiVivekanand Technical University, Bhilai

## SCHEME OF TEACHING & EXAMINATION

## BE (Computer Science & Engineering) III Semester

| Sl.No. | Board of Study | Subject Code | Subject Name | Periods per week | | | Scheme of Exam | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Appl. Mathematics | 322351(14) | Mathematics-III | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2 | Electronics & Telecom. | 322352(28) | Basic Electronics | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Comp. Science &Engg. | 322353(22) | Computational Science | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Comp. Science &Engg. | 322354(22) | Problem Solving & Logic Building using C | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | Comp. Science &Engg. | 322355(22) | Computer Concepts & Web Technology | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | Electronics & Telecom. | 322356(28) | Digital Electronics & Logic Design | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 7 | Electronics & Telecom. | 322361(28) | Basic Electronics Lab | - | - | 3 | 40 | | 20 | 60 | 2 |
| 8 | Comp. Science &Engg. | 322362(22) | Problem Solving & Logic Building using C Lab | - | - | 3 | 40 | | 20 | 60 | 2 |
| 9 | Electronics & Telecom. | 322363(28) | Digital Electronic and Logic Design Lab | - | - | 3 | 40 | | 20 | 60 | 2 |
| 10 | Comp. Science &Engg. | 322364(22) | Web Technology Lab(HTML / DHTML/CSS/XML) | - | - | 3 | 40 | | 20 | 60 | 2 |
| 11 | Humanities | 322365(46) | Value Education | - | - | 2 | | | 40 | 40 | 1 |
| 12 | | | Library | - | - | 1 | | | | | |
| | | | **TOTAL** | **19** | **6** | **15** | **640** | **120** | **240** | **1000** | **34** |
| | | | | | | | | | | | |

***L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment***
***Note: Duration of all theory papers will be of Three Hours.***

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:27:07 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Mathematics – III** | Code: | **322351(14)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To make the students understand the Fourier series analysis is a powerful method where the formulas are integrals and to have knowledge of expanding periodic functions that explore variety of applications of Fourier series.
2. To provide knowledge of Laplace transform of elementary functions including its properties and applications to solve ordinary differential equations.
3. To provide a sound background of complex analysis to perform a thorough investigation of major theorems of complex analysis and to apply these ideas to a wide range of problems that includes the evaluation of both complex line integrals and real integrals.
4. To have a thorough knowledge of PDE which arise in mathematical descriptions of situations in engineering.
5. To study about a quantity that may take any of a given range of values that can't be predicted as it is but can be described in terms of their probability.

**UNIT- I** **Fourier series:** Expansion of function as Fourier series, Change of interval, Even and odd functions, Half-range Fourier series, Practical harmonic analysis.

**UNIT-II** **Laplace Transformation:** Laplace transform of elementary functions, Properties of Laplace transform, Laplace transform of derivatives and integrals, multiplication by $t^n$ and division by t, Laplace transform of periodic functions. Inverse Laplace transform, Convolution theorem, Application of Laplace transform to solutions of ordinary differential equations.

**UNIT- III** **Theory of Complex Variables:** Limit, Derivative and Analytic functions; Cauchy-Riemann equations and its applications to flow problems; Complex Integration: Line and Contour integral, Cauchy integral theorem and Integral formula; Taylor series, Laurent series; singularities; Poles and their orders and residues; Evaluation of real definite integrals.

**UNIT-IV** **Partial Differential Equation:** Formation of partial differential equations, Equations solvable by direct integration, Lagrange's linear equations, Homogeneous linear differential equations with constant coefficients, Non-homogeneous linear equations, Solution of partial differential equations by the method of separation of variables.

**UNIT-V** **Random variable:** Discrete and continuous probability distributions, Mathematical expectation, Mean and Variance, Moments, Moment generating function, probability distribution, Binomial, Poisson and Normal distributions.

**Text Books:**

1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons.

**Reference Books:**

1. Advanced Engg.Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N.Wartikar& J.N. Wartikar. Vol- II– Pune VidyarthiGriha Prakashan, Pune.
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

**COURSE OUTCOME**:
After completion of this course the students will be able to apply Fourier series, Laplace transformation, Theory of complex variable, Partial differential equations and Random variable to Computer Science problems and solve them. Hands on these Mathematical topics will make them equipped to prepare for higher studies through competitive examinations.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:27:21 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Basic Electronics** | Code: | **322352(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To learn basic concepts of semiconductors
2. To understand working principle of Diode, Transistor and FET
3. To gain knowledge of applications of Diode and Transistor
4. To learn concepts of transport phenomenon and amplifications through numerical

**UNIT- I** Introduction, Transport Phenomena in semiconductor, Formation of P-N Junction, Properties of P-N Junction, P-N Junction Diodes; Semiconductor Diodes, V-I Characteristics, Effect of Temperature on V-I Characteristics, Ideal Diode, Diode equation, Diode Resistance, Diode Capacitance: Transition and Diffusion Capacitance.

**UNIT-II** Rectifying circuits and DC Power Supplies: Load line analysis of diode circuit, Half wave rectifier: Voltage regulation, Ripple factor, Ratio of rectification, Transformer Utilization factor. Full wave rectifier, Bridge rectifier, Filter circuits for power supply: Inductor filter, Capacitor filter, LC filter, Multiple LC filter, CLC or filter. Zener diode: Break down mechanism, Characteristics, Specifications, Voltage regulator circuit using zener diode.

**UNIT- III** Transistor: Introduction, Construction, Types: npn and pnp, Current components. Transistor as an amplifier, Transistor Characteristics, Transistor Circuit Configuration: Common Base (CB) Configuration, Common Emitter (CE) Configuration, Common Collector Configuration (CC), Early Effect, Ebers-Moll Model, Maximum Voltage Ratings.

**UNIT-IV** Transistor Biasing and Thermal stabilization: The operating point, Bias stability, Stability factor, Emitter bias, Collector – to – base bias, Voltage divider bias with emitter bias, Emitter bypass capacitor, Bias compensation.

**UNIT-V** Field Effect Transistor (FET): Introduction, Construction, Operation, V-I Characteristics, Transfer Characteristics, Drain Characteristics, Small-Signal Model.
Metal Oxide Semiconductor Field Effect Transistor (MOSFET): Introduction, Construction, Operation and characteristics, Depletion MOSFET, Enhancement MOSFET.

**TEXT BOOKS:**

1. Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman&Halkias, TMH.
2. Electronic Devices & Circuits – Allen Mottershead, PHI.

**REFERENCE BOOKS:**

1. Electronic Devices and Circuit Theory – Boylestad&Nashelsky, 8th Ed. PHI.
2. Electronic Devices & Circuit Analysis – K. Lal Kishore, BS Publications

**COURSE OUTCOME:**

After completion of this course the students will be able to -

1. Gain the knowledge of basics of semiconductor devices and their applications
2. Apply concepts of Junction theory in designing and solving basic circuits
3. Develop basic knowledge of PN junction diode, BJT and FET
4. Implement transistor based circuits that are used in IC technology

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:27:38 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Computational Science** | Code: | **322353(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To understand fundamental design concepts, flowchart
2. To get idea of programming language processors & data types
3. To study basics of functional programming languages
4. To familiarize with neuron and neural networks
5. To study basics fuzzy logic & genetic algorithms

**UNIT- I** **Program Design:** Introduction- fundamental design concepts - Modules and modularization criteria - Design notation: Procedure template, Pseudo code - Structured flow chart decision. Tables - Design techniques: Stepwise refinement, Levels of abstraction, Top down- Test plans-Design guidelines. Characteristics of programming languages, Factors influencing the evolution of programming language, Development in programming methodologies, desirable features and design issues.

**UNIT-II** **Programming language processors**: Structure and operations of translators, software simulated computer, syntax, semantics, structure, virtual computers, binding and binding time. **Data types:** Properties of types and objects – elementary data types – structured data types. **Abstraction:** Abstract data types – encapsulation by subprograms – type definition – storage Management.

**UNIT- III** **Functional programming languages:** Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional programming languages and comparison of functional and imperative languages.

**UNIT-IV** **Neural Networks (Introduction & Architecture):** Neuron, Nerve structure and synapse, Artificial neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory.

**UNIT-V** **Fuzzy Logic (Introduction):** Basic concepts of fuzzy logic, fuzzy sets and crisp sets, fuzzy set theory and operations, Properties of fuzzy sets, fuzzy and crisp relations, fuzzy to crisp conversion. **Genetic Algorithm (Introduction):** Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations (encoding), Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

**Text Books:**

1. " Software Engineering Concepts" by Richard Fairley, Tata Macgraw Hill,
2. "Programming Languages, Design and implementation" by Terrance W. Pratt, and Marvin V. Zelkowitz, Prentice-Hall of India, Fourth edition, 2002

**Reference Books:**

1. "Programming Languages – Concepts and Constructs" by Ravi Sethi, Addison-Wesley, 2nd Ed. 1996.
2. "Programming Languages: Principles and Paradigms" by Allen B. Tucker, Robert Noonan, TMH, 2006.
3. "Fundamentals of Programming Languages" by E. Horowitz, Galgotia Publishers, 1984.
4. "Programming Languages" by A.B. Tucker, Robert, Noonan, McGraw-Hill, 2002.
5. "Concepts of Programming Languages" by Robert W. Sebesta, Addison Wesley, Sixth edition, 2003.
6. "Computer Concepts and C Programming " byVikas Gupta, Wiley India.

**Course Outcomes:**

1. Demonstrate a broad understanding of the role of computer science and computational methods
2. Demonstrate understanding of the theoretical basis of computer science
3. Demonstrate knowledge of computational problem solving strategies
4. Design and implement substantial pieces of software
5. Demonstrate understanding of the importance of theoretical scientific underpinnings for practical work and methodology

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:27:56 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Problem Solving & Logic Building using C** | Code: | **322354(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To differentiate and understand low-level and high-level programming languages
2. To understand modular programming concepts
3. To understand the use of rich set of data types in C appropriate to specific programming problems.
4. Demonstrate the use of various operators
5. Demonstrate the use of the various control flow constructs.
6. Use arrays & pointers to efficiently to design C program to solve problems.
7. Demonstrate creation and use of own data types.

**UNIT- I** Introduction: Computer systems, Hardware & software concepts.
Problem Solving: Algorithm / pseudo code, flowchart, program development steps, Computer Languages: machine, symbolic, and high -level languages, Creating and running programs: Writing, editing, compiling, linking, and executing.
Basics of C: Structure of a C program, identifiers, basic data types and sizes. Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation, Sample programs.

**UNIT-II** Bit-wise Operators: logical, shift, rotation, masks.
Selection – Making Decisions: Two - way selection: if - else, null else, nested-if, examples, Multi- way selection: switch, else-if, examples.
Strings: concepts, C strings.
Iterative: Loops -while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, looping applications: Summation, powers, smallest and largest.

**UNIT- III** Arrays: Arrays-concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, multidimensional arrays, array applications: Matrix Operations, checking the symmetricity of a Matrix.
Functions -Modular programming: Function basics, parameter passing, storage classes (extern, auto, register, static), scope rules, block structure, user defined functions, standard library functions, recursive functions. Recursive solutions for Fibonacci series and Towers of Hanoi. Header files, C pre-processor. Examples C programs on Passing 1-D arrays and 2-D arrays to functions.

**UNIT-IV** Pointers: Pointers concepts, initialization of pointer variables, pointers and function arguments, passing by address – dangling memory, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory management functions, command line arguments.

**UNIT-V** Enumerated, Structure and Union: Derived types – structures, structure declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications.
File Handling: Input and output – concept of a file, text files and binary files, Formatted I/O, file I/O operations, example programs.

**Text Books:**

1. "The C –Programming Language" by B.W. Kernighan, Dennis M. Ritchie, PHI "
2. "Programming in C" by E. Balagurusamy (TMH)

**Reference Books:**

1. "C Programming: A Problem - Solving Approach" by Forouzan, E. V. Prasad, Giliberg, Cengage, 2010.
2. "Programming in C" by Stephen G. Kochan, 3/e Pearson, 2000
3. "C Programming Laboratory Handbook For Beginners" by Sidnal, Wiley India.

**Course Outcomes**:
After completion of the course study, students will be able to-

1. Use and differentiate between basic concepts of computer hardware and software.
2. Use data representation for the fundamental data types in C and perform conversions between binary-hexadecimal-decimal date representations.
3. Read, understand and trace the execution of programs written in C language
4. Analyze problems and design algorithms in pseudo code.
5. Write C program for a given algorithm using modular approach

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:28:10 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Computer Concepts & Web Technology** | Code: | **322355(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To understand the basics of a Computer.
2. To learn basics of network and internet.
3. Write a valid standards-conformant -including hyperlinks, images, lists, tables, and forms
4. Use CSS to implement a variety of presentation effects in HTML and XML documents.
5. Demonstrate techniques for improving the accessibility of an HTML document

**UNIT- I** Computer Basics:ASICS,Computer Generations and Classification, Algorithms, Characteristics of computers, Input/output Units, Description of a processor, Computer Languages (Machine, Assembly, High Level), Introduction of operating system, Functions of operating system, Single User and Multi-user operating systems, Introduction to systems software. Different storage media-CDROM, DVD, BD(Blue Ray Disk ), HDD.

**UNIT-II** Network:Introduction of computer networks - LAN, MAN, WAN, Internet & Intranet, Asynchronous, Synchronous and Isochronous, Transmission Mode
Internet: Internet, Connecting to Internet: Telephone, Cable, Satellite connection, Choosing an ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing. Protocols governing the web, web development strategies, Web applications.

**UNIT- III** WWW: Understanding the WWW and the Internet, Emergence of Web, Web Servers, Web Browsers, Protocols, Building Web Sites
HTML:Planning for designing Web pages, Model and structure for a Website, Developing Websites, Basic HTML using images links, Lists, Tables and Forms, Frames for designing a good interactive website CSS; XML: Document Type Definition (DTD), Namespaces, XML schemes, presenting and using XML, Entities, XSL, XLINK, XPATH, XPOINTER, XML Parser, Applications, Integrating XML with other applications.

**UNIT-IV** JAVA SCRIPT:Programming Fundamentals, Statements, Expressions, Operators, Popup Boxes, Control Statements, Try…. Catch Statement, Throw Statement, and Objects of JavaScript: Date object, array object, Boolean object, math object
CSS:External Style Sheets, Internal Style Sheets, Inline Style, The class selector, div & span tag, introduction to AJAX.

**UNIT-V** DOM: HTML DOM, inner HTML, Dynamic HTML (DHTML), DHTML form, XML DOM.
CGI/PERL: Introduction to CGI, Testing &debugging Perl CGI script, Using scalar variables and operators in Perl.
Java Applet:Introduction to Java, Writing Java applets, Life cycle of applet.

**Text Books:**

1. Fundamentals of Computer, V. Rajaraman, Prentice-Hall of India
2. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar& others, Cengage Learning

**Reference Books:**

1. Web Technology and Design by Xavier, C, New Age International
2. HTML, DHTML, Java Script, Perl & CGI by Ivan Bayross, BPB Publication.
3. Internet and Web Design by Ramesh Bangia, New Age International
4. Web Technology: A developer perspective, Gopalan&Akilandeswari, PHI

**Course Outcomes**:
After completion of the course students will be able

1. To design web sites utilizing multiple tools and techniques
2. To demonstrate the ability to create dynamic pages that are easy to navigate and easy to update
3. To utilize entry - level system analysis and design principles to solve business problems.
4. To demonstrate the ability to apply testing, debugging, and troubleshooting skills
5. To exhibit the ability to design and implement an internet database.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:28:26 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science &Engineering** | Semester: | **III** |
| Subject: | **Digital Electronics & Logic Design** | Code: | **322356(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To study various number systems, knowledge of these number systems is essential in core computer science subjects.
2. To explore brief idea about the different digital circuits which are used to develop the digital devices.
3. Understand the concepts of Memories, Programmable Logic Devices & Digital ICs.
4. To motivate the students to develop their logic to design new digital circuits usable for hardware design.
5. To motivate our students to use these digital circuits in integrated circuit design using VLSI.

**UNIT- I** **Overview of Boolean algebra and Logic gates:** Codes: Binary codes: Weighted & Non-weighted codes, Sequential codes, self complementing codes, Cyclic codes, 8-4-2-1 BCD code, Excess-3 code, Gray code: Binary to Gray and Gray to binary code conversion, Error detecting code, Error correcting code, 7-bit Hamming code, ASCII code, EBCDIC code. Binary Arithmetic, Boolean Algebra, Minimization of Switching Function , Demorgan's Theorem, Karnaugh's Map Method, Quine-McCluskey's Method (Tabular Method). Basic and Universal logic Gates, Realization of switching functions using gates.

**UNIT-II** **Digital Logic Families:** Transistor Inverter: Basic Concepts of RTL and DTL; TTL: Open collector gates, TTL subfamilies, IIL, ECL; MOS Logic: CMOS Logic, Dynamic MOS Logic, Interfacing: TTL to ECL, ECL to TTL, TTL to CMOS, CMOS to TTL, and Comparison among various logic families.

**UNIT- III** **Combinational Circuits:** Adder &Subtractor: Half adder, Full adder, Half-subtractor, Full- subtractor, Parallel Binary adder, Look Ahead carry adder, Serial adder, BCD adder. Code converter, Parity bit generator/Checker, Comparator. Decoder: 3-line to 8-line decoder, 8-4-2-1 BCD to Decimal decoder, BCD to Seven segment decoder. Encoder: Octal to binary and Decimal to BCD encoder. Multiplexer: 2- input multiplexer, 4-input multiplexer. De-multiplexer: 1-line to 4-line, study of Multiplexer as Universal Logic Function Generator.

**UNIT-IV** **Sequential Circuits:** Flip-Flops and their conversion, Excitation Tables. Introduction to registers and counters:Synchronous and Asynchronous counters and Designing of sequential circuits: code converter and counters. Mode-k and divide by K counters, Counter applications.

**UNIT-V** **Memories and Machines:** Finite State Machine, Meelay Machine, Moore Machine, Introduction to various semiconductor memories and designing of ROM and PLA & PAL.

**Text Books:**

1. R. P. Jain: "Modern Digital electronics", TMH
2. B. Somanathan Nair, "Digital Electronics & Logic Design", Prentice-Hall of India

**Reference Books:**

1. R J Tocci, "Digital System principles and Applications"
2. "Digital Electronics " byA.K.Maini, Wiley India.
3. M.M. Mano:" Digital design", PHI.
4. MillmanTaub, "Pulse, Digital and Switching Waveforms "TMH
5. M.M. Mano: "Digital logic and computer design", PHI.
6. Floyd: "Digital fundamentals", UBS.

**Course Outcomes:**

After completion of this course, students will be able to -

1. Acknowledge about the fundamentals of digital circuit design.
2. Understand the operation of Latch circuits & Flip flops.
3. Take interest to designing & develop ICs in VLSI industries.
4. Learn operation of different Semiconductor Memories.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:28:43 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Basic Electronics Laboratory** | Code: | **322361(28)** |
| Total Lab Periods: | **48** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. To draw the characteristics of a semi conductor diode and to find cut-in voltage, reverse resistance, static resistance and dynamic resistance.
2. To draw the characteristics of a zener diode
3. To design a half wave rectifier and to determine its efficiency and ripple factor.
4. To design a- full wave rectifier and determine the ripple factor and efficiency with filter.
5. To design a- full wave rectifier and determine the ripple factor and efficiency without filter.
6. To draw the characteristics of FET using BFW – 10
7. To draw the characteristics of CE configuration of a transistor amplifier.
8. To draw the characteristics of CB configuration of a transistor amplifier.
9. To draw the characteristics of CC configuration of a transistor amplifier.
10. To design a Zener regulator circuit and to find the regulation characteristics.
11. To draw the load line of a transistor amplifier under CE configuration.
12. To design and verify the self bias circuit operation.
13. To design and verify the voltage divider biasing circuit.
14. To verify the effect of emitter bypass capacitor.

**List of Equipments/Machine Required:**
Circuit components, Breadboard, Hook-up wire, Power supply, CRO, Function generator

**Recommended Books:**
1. Laboratory Manual for Electronic Devices and Circuits, 4th Ed., David A. Bell, PHI

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:29:28 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Problem solving & Logic building using C Laboratory** | Code: | **322362(22)** |
| Total Lab Periods: | **48** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. Write a C program to take the radius of a sphere as input and print the volume and surface area of that sphere.
2. Write a C program to take a 5-digit number as input and calculate the sum of its digits.
3. Write a C program to take three sides of a triangle as input and verify whether the triangle is an isosceles, scalene or an equilateral triangle.
4. Write a C program that will take 3 positive integers as input and verify whether they form a Pythagorean triplet or not.
5. Write a C program to print all prime numbers between a given range of numbers.
6. Write a C program to define a function that will take an integer as argument and return the sum of digits of that integer
7. Write a C program to define a macro that can calculate the greater of two of its arguments. Use this macro to calculate the greatest of 4 integers.
8. Write a C program to define a recursive function that will print the reverse of its integer argument.
9. Write a C program to print the sum of first N even numbers using recursive function.
10. Write a C program to sort an array using Bubble sort technique.
11. Write a C program that will take the elements of two integer arrays of 5 element each, and insert the common elements of both the array into a third array (Set intersection)
12. Write a C program to take 5 names as input and print the longest name.
13. Write a C program to define a structure *Student* that will contain the *roll number*, *name* and *total marks* of a student The program will ask the user to input the details of 5 students and print the details of all the students whose total marks is greater than a given value.
14. Write a C program to define a union *Contact* that will contain the members *Mobile no* and *E-mail id*. Now define a structure *Employee* that will contain *name*, *UID*,*PhNo*, *emailId* and a variable of type Contact as members. The program will ask the user to give the details of five Employees including contact details. Print the details of all the Employees.
15. Write a C program that will ask the user to input a file name and copy the contents of that file into another file.
16. Write a C program that will take any number of integers from the command line as argument and print the sum of all those integers.
17. Write a C program to process sequential file for payroll data.
18. Write a C program to process random file of library data.

**REQUIRED SOFTWARE/ SOFTWARE TOOL:**

- Linux Operating System and/ or Windows Operating System
- Turbo C/C++ IDE.

**Recommended Book:**

1) C Programming Laboratory by Dr. Nandini S. Sidnal, Wiley India, 2012

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:29:45 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Digital Electronics and Logic Design Laboratory** | Code: | **322363(28)** |
| Total Lab Periods: | **48** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. To study the characteristics and operations of TTL Inverters, OR, AND, NOR and NAND gate using ICs.
2. To study NAND and NOR gates as a universal logic.
3. To study and prove Demorgan'sTheorem .
4. To design Half and Full adder circuits using logic gates.
5. To design Half and full subtractor circuits using logic gates.
6. To study the binary parallel adder.
7. To design 4 bit magnitude comparator circuits.
8. To study the 7 segment decoder .
9. To design 4:16 decoder using two 3:8 decoder and four 2:4 decoder
10. To design 16: 1 Multiplexer using 4:1 Multiplexer.
11. To study various types of flip flops using logic gates and ICs.
12. To design Mode-N and divide by K counter.
13. To construct a 4 bit binary to gray converter and vice versa using IC 7486 .
14. To study Up-Down counter.
15. To study programmable shift registers.

**List of Equipments /Machine Required:**

- Logic gate trainer
- Digital ICs Trainer
- Various ICs 7400,7402,7404,7408,7432,7486,74138,74151,74155 etc.

**Recommended Books:**

M.M. Mano : "Digital Logic and Computer Design"

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:30:00 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Web Technology Laboratory** | Code: | **322364(22)** |
| Total Lab Periods: | **48** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. To Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the  tag.
2. To Develop and demonstrate a XHTML file that includes JavaScript script for the following problems:
   a) Input: A number n obtained using prompt, Output: The first n Fibonacci numbers
   b) Input: A number n obtained using prompt, Output: A table of numbers from 1 to n and their squares using alert
3. To Develop and demonstrate a XHTML file that includes Javascript script that uses functions for the following problems:
   a) Parameter: A string, Output: The position in the string of the left-most vowel
   b) Parameter: A number, Output: The number with its digits in the reverse order
4. To Develop and demonstrate, using Javascript script, a XHTML document that collects the RollNo ( the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-case characters followed by three digits; no embedded spaces allowed- e.g. 1AB23CD356, 1GC13CS345) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected.
5. To Modify the above program to get the current semester also (restricted to be a number from 1 to 8)
6. To Develop and demonstrate, using JavaScript script, a XHTML document that contains three short paragraphs of text, stacked on top of each other, with only enough of each showing so that the mouse cursor can be placed over some part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible.
7. To Modify the above document so that when a paragraph is moved from the top stacking position, it returns to its original position rather than to the bottom
8. To Design an XML document to store information about a student in an engineering college affiliated to CSVTU. The information must include RollNo, Name, Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 5 students. Create a CSS style sheet and use it to display the document.
9. To Create an XSLT style sheet for one student element of the above document and use it to create a display of that element.
10. To Write a Perl program to display various Server Information like Server Name, Server Software, Server protocol, CGI Revision etc.
11. To Write a Perl program to accept UNIX command from a HTML form and to display the output of the command executed.
12. To Write a Perl program to accept the User Name and display a greeting message randomly chosen from a list of 4 greeting messages.
13. To Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
14. To Write a Perl program to display a digital clock which displays the current time of the server.
15. To Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.
16. To Write a PHP program to store current date-time in a COOKIE and display the "Last visited on" date-time on the web page upon reopening of the same page.
17. To Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.
18. To Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name.
19. To Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.

**List of equipments/Machine/Software required:**
Dual Core/Core I3 PC, Ubuntu/Fedora/Debian or any Open Source operating System, Mozilla Firefox/Netscape Navigator Web Browser.

**Recommended Books**:

1. HTML Complete Reference- Tata McGraw hill
2. HTML and XML: An Introduction NIIT, Prentice-Hall of India
3. Building Enhanced HTML Help with DHTML and CSS by Jeannine M.E.Klien. Pearson Education
4. HTML for the World Wide Web, Fifth Edition, with XHTML and CSS
5. Visual QuickStart Guide 5th Edition Elizabeth Castro, Pearson EducationSams Teach Yourself HTML &XHTML in 24 Hours 6th Edition Dick Oliver, Michael Morrison, Pearson Education

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:30:17 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **III** |
| Subject: | **Value Education** | Code: | **322365(46)** |
| No. Of Periods: | **2 Periods/Week** | Total Tutorial Periods: | **NIL** |
| **Maximum Marks:** | **40** | **Minimum Marks:** | **24** |

**Course Objectives:**

1. This course is designed to provide the importance of education with why, what & how.
2. To impart students with an understanding of fundamental humanitarian viewpoint and its outcomes.
3. To provide the knowledge about whole existence and its impact on values.
4. To bring the awareness about life long exercise so that they can fulfill their responsibility towards themselves, the family, the society, the planet.

**UNIT- I** **Aim of Education and Necessity for Value Education:** Education in values/wisdom/etc and education in traits/technologies/etc as the two fundamental strands of education; Answer to the frequently asked questions such as "Why to do studies", "What studies to do in overall", "How to do studies in a proper way", "How to think systematically and talk systematically"

**UNIT-II** **Humanitarian Viewpoint and Basic Human Objective:** Meaning and concept of happiness, Need for a fundamental viewpoint to judge things in all cases of human concerns, Proposal of the natural path of humanitarian coexistentialism; Consciousness development and its expression; Fundamental want of sustainable happiness in human being; Understanding the distinct activities and needs of self (I) and body in human being; Fundamental goal of human being; Sustainable-solution in individual (At the place of delusion); Sustainable-prosperity in family (At the place of poverty); Sustainable-cooperation in society (At the place of competition); Sustainable-coexistence in planet (At the place of struggle)

**UNIT- III** **Elements of Holistic and Systematic Perspective:** Need for study of fundamental information categories to develop holistic perspective; Particular-time actions and general-time laws; Need for fundamental information sequence to develop systematic perspective, Some examples for systematic study sequence

**UNIT-IV** **Elements of Society-friendly and Environment-friendly Goals:** Elements of Knowledge of whole existence; Elements of Knowledge of human being; Elements of fundamental Values and Wisdom; Value spectrum with reference to general relationships and particular relationships of the objects in nature; Elements of History and Contemporarity used to set current goals; Elements of Sciences and Techniques to formulate methods to achieve goals; Elements of Motoricity and Mattericity to make actions to execute the methods

**UNIT-V** **Lifelong Exercise for All-round Sustainability:** Collecting information for sustainability issues; Motivating people towards sustainable life-style; Ability to identify and develop appropriate technologies and management patterns for society-friendly and environment-friendly systems for production /protection/ utilization/ experimentation ; Ability to establish and execute the fundamental five-fold system in order to ensure sustainable peace-and-prosperity worldwide.

**Text Books:**

Value Education for Consciousness Development by Dr P B Deshmukh, Radha K Iyer, and Deepak K Kaushik (2nd Edition, 2012, ISBN: 978-81-924034-0-3)

**Reference Books:**

1. International Research Handbook on Values Education and Student Wellbeing by Terence Lovat, Ron Toomey, Neville Clement (Eds.), Springer 2010, ISBN: 978-90481-86747
2. Values Education and Lifelong Learning: Principles, Policies, Programmes by David N Aspin and Judith D Chapman (Eds.); Springer 2007, ISBN: 978-1-4020-6183-7
3. Fundamentals of Ethics for Scientists and Engineers by E G Seebaur and Robert L Berry, 2000, Oxford University Press

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:30:32 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

## Scheme of Teaching & Examination

## BE (Computer Science & Engineering) IV Semester

| Sr No. | Board of Study | Subject Code | Subject Name | Periods per week | | | Scheme of Exam | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory/Practical | | | | |
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Appl. Mathematics | 322451(14) | Computational Mathematics | 4 | 1 | | 80 | 20 | 20 | 120 | 5 |
| 2 | Appl. Mathematics | 322452(14) | Discrete Structures | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 3 | Comp. Science &Engg. | 322453(22) | Data Structures | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 4 | Comp. Science &Engg. | 322454(22) | Computer Systems Architecture | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 5 | Comp. Science &Engg. | 322455(22) | Object Oriented Concepts & Programming using C++ | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 6 | Comp. Science &Engg. | 322456(22) | Operating System | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 7 | Comp. Science &Engg. | 322461(22) | Data Structures Lab | | | 3 | 40 | | 20 | 60 | 2 |
| 8 | Comp. Science &Engg. | 322462(22) | Computer Hardware Maintenance Lab | | | 3 | 40 | | 20 | 60 | 2 |
| 9 | Comp. Science &Engg. | 322463(22) | Object Oriented Concepts Programming using C++ Lab | | | 3 | 40 | | 20 | 60 | 2 |
| 10 | Comp. Science &Engg. | 322464(22) | GUI programming (VB/Gambus/ Other tools) | | | 3 | 40 | | 20 | 60 | 2 |
| 11 | Humanities | 322465(46) | Health , Hygiene and Yoga | | | 2 | | | 40 | 40 | 1 |
| 12 | | | Library | | | 1 | | | | | |
| | | | TOTAL | 19 | 6 | 15 | 640 | 120 | 240 | 1000 | 34 |

*L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment*

*Note (1): Duration of all theory papers will be of Three Hours.*

*Note (2): Industrial Training of six weeks is mandatory for B.E. students. It is to be completed in two parts. The first part will be in summer after IV sem. after which students have to submit a training report which will be evaluated by the college teachers during B.E. V SEM.*

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:31:00 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Computational Mathematics** | Code: | **322451(14)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To provide knowledge of various methods for numerical solutions of algebraic and transcendental equations, simultaneous equation and ordinary differential equations.
2. To provide a thorough understanding of interpolation and numerical differentiation and integration.

**UNIT- I** **NUMERICAL SOLUTIONS OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:** Bisection Method, Regula-Falsi Method, Newton-Raphson Method, Secant Method, Birge-Vieta Method, Bairstow's Method.

**UNIT-II** **NUMERICAL SOLUTIONS OF SIMULTANEOUS LINEAR EQUATIONS:** Direct Methods - Gauss Elimination, Gauss-Jordan &Crout'sTriangularisation Method. Iterative Methods - Jacobi's, Gauss- Siedal& Successive over Relaxation Method.

**UNIT- III** **INTERPOLATION WITH EQUAL AND UNEQUAL INTERVALS:** Finite differences, Newton's Forward & Backward Difference Formulae, Central Difference Formula, Stirling's Formula, Bessel's Formula, Lagrange's Formula and Newton's Divided Difference Formula,

**UNIT-IV** **NUMERICAL DIFFERENTIATION AND INTEGRATION:** Derivatives using Forward, Backward and Central Difference Formulae. Newton-Cote's Quadrature Formula, Trapezoidal rule, Simpson's rules, Weddle's rule.

**UNIT-V** **NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS:** Picard's Method, Taylor's Series Method, Euler's Method, Euler's Modified Method, Runge-Kutta Methods, Predictor-corrector Methods- Milne's Method, Adams-Bashforth Method.

**Text Books:**

1. Numerical Methods in Engineering and Science by Dr. B.S. Grewal, Khanna Publishers.
2. Numerical Methods for Scientific and Engineering Computation by M .K. Jain, S. R. K.

**Reference Books:**

1. Numerical Methods for Scientists and Engineers by K. Shankar Rao, Prentice Hall of India.
2. Numerical Methods with C++ Programming, by Somasundaram&Chandrasekaran, Prentice Hall of India.
3. Numerical Methods, by S. S. Shastry, Prentice Hall Inc. India 1998.
4. Iyengar& R. K. Jain, Wiley Eastern Limited.

**Course Outcome:**
After completion of this course students will be able to find Numerical solution of various equations, which may be arising due to mathematical modelling based on engineering problems.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:31:17 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Discrete Structures** | Code: | **322452(14)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To introduce a number of discrete mathematical structures found to be serving as tools in the development of theoretical computer science.
2. Course focuses on how discrete structures actually helped computer engineers to solve problems occurred in the development of programming languages.
3. Course highlights the importance of discrete structures towards simulation of a problem in computer science engineering.

**UNIT- I** **MATHEMATICAL LOGIC & BOOLEAN ALGEBRA:** Basic concept of mathematical logic, Statements, Connectives, Conditional and biconditional statements, Logical equivalence, Logical implication & quantifiers, Basic concept of Boolean Algebra, Properties of Boolean Algebra, Boolean functions, Disjunctive & conjunctive normal forms of Boolean functions, Applications of Boolean Algebra in switching circuits & logic circuits.

**UNIT-II** **SET THEORY, RELATIONS, FUNCTIONS:** Basic concept of set theory, Relations, Properties of relation in a set, Equivalence relation, Composition of relations, Partial order & total order relations, Lattices &Hasse diagram, Introduction to function, Inverse, Identity, Injective, Surjective&Bijective functions, Composition of functions and some special functions.

**UNIT- III** **ALGEBRAIC STRUCTURES:** Groups, Subgroups, Cosets, Lagrange's theorem, Isomorphism, Automorphism, Homomorphism, Codes & group codes, Rings, Integral domains and Fields.

**UNIT-IV** **GRAPH THEORY:** Introduction to graph theory, Walks, Paths & Circuits, Types of graphs, Shortest path problems, Eulerian and Hamiltonian graphs, Basic concept of tree: spanning tree, minimum spanning tree, search tree, rooted binary tree, Cut sets, Network flow, Matrix representation of graphs.

**UNIT-V** **COMBINATORICS:** Permutation and combination, Pigeon-hole principle, Mathematical induction, Principle of Inclusion and Exclusion, Generating function, Recurrence relation.

**Text Books:**

1. Elements of discrete mathematics by C.L. Liu, Tata McGraw-Hill, publications.
2. Discrete Mathematical structures, by Bernard Kolman, Robert C. Busby and Sharon Cutler Ross, Pearson Education.

**Reference Books:**

1. A Text Book of Discrete Mathematics, Swapan Kumar Sarkar, S. Chand &Compeny Ltd.
2. Graph theory with applications to engineering and computer science, by NarsinghDeo, Prentice Hall of India.
3. Discrete mathematics for computer scientists and mathematicians, by J.L. Mott, A. Kandel and T.P. Baker, Prentice Hall of India.
4. Discrete Mathematical Structures with applications to computer science, by J.P. Tremblay and R. Manohar, Tata McGraw-Hill.

**Course Outcomes:**

After completion of this course students will be -

1. Able to apply mathematical logic and Boolean algebra in switching circuits & logic circuits.
2. Familiar with set theory, relation and functions.
3. Familiar with algebraic structures, graph theory and combinatorics.
4. Able to solve problems in various fields in computer science, specially networking.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:31:33 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Data Structures** | Code: | **322453(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. Understand the data organization
2. Define the term 'data structure';
3. Know the classifications of data structures, i.e., linear and non-linear understand the basic operations on linear and non- linear data structures;
4. Explain the memory representation of all types of data structures
5. Explain how to implement the all kinds of data structures.

**UNIT- I** Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big-Oh, Time-Space trade-off. Abstract Data Types (ADT) Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays, Sparse Matrices and their representations. Linked lists: Array Implementation and Dynamic Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition, Generalized Linked List.

**UNIT-II** Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Recursion, Tower of Hanoi Problem, Simulating Recursion, Principles of recursion, Tail recursion, Removal of recursion Queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.

**UNIT- III** Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Tree Traversal algorithms: Inorder, Preorder and Postorder, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm.

**UNIT-IV** Graphs: Terminology, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency List, Adjacency Multi list, Graph Traversal : Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transistive Closure and Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm, Introduction to Activity Networks

**UNIT-V** Searching : Sequential search, Binary Search, Comparison and Analysis Internal Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Radix Sort, Practical consideration for Internal Sorting. (7) Search Trees: Binary Search Trees(BST), Insertion and Deletion in BST, Complexity of Search Algorithm, AVL trees, Introduction to m-way Search Trees, B Trees & B+ Trees, Hashing: Hash Function, Collision Resolution Strategies ,Storage Management: Garbage Collection and Compaction.

**Text books:**

1. Aaron M. Tenenbaum, YedidyahLangsam and Moshe J. Augenstein "Data Structures Using C and C/C++" , PHI
2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication

**References books:**

1. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill
2. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education
3. Lipschutz, "Data Structures" Schaum's Outline Series, TMH
4. G A V Pai, "Data Structures and Algorithms", TMH

**Course Outcomes:**

1. Have a comprehensive knowledge of the data structures and algorithms on which file structures and data bases are based.
2. Understand the importance of data and be able to identify the data requirements for an application.
3. Have in depth understanding and practical experience of algorithmic design and implementation.
4. Have practical experience of developing applications that utilize databases.
5. Understand the issues involved in algorithm complexity and performance

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:32:09 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Computer Systems Architecture** | Code: | **322454(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**
The overall objective with the course is to understand basic working principles of computer hardware units and give knowledge and insights into the design of modern computers, in particular the processor design including parallel computational pipelines and memory hierarchies.

**UNIT- I** **BASIC STRUCTURE OF COMPUTERS:** Functional units, Basic operational concepts, Bus structures Addressing modes, subroutines: parameter passing, Instruction formats, expanding Opcodes method. BASIC PROCESSING UNIT: bus architecture, Execution of a Complete Instruction, sequencing of control signals, Hardwired control, Microprogrammed Control, microinstruction format, Bit slice concept.

**UNIT-II** **ARITHMETIC:** Number representations and their operations, Design of Fast Adders, Signed multiplication, Booth's Algorithm, bit-pair recoding, Integer Division, Floating point numbers and operations, guard bits and rounding.

**UNIT- III** **THE MEMORY SYSTEM:** various technologies used in memory design, higher order memory design, multi-module memories and interleaving, Associative Memory, Cache memory, Virtual Memory.

**UNIT-IV** **INPUT/OUTPUT ORGANIZATION:** I/O-mapped I/O and memory-mapped I/O, interrupts and interrupt handling mechanisms, vectored interrupts, synchronous vs. asynchronous data transfer, Direct Memory Access COMPUTER PERIPHERALS: I/O devices such as magnetic disk, magnetic tape, CDROM systems.

**UNIT-V** **RISC philosophy:** pipelining, basic concepts in pipelining, delayed branch, branch prediction, data dependency, influence of pipelining on instruction set design, multiple execution units, performance considerations, **Basic concepts in parallel processing**:& classification of parallel architectures, Vector Processing, Array Processors.

**Text Books:**

1. Computer Organization, V.C.Hamacher,Z.G.Vranesic and S.G.Zaky, McGraw Hill,5th Edition,2002.
2. Computer Architecture & Organization, 3rdEdition, J.P. Hayes, McGraw-Hill.
3. Structured Computer Organization, A.S.Tanenbaum, 4th Edition, Pearson Education India

**Reference Books:**

1. Computer System Architecture &Organisation, Dr. Usha, Wiley India
2. Computer System and Architecture,M. Mano, Pearson Education India.
3. Computer Organization & Architecture, W. Stallings, Pearson Education India

**Course Outcomes:**

1. To be able to describe the basic hardware components of a computer system.
2. To be familiar with the binary and hexadecimal number systems including computer arithmetic.
3. To be familiar with the functional units of the processor such as the register file and arithmetic-logical unit.
4. Be familiar with the basics of systems topics: parallel, pipelined, superscalar, and RISC/CISC architectures.
5. To be familiar with the representation of data, addressing modes, an instruction sets.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:32:24 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Object Oriented Concepts & Programming using C++** | Code: | **322455(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. Understand object-oriented programming features in C++,
2. Apply these features to program design and implementation,
3. Understand object-oriented concepts and how they are supported by C++,
4. Understand implementation issues related to object-oriented techniques,
5. Build good quality software using object-oriented programming technique

**UNIT- I** **Object-Oriented Programming Concepts:** Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging.

**UNIT-II** **Standard Input/Output:** Concept of streams, hierarchy of console stream classes, input/output using overloaded operators >> and << and member functions of i/o stream classes, formatting output, formatting using ios class functions and flags, formatting using manipulators. **Classes and Objects:** Specifying a class, creating class objects, accessing class members, access specifiers, static members, use of *const*keyword, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes.

**UNIT- III** **Pointers and Dynamic Memory Management:** Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using *new* and *delete* operators, pointer to an object, *this* pointer, pointer related problems - dangling/wild pointers, null pointer assignment, memory leak and allocation failures. **Constructors and Destructors:** Need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, initializer lists.

**UNIT-IV** **Operator Overloading and Type Conversion:** Overloading operators, rules for overloading operators, overloading of various operators, type conversion - basic type to class type, class type to basic type, class type to another class type. **Inheritance:** Introduction, defining derived classes, forms of inheritance, ambiguity in multiple and multipath inheritance, virtual base class, object slicing, overriding member functions, object composition and delegation, order of execution of constructors and destructors.

**UNIT-V** **Virtual functions & Polymorphism:** Concept of binding - early binding and late binding, virtual functions, pure virtual functions, abstract classes, virtual destructors. **Exception Handling:** Review of traditional error handling, basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism, rethrowing an exception, specifying exceptions. **Templates and Generic Programming:** Template concepts, Function templates, class templates, illustrative examples. **Files:** File streams, hierarchy of file stream classes, error handling during file operations, reading/writing of files, accessing records randomly, updating files.

**Text Books:**

1. Lafore R., Object Oriented Programming in C++, Waite Group.
2. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill.

**Reference Books:**

1. R. S. Salaria, Mastering Object-Oriented Programming with C++, Salaria Publishing House.
2. BjarneStroustrup, The C++ Programming Language, Addison Wesley.
3. Herbert Schildt, The Complete Reference to C++ Language, McGraw Hill-Osborne.
4. Lippman F. B, C++ Primer, Addison Wesley.
5. R. S. Salaria, Test Your Skills in Object-Oriented Programming With C++, Salaria Publishing House.

**Course Outcomes:**

1. Knowledge and Understanding- At the end of a course the student will understand the concepts of:
   a) Variables, data Types (including strings and arrays) and Expressions
   b) Flow of Control
   c) Functional and procedural abstraction and its importance in good program design
   d) Pointers and memory allocation (static and dynamic)
   e) Iteration and Recursion
2. Skills - At the end of the course, a student will be able to:
   a) Analyse a simple programming problem specification
   b) Design a high-level (programming language independent) solution to the problem using functional abstraction and general imperative programming language constructs.

Write, compile, execute and debug a C++ program which maps the high-level design onto concrete C++ programming constructs

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:32:41 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Operating System** | Code: | **322456(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**
To study and apply concepts relating to operating systems, such as concurrency and control of asynchronous processes, deadlocks, memory management, processor and disk scheduling, parallel processing, and file system organization.

**UNIT- I** **INTRODUCTION:** Operation System objective and function, The Evolution of operating Systems, Batch, interactive, time sharing and real time systems, Protection. Operating System Structure,System Components, operating system service, System structure. Distributed Computing,The Key Architecture Trend; Parallel Computation, Input-Output Trends.

**UNIT-II** **CONCURRENT PROCESSES:**Process concept: Introduction, Definitions of "Process", Process States, Process StateTransitions, The process Control Block, Operations on Processes, Suspend and Resume,Interrupt Processing. Mutual Exclusion, the Producer / Consumer problem, the critical section problem, Semaphores, Classical problems in concurrency, inter process communication.Asynchronous Concurrent Process: introduction, parallel Processing, A Control Structure for indicating parallelism. CPU scheduling: concepts, performance criteria, and scheduling Algorithms. Algorithm evaluation, Multiprocessor scheduling.

**UNIT- III** **DEAD LOCKS:** System model, Deadlock characterization. Prevention, Avoidance and Detection, Recovery from deadlock, combined approach.

**UNIT-IV** **MEMORY MANAGEMENT:** Base machine, resident Monitor, multiprogramming with fixed partition, Multiprogramming with variable partitions, Paging, Segmentation, paged - segmentation, virtual Memory concepts, Demand paging, performance, page Replacement algorithms, Allocation of frames, Thrashing, cache memory organization impact on performance.

**UNIT-V** **I/O MANAGEMENT &DISK SCHEDULING:** I/O device and the organization of the I/O function, I/O Buffering, Disk I/O, Operating system Design issues. File system: File Concepts – File organization and Access mechanism, File Directories, File sharing, Implementation issues. Case studies: UNIX system, a virtual machine OS.

**Text Books:**

1. Operating System concepts by Silberscatz A and Peterson, J.L., PE- LPE.
2. Operating System Design & Implementation by Tanenbaum, A.S., PHI.
3. Operating system concepts Galvin by Silberscatz, John Weiley& Sons
4. Operating systems by H.M.Deital, Pearson Education

**Reference Books :**

1. Operating System in Depth Design and Programming by Thomas Doeppner, Wiley India
2. Operating System Concept & Design, Milenkovic M, McGraw Hill.
3. Operation System, Stalling William, Maxwell MCMillan International Editions

**Course Outcomes:**
After completion of this course the students will be able to -
1. To learn what is operating system and how it makes computers work
2. To know how operating system manages complexity through appropriate abstraction of CPU, memory, files, semaphores etc.
3. To get knowledge about different components of operating system like Process Management, Concurrency mechanisms, Deadlock handling, Memory Management techniques, Virtual Memory, File System and Secondary Storage Management, Security & protection etc.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:32:57 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Data Structures Lab** | Code: | **322461(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. Write a program to perform following operations in one dimensional array, Insertion, Deletion and Searching (Linear & Binary).
2. Write a program to implement stack and perform push and pop operations.
3. Write a program to convert infix to postfix expressions using stack.
4. Write a program to perform following operations on a linear queue - addition, deletion, traversing.
5. Write a program to perform following operations on a circular queue - addition, deletion, traversing.
6. Write a program to perform following operations on a double ended queue - addition, deletion, traversing.
7. Write a program to perform following operations on a single link list-creation, inversion, deletion.
8. Write a program to perform following operations on a double link list – creation, insertion, deletion.
9. Write a program to implement polynomial in link list and perform.

a) Polynomial arithmetic b) Evaluation of polynomial

10. Write a program to implement a linked stack and linked queue.
11. Write programs to perform Insertion, selection and bubble sort.
12. Write a program to perform quick sort.
13. Write a program to perform merge sort.
14. Write a program to perform heap sort.
15. Write a program to create a Binary search tree and perform –insertion, deletion & traversal.
16. Write a program to traversal of graph (B.F.S, D.F.S)

**Recommended Books:**

1. "Data structure using C" by Samir kumarBandyopadhyay, KashiNathDey
2. "C and Data structures" by Ashok K Kamthane Pearson Education.
3. "An Introduction to Data Structures with Application" by Tremblay & Sorenson ( TMH)
4. "Fundamentals of Data Structure" by Horowitz &Sahni (Golgotia)
5. "Data Structures using C/C++" by Rajesh Shukla, Wiley India
6. "Data Structures using C" by ISRD Group (TMH)
7. "Data Structures using C/C++" by Langsam, Augenstein&Tananbaum (PHI)
8. "Data Structures & Program Design" by Robert L Kruse (PHI)

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:33:10 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Computer H/W Maintenance Lab** | Code: | **322462(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1) Assembling of a Personal Computer:
   a. Identifying parts of mother board, power connections and locating other connectors.
   b. Interconnection of disk drive units, keyboard, mouse and monitor.
2) Hard disk partitioning and OS installation:
   a. Partitioning the hard disk using FDISK/ Partition Magic/ Disk Manager
   b. Installation of Windows XP/2000/Pro
   c. Installation of Linux kernel (possibly with dual boot option).
3) Circuit Tracing: Using Multimeter and continuity test mode, to trace a given circuit board and draw the schematic.
4) Load testing of SMPS: Testing the given SMPS of a PC using a multimeter

**Task 1 :**Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

**Task 2:** Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

**Task 3:** Every student should individually install Windows/Ubuntu/Fedora in dual boot and virtual OS on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

**Task 4:** Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

**Task 5:** Several mini tasks would be that covers Basic commands in Linux and Basic system administration in Linux which includes: Basic Linux commands in bash, Create hard and symbolic links, Text processing, Using wildcards

**Task 6: Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

**Task 7: Software Troubleshooting:** Students have to be given a malfunctioning CPU due to System software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

**Task 8:** The test consists of various systems with Hardware / Software related troubles,Formatted disks without operating systems.

**Internet & World Wide Web**

**Task 9: Orientation& Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally Students should demonstrate, to the instructor, how to access the websites and email. If there is no Internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

**Task 10: Web Browsers, Surfing the Web:** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Task 11: Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors.

**List of Equipment / Machine Required:**

1. Computer Hardware trainer
2. Old computing system – should be used for training
3. Prepare museum of antique computer components for display in laboratory

**Recommended Books:**

1. Computer Repair with Diagnostic Flowcharts Third Edition: Troubleshooting PC Hardware Problems from Boot Failure to Poor Performance - Morris Rosenthal
2. A+ Guide to Hardware: Managing, Maintaining, and Troubleshooting: by Jean Andrews

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:33:24 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Object Oriented Concepts & Programming using C++ Lab** | Code: | **322463(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. Write a Program to check whether number is prime or not.
2. Write a Program to read number and to display the largest value between: (a) Two number, (b)Three Numbers, (c) Four numbers by using switch-case statements.
3. Write a Program to find sum of first natural numbers: sum= 1+2+3+4+..... 100 by using(a) *for* loop, (b)*while* loop, (c) *do-while* loop
4. Write a Program to find sum of the following series using function declaration: Sum= $x-(x)^3/3!+(x)^5/5!-\ldots\ldots\ldots(x)^n/n!$
5. Write a Program to read the element of the given two matrixes & to perform the matrix multiplication.
6. Write a Program to exchange the contents of two variables by using (a)Call by value, (b)Call by reference.
7. Write a Program to perform the following arithmetic operations of a complex number using astructure: (a) Addition of two complex numbers, (b) Subtraction of two complex numbers, (c) Multiplication of two complex numbers, (d) Division of two complex numbers.
8. Write an object oriented program (OOP) using C++ to exchange the private data members of two different functions using friend functions.
9. Write an OOP using C++ to count how many times a particular member function of a class is called by: (a) A particular object, (b) Any objects
10. Write an OOP using C++ to define a constructor for a "Date" class that initializes the Date objects with initial values. In case initial values are not provided, it should initialize the objects with default values.
11. Write an OOP using C++ to overload = = operator to compare two strings.
12. Write an OOP using C++ to perform simple arithmetic operations of two complex numbers using operator overloading.
13. Write a C++ program to demonstrate how ambiguity is avoided using scope resolution operator in thefollowing inheritance: (a) Single inheritance, (b) Multiple inheritance
14. Write a C++ Program to perform the swapping of two data items of integer, floating point number and character type with the help of function overloading.
15. Write a C++ program to generate a Fibonacci series by overloading: (a) Prefix Operator, (b) Postfix Operator.
16. Write a C++ program to access the private data of a class by non-member function through friend function where the friend function is declared: (a) in the location of public category, (b) in the location of private category, (c) within the scope of a class definition itself, (d) defined with inline code subtraction.
17. Write a C++ program to demonstrate how a pure virtual function is defined, declared and invoked from the object of derived class through the pointer of the base class.
18. Write a C++ program to open a file and count the number of characters, number of vowels and number of newline characters present in the file.
19. Write a program to copy the contents of one text file to another and display both the files using a text Menu.
20. Create a database of 10 students. The database should contain the Name, Marks of 5 subjects, Aggregate Marks, Aggregate percentage and Division according to the following conditions: (a) Percentage above or equal to 60 – First division, (b) Percentage between 50 and less than 60 – Second division, (c) Percentage between 40 and less than 50 – Third division, (d) Percentage below 40 – Improvement required
    Display the above database of every student in a tabulated form. Implement the above program using Structures, Text-Menu and File I/O operations.
21. Write an OOP using a class template to read any five parameterized data type such as float and integer, and print the average.
22. Write a C++ program to Bubble Sort using template function.
23. Write a C++ program to read two numbers and find the division of these two numbers using exception handling.
24. Write a C++ program to create a function which take a parameter, if the value of parameter is > 0 then throw integer type, if parameter is = 0, then throw character type, if parameter is < 0 then throws float type exception but for all design use only one catch block.
25. Write a C++ program for invoking, for that generate & handle exception.

**List of Equipment/Machine Required**

Pentium IV machine, Turbo C++ compiler / gcc, windows / Linux environment

**Recommended Books :**

1. Programming with C++ : D Ravichandran
2. OOP's with C++ : E. Balaguruswamy .
3. Programming with C++ :Venugopal .
4. Object Oriented Programming in C++ :StroutStrups.
5. OOP with C++ : Robert Lafore
6. Let us C++ :YaswantKanetkar.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:33:40 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **GUI Programming (VB/Gambus/other tools)** | Code: | **322464(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. Gambas/.NET /Other- an Integrated Development Environment (IDE): An introduction, Explain New project window, Property window, Project Explorer window, Watch window etc.
   Design and identity card containing information regarding students such as Name, Roll No., Address, Class studying, Date of Birth, Blood Group, Phone No., etc. Add a Exit Button.
2. Develop an application to calculate Interest. It should accept rate of interest, period for calculation of interest (years), amount on which interest is to be calculated (Rs.). After clicking Compute Investment amount (Principal + Interest) should be displayed in separate text box. Add Exit button, Proper text box controls and labels to be used. Provide 2 options- Simple, Compound interest. Provide Picture and Radio Button control.
3. Design a Simple Calculator to implement addition, subtraction, multiplication, division, remainder operations of two digits (include validation of input & proper message).
4. Create a form using check box & option box to give effect for fonts such as bold, italic, underline, strike through respectively for the text entered in the Rich Text Box (add status bar control).
5. Create a form to access drive list, directory list, and files within a directory of the computer you are using (use Tree structure, menus & toolbars).
6. Design a form for demonstration of print method (Error code, Error message display). Use print control box. Log the status of each message in a log file.
7. Demonstrate use of Date Environment, add tables and queries, place fields on form, report etc. Generate single table report & two table grouped report outputs.
8. Design a program to display regional languages of different states in India. Take many names of status of India in one list box control and other text box control should display their languages e. g. Maharashtra _ Marathi etc.
9. CASE STUDY (Design and develop one of the following three case studies):
   a. Create a Scientific Calculator (add minimum 15 functions).
   b. Develop a program for Online Examination system, which includes database and recordkeeping facility.
   c. Develop a program for Payroll System, which can handle database as well as can print the pay slips of employees. In this system provide a Login Window, which will accept the User Name and Password. After verifying the user information, the user should get the access to Payroll System.
10. Create a Simple Notepad application, which contains Menus, Rich Text Box, Common Dialog box, formatted text using Toolbar, and Replace text, Windows (Tile / Cascade), Status bar and scroll bar.
11. Modify the practical No. 7 to add following buttons: FIND, ADD, DELETE, UPDATE, and CANCEL. Give proper code to perform the activity described by these buttons.
12. Display the Table Data using Data Control/ADODC. Add Find, Delete, Update, Cancel Buttons on the form.
13. Display the data from two different tables having common keys using Visual data manager. Use Flex Gride control to display data.
14. Use Active –X control in the form which is created in previous practical.

**List of Equipments / Machine Required**:

- Dual Core of Core –I3 Computing System.
- Gambas/Visual Studio
- Database (PostgreSQL/ MySQL/others …)

**Recommended Books:**

1. A Beginners Guide to Gambas – John W Rittinghouse

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:33:55 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Computer Science & Engineering** | Semester: | **IV** |
| Subject: | **Health, Hygiene & Yoga** | Code: | **322465(46)** |
| No. Of Periods: | **2 Periods/Week** | Total Tutorial Periods: | **NIL** |
| **Maximum Marks:** | **40** | **Minimum Marks:** | **24** |

**Course Objectives:**

1. To provide understanding the importance of health.
2. To provide insight into the hygiene aspect & quality of life.
3. To study the concepts of various medical therapy.
4. To practice the various yogasans.
5. To provide knowledge about common diseases and its cure through yagasans and pranayam.
6. To develop concentration through various methods.

**UNIT- I** **HEALTH & HYGIENE:** Concept of health, Physical health and mentall health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and underrating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs nutritious food; fruits, vegetables cereals and qualities of each of these.

**UNIT-II** **INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE:** History, development, basic concepts, modes of operation of Alopathy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accurpressure, Accupunture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

**UNIT- III** **YOGASANS:** Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshep Mudra.

**UNIT-IV** **YOGASANS FOR COMMON DISEASES:** From Yogic MateriaMedica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomache disorders, such as, indigestion, acidity, dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:** Shavasan, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain:** Shirshpadasan, Shashankasan.
- **Asans for eye sight:** Tratak, NetiKriya .
- **Pranayam:** Definition and types: NadiShodhan, Bhastrik, Shitakari, Bhramari useful for students.

**UNIT-V** **CONCENTRATION:** Concentration of mind and how to achieve it. Tratak **(त्राटक)**. Concentration on breath, Japa **(जप)**. Ajapajap **(अजपाजप)**. internal silence **(अन्तर्मौन)**. visualization in mental sky **(चिदाकाश धारणा)**. Concentration on point of light **(ज्योति ध्यान)**. Concentration on feeling **(भाव ध्यान)**. Concentration on figure **(मूर्त ध्यान)**.

**Text Books:**

Health, Hygiene & Yoga,Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

**Reference Books:**

(1) Yogic MateriaMedica
(2) Asan, Pranayam and Bandh.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:34:10 -08'00'

# Chhattisgarh Swami Vivekanand Technical University
## Bhilai (C.G.)
### Scheme of Teaching and Examination
### B.E. V Semester (Computer Science &Engineering)

| S. No | Board of Study | Subject Code | Subject Name | Periods per week | | | Scheme of Exam Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Computer Science & Engg | 322551(22) | Microprocessor and Interfaces | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2 | Computer Science & Engg | 322552(22) | Analysis and Design of Algorithms | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Computer Science & Engg | 322553(22) | Programming in Java | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Computer Science & Engg | 322554(22) | Theory of Computation | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | Computer Science & Engg | 322555(22) | Unix & Shell Programming | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | Computer Science & Engg | 322556(22) | Database Management System | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 7 | Computer Science & Engg | 322561(22) | Microprocessor and Interfaces Lab | - | - | 3 | 40 | | 20 | 60 | 2 |
| 8 | Computer Science & Engg | 322562(22) | Programming in Java Lab | - | - | 3 | 40 | | 20 | 60 | 2 |
| 9 | Computer Science & Engg | 322563(22) | Unix & Shell Programming Lab | - | - | 3 | 40 | | 20 | 60 | 2 |
| 10 | Computer Science & Engg | 322564(22) | DBMS Lab | - | - | 3 | 40 | | 20 | 60 | 2 |
| 11 | Humanities | 300565(46) | Personality Development | - | - | 2 | | | 20 | 20 | 1 |
| 12 | Computer Science & Engg | 322566(22) | * Practical Training Evaluation & Library | - | - | 1 | | | 20 | 20 | 1 |
| | | | TOTAL | 19 | 6 | 15 | 640 | 120 | 240 | 1000 | 35 |

**L:** Lecture **T:** Tutorial **P:** Practical
**ESE:** End Semester Examination **CT:** Class Test **TA:** Teachers Assessment

**To be completed after IV Semester and before the commencement of V Semester*

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:34:25 -08'00'

Name of the Programme: Bachelor of Engineering :::::: Duration of the Programme: Four years

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Computer Science & Engineering** Semester: **V**
Subject: **Microprocessor & Interfaces** Code: **322551 (22)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **One per Unit**
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

**COURSE OBJECTIVE:** To introduce the basic concepts of microprocessor & assembly language programming.

**COURSE OUTCOME**:
1. The student will be able to analyse, specify, design, write and test assembly language programs of moderate complexity.
2. The student will be able to select an appropriate 'architecture' or program design to apply to a particular situation; e.g. an interrupt-driven I/O handler for a responsive real-time machine. Following on from this, the student will be able to design and build the necessary programs.

**UNIT I:** **Introduction to Basic Microprocessors:** Historical Background, the Harvard and Princeton architecture, The Microprocessor-Based Personal Computer Systems. The Microprocessor 8085, 8088 basics and comparison (Block & Pin diagram only).

**UNIT II:** **Microprocessor Architecture 8086:** 8086 basic block diagram, Internal Microprocessor Architecture, Real Mode Memory Addressing, Registers, pin configuration, segmentation.
**Data Movement Instructions:** MOV, PUSH/POP, Load-Effective Address, String Data Transfers, Miscellaneous Data Transfer Instructions, Segment Override Prefix, Assembler Details. Arithmetic and Logic Instructions: Addition, Subtraction and Comparison, Multiplication and Division, BCD and ASCII Arithmetic, Basic Logic Instructions, Shift and Rotate, String Comparisons. Program Control Instructions: The Jump Group, Controlling the Flow of the Program, Procedures, and Introduction to Interrupts, Machine Control and Miscellaneous Instructions. Assembler directives, assembler instructions, Assembly Language Programming.

**UNIT III:** **Assembly Language programming with C/C++, Interrupt and Timing diagrams:** Using Assembly Language with C/C++ for linking C/C++ into assembly language, Basic Programs - Use of BIOS and DOS Interrupts in assembly & C/C++, Interrupts of 8086 microprocessors, Timing diagram of 8086 microprocessor.

**UNIT IV:** **Memory and I/O Interfacing:** Minimum and Maximum mode configuration of 8086, Memory Interface with 8086 microprocessor, Address Decoding. Basic I/O Interface: Introduction to I/O Interface, I/O Port Address Decoding. I/O Interface using peripheral devices: The Programmable Peripheral Interface 8255, Programmable Interval Timer 8254. **Direct Memory Access:** Basic DMA Operation and Definition.

**UNIT V:** **Advanced Microprocessors:** 80386- Features, block diagram, data types, supported registers, memory system, real mode and protected mode operation, descriptors, cache register, control register, paging mechanism, virtual mode, and protection mechanism for operating system.. **Comparative Study of Modern Microprocessor (Web based Reference for study):** Pentium Pro (Pentium II, Pentium III, Pentium IV), Core i3,i5,i7 and Atom processors.

**Text Book:**
1. Barry B Brey: The Intel Microprocessors, 8th Edition, Pearson Education, 2009. (Listed topics only from the Chapters 1 to 13)
2. Ramesh S. Gaonkar : Microprocessor Architecture, programming and Application with 8085, 4th Edition, Wiley,2012

**Reference Books:**
1. Douglas V. Hall: Microprocessors and Interfacing, Revised 2nd Edition, TMH, 2006.
2. James L. Antonakos: The Intel Microprocessor Family: Hardware and Software Principles and Applications, Cengage Learning, 2007.
3. Nilesh B. Bahadure: Microprocessors: The 8086/8088, 80186/80286, 80386/80486 and the Pentium family, 2nd edition (2014), Prentice Hall of India (PHI).
4. K. Udaya Kumar & B.S. Uma Shankar: Advanced Microprocessors & IBM-PC Assembly Language Programming, TMH 2003.
5. Microprocessor: Theory and Applications- Intel and Motorolla, Rafiquuzzaman, PHI.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:35:05 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **V** |
| Subject: | **Analysis & Design of Algorithms** | Code: | **322552 (22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:**

- This course aims to introduce the classic algorithms in various domains, and techniques for designing efficient algorithms.
- Introducing students to the general tools and techniques for analysing computer algorithms.
- Equip the students with mathematical preliminaries required to analyse and design computer algorithms.

**COURSE OUTCOME**:

After successful completion of this course, students should be able to:

- Prove the correctness and analyze the running time of the basic algorithms for those classic problems in various domains.
- Apply the algorithms and design techniques to solve problems.
- Analyze the complexities of various problems in different domains.

**UNIT I** **Algorithms:** Definitions and notations: standard notations - asymptotic notations – worst case, best case and average case analysis; big oh, small oh, omega and theta notations; Recursive algorithms, analysis of non-recursive and recursive algorithms, solving recurrence equations, analysing control structures. Analysis of Sorting and Searching: Heap, shell, radix, insertion, selection and bubble sort; sequential, binary and Fibonacci search.

**UNIT II** **Divide and Conquer Method:** General Method – binary search – finding maximum and minimum – merge sort and quick sort – Stassen's Matrix multiplication. Greedy Method: General method – knapsack problem – minimum spanning tree algorithms – single source shortest path algorithm – scheduling, optimal storage on tapes, optimal merge patterns.

**UNIT III** **Dynamic Programming:** General method – multi-stage graphs – all pair shortest path algorithm – 0/1 Knapsack and Travelling salesman problem – chained matrix multiplication – approaches using recursion – memory functions. Basic Search and Traversal technique: Techniques for binary trees and graphs – AND/OR graphs – biconnected components – topological sorting.

**UNIT IV** **Backtracking:** Back tracking and Recursive back tracking, applications of Back tracking paradigm, The general method – 8-queens problem – sum of subsets – graph coloring – Hamiltonian cycle – Knapsack problem.

**UNIT V** **Branch and Bound Method:** Least Cost (LC) search – the 15-puzzle problem – control abstractions for LC-Search – Bounding – FIFO Branch-and-Bound - 0/1 Knapsack problem – travelling salesman problem. Introduction to NP-Hard and NP-Completeness, Cook's theorem.

***TEXTBOOK***

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications Pvt. Ltd., 2008.
2. Cormen, Lelserson, Rivert, "Introduction to Algorithms", Second Edition, PHI.

***REFERENCES***

1. Paneerselvam, "Design and Analysis of Algorithms", Prentice-Hall of India, 2006
3. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Education, 2005.
4. Gilles Brassard and Paul Bratley, "Fundamentals of Algorithms", Prentice-Hall of India, 1997. (UNIT I)
5. Thomas II. Corman, Charles E. Leiserson, Ronald and L. Rivest, "Introduction to Algorithms", Prentice-Hall of India, Second edition, 2003.
6. Richard Johnsonbaugh and Marcus Schaefer, "Algorithms", Pearson Education, 2004. (UNIT V)

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:35:22 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **V** |
| Subject: | **Programming in Java** | Code: | **322553 (22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:**

- Make them learn about Java programming concepts, graphical user interfaces, basic data structures.

**COURSE OUTCOME**:

- Can develop solutions for a range of problems using object-oriented programming.
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Demonstrate the ability to use simple data structures like arrays in a Java program.

**UNIT I** **Introduction:** Introduction to Java and Java programming Environment. Object Oriented Programming. Fundamental Programming Structure: Data Types, variable, Typecasting Arrays, Operators and their precedence. **Control Flow:** Java's Selection statements (if, switch, iteration, statement, while, do-while, for, Nested loop) Concept of Objects and Classes, Using Exiting Classes building your own classes, constructor overloading, static , final, this keyword

**UNIT II** **Inheritance:** Using Super to Call Super class constructor, Method overriding, dynamic method Dispatch, Using Abstract Classes, Using final with inheritance. The Object Class. **Packages & Interfaces:** Packages, Access Protection, Importing package, Interface, Implementing Interfaces, variables in Interfaces, Interfaces can be extended. **Exception Handling:** Fundamentals, Types Checked , Unchecked exceptions, Using try & catch, Multiple catch, throw , throws, finally, Java's Built in exceptions, user defined exception.

**UNIT III** **Multi-Threading:** Java Thread Model, Thread Priorities, Synchronization, Creating a thread, Creating Multiple threads, Using isAlive ( ) and join ( ), wait () & notify ( ). **String Handling:** String constructors, String length, Character Extraction, String Comparison, Modifying a string. **Java I/O:** Classes & Interfaces, Stream classes, Byte streams, Character streams, Serialization.

**UNIT IV** **Applets:** Basics, Architecture, Skeleton, The HTML APPLET Tag, Passing Parameters to Applets, Applet context and show documents (). **Event Handing:** Delegation Event model, Event Classes, Event Listener Interfaces, Adapter classes. **JDBC:** Fundamentals, Type I, Type II, Type III, Type IV drivers. **Networking:** Basics, Socket overview, Networking classes, & interfaces, TCP/IP client sockets, whois, URL format, URL connection, TCP/IP Server Sockets.

**UNIT V** **AWT:** AWT Classes window fundamentals, component, container, panel, Window, Frame , Canvas, Creating a frame window in an Applet , working with Graphics , Control Fundamentals , Layout managers, Handling Events by Extending AWT components. Core java API package, reflection, Remote method Invocation (RMI) **Swing:** J applet, Icons & Labels, Text fields, Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees, Tables. **Exploring Java-lang:** Simple type wrappers, Runtime memory management, object (using clone () and the cloneable Interface), Thread, Thread Group, Runnable.

**TEXT BOOKS:**

1. Introduction to Java Programming: Liang, Pearson Education, 7th Edition.
2. Java The complete reference: Herbert Schildt, TMH, 5th Edition.

**REFERENCE BOOKS:**

1. Balguruswamy, Programming with JAVA, TMH.
2. Programming with Java: Bhave &. Patekar, Pearson Education.
3. Big Java: Horstman, Willey India, 2nd Edition.
4. Java Programming Advanced Topics: Wigglesworth, Cengage Learning.
5. Java How to Program: H.M. Deitel & Paul J. Deitel, PHI, 8th Edition

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:35:40 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **V** |
| Subject: | **Theory of Computation** | Code: | **322554 (22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:**

- Students will learn about a variety of issues in the mathematical development of computer science theory, particularly finite representations for languages and machines.
- Students will gain a more formal understanding of algorithms and procedures.

**COURSE OUTCOME**:

At the end of this course students will:

- Be able to construct finite state machines and the equivalent regular expressions.
- Be able to prove the equivalence of languages described by finite state machines and regular expressions.
- Be able to construct pushdown automata and the equivalent context free grammars.
- Be able to prove the equivalence of languages described by pushdown automata and context free grammars.
- Be able to construct Turing machines and Post machines.

**UNIT I** **THE THEORY OF AUTOMATA :** Introduction to automata theory, Examples of automata machine, Finite automata as a language acceptor and translator. Deterministic finite automata. Non deterministic finite automata, finite automata with output (Mealy Machine. Moore machine). Finite automata with ? moves, Conversion of NFA to DFA by Arden's method, Minimizing number of states of a DFA. My hill Nerode theorem, Properties and limitation of FSM. Two way finite automata. Application of finite automata.

**UNIT II** **REGULAR EXPRESSIONS :** Regular expression, Properties of Regular Expression. Finite automata and Regular expressions. Regular Expression to DFA conversion & vice versa. Pumping lemma for regular sets. Application of pumping lemma, Regular sets and Regular grammar. Closure properties of regular sets. Decision algorithm for regular sets and regular grammar.

**UNIT III** **GRAMMARS:** Definition and types of grammar. Chomsky hierarchy of grammar. Relation between types of grammars. Role and application areas of grammars. Context free grammar. Left most linear & right most derivation trees. Ambiguity in grammar. Simplification of context free grammar. Chomsky normal from. Greibach normal form, properties of context free language. Pumping lemma from context free language. Decision algorithm for context tree language.

**UNIT IV** **PUSH DOWN AUTOMATA AND TURING MACHINE:** Basic definitions. Deterministic push down automata and non deterministic push down automata. Acceptance of push down automata. Push down automata and context free language. Turing machine model. Representation of Turing Machine Construction of Turing Machine for simple problem's. Universal Turing machine and other modifications. Church's Hypothesis. Post correspondence problem. Halting problem of Turing Machine

**UNIT V** **COMPUTABILITY:** Introduction and Basic concepts. Recursive function. Partial recursive function. Partial recursive function. Initial functions, computability, A Turing model for computation. Turing computable functions, Construction of Turing machine for computation. Space and time complexity. Recursive enumerable language and sets.

**Text Books :**

1. Theory of Computer Science (Automata Language & Computation), K.L.P. Mishra and N. Chandrasekran, PHI.
2. Introduction to Automata theory. Language and Computation, John E. Hopcropt & Jeffery D. Ullman, Narosa Publishing House.

**Reference Books :**

1. Finite Automata and Formal Languages: A Simple Approach, A.M. Padma Reddy, Pearson Education, India.
2. Theory of Automata and Formal Language, R.B. Patel & P. Nath, Umesh Publication.
3. An Introduction and finite automata theory, Adesh K. Pandey, TMH.
4. Theory of Computation, AM Natrajan. Tamilarasi, Bilasubramani, New Age International Publishers.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:35:55 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **V** |
| Subject: | **UNIX & Shell Programming** | Code: | **322555 (22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:**

- To familiarize students with the Linux environment.
- To learn the fundamentals of shell scripting/programming
- To familiarize students with basic Linux shell script programming.

**COURSE OUTCOME**:
At the end of this course students will be able to Work confidently in Unix/Linux environment

**UNIT I** **INTRODUCTION TO UNIX:** Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip **UNIX UTILITIES:** Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text processing utilities and backup utilities , detailed commands to be covered are tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

**UNIT II** **INTRODUCTION TO SHELLS:** Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, -Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization. FILTERS: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.

**UNIT III** **GREP:** Operation, grep Family, Searching for File Content. SED: Scripts, Operation, Addresses, commands, Applications, grep and sed. **AWK:** Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

**UNIT IV** **INTERACTIVE KORN SHELL:** Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process. KORN SHELL PROGRAMMING: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

**UNIT V** **INTERACTIVE C SHELL:** C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts. C SHELL PROGRAMMING: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples. **FILE MANAGEMENT:** File Structures, System Calls for File Management system, INODES, Structure of Regular File, Directories,Conversions of a Path, name to an INODE, Super Block, INODE Assignment to a New File create, open, close, read, write, lseek, link, symlink unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

**Text Books:**

1. Unix and shell Programming, Behrouz A. Forouzan, Richard F. Gilberg.Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.

**References:**

1. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson education.
2. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
3. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.
4. Unix Shell programming, Yashwanth Kanitkar, 1st Edition, BPB Publisher

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:36:14 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **V** |
| Subject: | **Data Base Management System** | Code: | **322556 (22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:**

- To understand the role of a database management system and its users in an organization.
- To understand database concepts, including the structure and operation of the relational data model.
- Can successfully apply logical database design principles, including E-R diagrams and database normalization.
- Construct simple and moderately advanced database queries using Structured Query Language (SQL).
- To understand the concept of transaction, its properties and how to persist the data in complex concurrent users environment.

**COURSE OUTCOME:**

- Will be able to describe the basic concepts of RDMBS and relational data model
- Be familiar with the relational database theory & be able to write relational algebra expressions for queries
- Understand DML, DDL and will be able to construct queries using SQL by knowing the importance of data &its requirements in any applications.
- Be familiar with the basic issues of transaction, its processing and concurrency control.
- Be familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.

**UNIT I** Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor. History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

**UNIT II** Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and Calculus

**UNIT III** Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

**UNIT IV** Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability Recoverability – Implementation of Isolation – Testing for serializability- Lock – Based Protocols – Timestamp Based Protocols Validation- Based Protocols – Multiple Granularity

**UNIT V** Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

**TEXT BOOKS:**

1. Data base System Concepts, Silberschatz, Korth, McGraw Hill, 5th edition.
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition

**REFERENCES:**

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J. Date Pearson Education

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:36:29 -08'00'

**Name of the Programme: Bachelor of Engineering :::::: Duration of the Programme: Four years**

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Computer Science & Engineering**
Subject: **Microprocessor & Interfaces Laboratory**
Total Lab Periods: **36**
Maximum Marks: **40**

Semester: **V**
Code: **322561(22)**
Batch Size: **30**
Minimum Marks: **20**

**List of Experiment to be performed**

1. To perform addition & subtraction of two 8 – bit hexadecimal numbers.
2. To perform addition & subtraction 16 – bit hexadecimal numbers.
3. To perform addition & subtraction 32 – bit hexadecimal numbers.
4. To perform addition & subtraction of two 8 – bit decimal numbers and store the result in DX register.
5. To perform addition & subtraction of two decimal digits 9 and 7 using ASCII code store the result in ASCII format.
6. To perform addition & subtraction of two decimal digits 97 and 25 using ASCII code store the result in ASCII format in CX-BX register.
7. To perform multiplication of 4 and 5 .
8. To perform division of 16 – bit number with 8-bit number.
9. To perform multiplication of two 8-bit numbers using ASCII code store the result in ASCII form in DX. register.
10. To perform division of two 8-bit numbers using ASCII code store the result in ASCII form in DX register.
11. To solve Arithmetic equation 3AX+5DX+BP and store the result in CX register.
12. To solve Arithmetic equation (P*Q)+(R*S).
13. To add only positive number from 100 data bytes.
14. To write a program to add series of 20 bytes.
15. To find positive & negative byte from 100 data bytes.
16. To find largest & smallest byte from block of data.

- List of Equipment's/Machine Required: 8086 based microprocessor kit, MASM assembler, 8086 simulator, PCs.

**Reference Books:**

1. IBM PC Assembly Language and Programming, P. Abel, 5th Edition, PHI/Pearson Education.
2. Introduction To Assembly Language Programming, SivaramaP.Dandamudi, Springer Int. Edition,2003.
3. The 8088 and 8086 Microprocessors: Programming , Interfacing,Software,Hardware and Application,4th edition,W.A.Triebel,A.Singh,N.K.Srinath,Pearson Education

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:36:49 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **V** |
| Subject: | **Programming in Java Laboratory** | Code: | **322562(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of Experiment to be performed**

1. Write a program to check whether a number is an Armstrong number or not.
2. Write a program to sort a stream of Strings.
3. Write a program to perform multiplication of two matrices.
4. Write a program to find the volume of a box having its side w, h, d means width, height and depth. Its volume is v=w*h*d and also find the surface area given by the formula s=2(wh+hd+dw), use appropriate constructors for the above.
5. Develop a program to illustrate a copy constructor so that a string may be duplicated into another variable either by assignment or copying.
6. Create a base class called shape. It contains two methods getxyvalue() and showxyvalue() for accepting co-ordinates and to display the same. Create the subclass called Rectangle which contains a method to display the length and breadth of the rectangle called showxyvalue().Use overriding concept.
7. Write a program that creates an abstract class called dimension, creates two subclasses, rectangle and triangle. Include appropriate methods for both the subclass that calculate and display the area of the rectangle and triangle.
8. Write a program which throws Arithmetic Exception. Note the output; write another class (in a different file) that handles the Exception.
9. Create a user defined Exception class which throws Exception when the user inputs the marks greater than 100.
10. Write a program in which a Mythread class is created by extending the Thread class. In another class, create objects of the Mythread class and run them. In the run method print "CSVTU" 10 times. Identify each thread by setting the name.
11. Write a program using InetAddress class and also show the utility of URL and URL Connection classes.
12. Write a program which illustrates capturing of Mouse Events. Use Applet class for this.
13. Write a program using RMI in which a simple remote method is implemented.
14. Write a servlet program using HttpServlet class. Also give the appropriate HTML file which posts data to the servlet.
15. Write a JDBC program for Student Mark List Processing.
16. Design a text editor which is having some of the features of notepad.

**Reference Books:**

1. Java complete reference - Naughton schildt (TMH)
2. Java programming – E Balagurusamy
3. Java 2 Black book – Steven Holzner
4. Java Examples in a nutshell – O' Reilly

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:37:02 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **V** |
| Subject: | **UNIX & Shell Programming Laboratory** | Code: | **322563(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**Note: Use Bash for Shell scripts.**

**List of Experiment to be performed**

1. a) Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
   b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
2. a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
   b) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
3. a) Write a shell script to list all of the directory files in a directory.
   b) Write a shell script to find factorial of a given integer.
4. a) Write an awk script to count the number of lines in a file that do not contain vowels.
   b) Write an awk script to find the number of characters, words and lines in a file.
5. a) Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
   b) Write a c program that makes a copy of a file using standard I/O and system calls.
6. a) Implement in C the following Unix commands using System calls
   - cat , ls, mv

   b) Write a C program to emulate the Unix ls –l command.
7. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.
   **a)** File type.
   **b)** Number of links.
   **c)** Time of last access.
   **d)** Read, Write and Execute permissions.
8. a) Write a C program to list for every file in a directory, its inode number and file name.
   b) Write a C program that demonstrates redirection of standard output to a file. Ex: ls > f1.
9. a) Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
   b) Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls –l | sort
10. a) Write a C program to create a Zombie process.
    b) Write a C program that illustrates how an orphan is created.
11. a) Write C programs that illustrate communication between two unrelated processes using named pipe.
    b) Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
    c) Write a C program (receiver.c) that receives the messages (from the above message queue as specified in (21)) and displays them.
12. a) Write a shell script to accept three numbers and display the largest.
    b) Write a shell script to find the number of files in a directory.
    c) Write a shell script to display first ten positive numbers using until loop.
13. a) Write a shell script to check if a particular user has logged in or not. If not, continue the loop till he/she logins. Once the required user logins, display a message.
    b) Write a shell script to accept the name, grade, and basic salary from the user. Write the details into a file called employee, separating the fields with a colon (,) continue the process till the user wants.
14. a) Write a shell script to check whether a file is existing or not.
    b) Write a shell script to find the mode of a file in a directory.
    c) Write a shell script which will accept different numbers and find their sum.
15. a) Write a menu driven program to display a menu of options and depending upon the user's choice execute the associated command.
    b) Write a shell script to calculate the total salary payable to all the employees from the employee file. The salary should be taken from the 8th field of the employee file.
16. a) Write a shell script to copy the source file to the target file.
    b) Write a shell script to print the first 10 odd numbers using the while loop.
    c) Write a shell script to reverse the digits of a given number.

**References:**

1. Unix Shell programming, Yashwanth Kanitkar, 1st Edition, BPB Publisher
2. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson education.
3. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
4. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:37:17 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **V** |
| Subject: | **Data Base Management System Laboratory** | Code: | **322564(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**H/W Requirement:**

- At least Dual Core or Core-I3 Pro Computing System, 2GB RAM, 80GB HDD

**Software**

- All systems are configured in **DUAL BOOT** mode i.e., Students can boot from Windows 7/8 or Linux as per their lab requirement.
- MySQL/PgSQL/Oracle May be used as Database Management System
- Systems are provided for students in the 1:1 ratio.

**LIST OF EXPERIMENTS**

1 **Database Schema for a customer-sale scenario**
Customer(**Cust id : integer,** cust_name: string)
Item(**item_id: integer,** item_name: string, price: integer)
Sale(**bill_no: integer,** bill_data: date, **cust_id: integer, item_id: integer**, qty_sold: integer)
For the above schema, perform the following—
a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the bills for the current date with the customer names and item numbers
d) List the total Bill details with the quantity sold, price of the item and the final amount
e) List the details of the customer who have bought a product which has a price>200
f) Give a count of how many products have been bought by each customer
g) Give a list of products bought by a customer having cust_id as 5
h) List the item details which are sold as of today
i) Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount
j) Create a view which lists the daily sales date wise for the last one week

2 **Database Schema for a Student Library scenario**
Student(**Stud_no : integer,** Stud_name: string)
Membership(**Mem_no: integer**, **Stud_no: integer**)
Book(**book_no: integer**, book_name:string, author: string)
Iss_rec(**iss_no:integer**, iss_date: date, **Mem_no: integer**, **book_no: integer**)
For the above schema, perform the following—
a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the student names with their membership numbers
d) List all the issues for the current date with student and Book names
e) List the details of students who borrowed book whose author is CJDATE
f) Give a count of how many books have been bought by each student
g) Give a list of books taken by student with stud_no as 5
h) List the book details which are issued as of today
i) Create a view which lists out the iss_no, iss _date, stud_name, book name
j) Create a view which lists the daily issues-date wise for the last one week

3 **Database Schema for a Employee-pay scenario**
employee(**emp_id : integer**, emp_name: string)
department(**dept_id: integer**,dept_name:string)
paydetails(**emp_id : integer**, **dept_id: integer**, basic: integer, deductions: integer, additions: integer, DOJ: date)
payroll(**emp_id : integer**, pay_date: date)
For the above schema, perform the following—
a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List the employee details department wise
d) List all the employee names who joined after particular date
e) List the details of employees whose basic salary is between 10,000 and 20,000
f) Give a count of how many employees are working in each department
g) Give a names of the employees whose netsalary>10,000
h) List the details for an employee_id=5
i) Create a view which lists out the emp_name, department, basic, dedeuctions, netsalary
j) Create a view which lists the emp_name and his netsalary

4 **Database Schema for a Video Library scenario**
Customer(cust_no: integer,cust_name: string)
Membership(**Mem_no: integer**, **cust_no: integer**)
Cassette(**cass_no:integer**, cass_name:string, Language: String)

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:37:29 -08'00'

Iss_rec(**iss_no: integer**, iss_date: date, **mem_no: integer**, **cass_no: integer**)
For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the customer names with their membership numbers
d) List all the issues for the current date with the customer names and cassette names
e) List the details of the customer who has borrowed the cassette whose title is " The Legend"
f) Give a count of how many cassettes have been borrowed by each customer
g) Give a list of book which has been taken by the student with mem_no as 5
h) List the cassettes issues for today
i) Create a view which lists outs the iss_no, iss_date, cust_name, cass_name
j) Create a view which lists issues-date wise for the last one week

**5** **Database Schema for a student-Lab scenario**
Student(**stud_no: integer**, stud_name: string, **class: string**)
Class(**class: string,descrip: string**)
Lab(**mach_no: integer**, Lab_no: integer, description: String)
Allotment(**Stud_no: Integer, mach_no: integer, dayof week: string)**
For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b) Insert around 10 records in each of the tables
c) List all the machine allotments with the student names, lab and machine numbers
d) List the total number of lab allotments day wise
e) Give a count of how many machines have been allocated to the 'CSIT' class
f) Give a machine allotment details of the stud_no 5 with his personal and class details
g) Count for how many machines have been allocated in **Lab_no 1** for the day of the week as "Monday"
h) How many students class wise have allocated machines in the labs
i) Create a view which lists out the stud_no, stud_name, mach_no, lab_no, dayofweek
j) Create a view which lists the machine allotment details for "Thursday".

**6** a) Write and execute subprogram to find largest number from the given three numbers.
b) Write and execute subprogram using loop, while and for iterative control statement.

**7.** a) Write and execute subprogram to check whether the given number is Armstrong or not
b) Write and execute subprogram to generate all prime numbers below 100.

**8** a) Write and execute subprogram to demonstrate the GOTO statement.
b) Write a subprogram to demonstrate %type and %rowtype attributes

**9** a) Write and execute subprogram to demonstrate predefined exceptions
b) Write and execute subprogram to demonstrate user defined exceptions

**10** a) Create a cursor, which displays all employee numbers and names from the EMP table.
b) Create a cursor, which update the salaries of all employees as per the given data.

**11** a) Create a cursor, which displays names of employees having salary > 50000.
b) Create a procedure to find reverse of a given number

**12** a) Create a procedure to update the salaries of all employees as per the given data
b) Create a procedure to demonstrate IN, OUT and INOUT parameters

**13** a) Create a function to check whether given string is palindrome or not.
b) Create a function to find sum of salaries of all employees working in depart number 10.

**14** a) Create a trigger before/after update on employee table for each row/statement.
b) Create a trigger before/after delete on employee table for each row/statement.
c) Create a trigger before/after insert on employee table for each row/statement.

**16** a) Create a Form to display employee details using SQL
b) Create a Report to generate all employee annual salaries….

**Additional Programs**

**1** Create a form using Forms 6i to display Employee table data.

**2** Create a Master/details relationship form which perform Add New, Search, Delete, Save and Update on the records

**3** Generate a report to calculate employee's salaries department wise from employee table.

**4** Create a Report to generate the details of employee table including sum and average salaries department wise.

**Course Outcome:**Upon successful completion of this Lab the student will be able to:

- Creating , Modify database Tables and manipulate data in the Tables
- Performing database operations in a procedural manner using pl/sql
- Performing database operations (create, update, modify, retrieve, etc.,) using front-end tools like D2K/Gambas/PhP/Servlet/JSP.
- Design and Develop applications like banking, reservation system, etc.
- Design and implement a small database project using RDBMS to understand the concept of a database transaction and related database facilities.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:37:43 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of Program: | **Bachelor of Engineering** | | |
| Branch: | **Common to All Branches** | Semester: | **V** |
| Subject: | **Personality Development** | Code: | **300565 (46)** |
| No. of Lectures: | **2/Week** | Tutorial Period: | **NIL** |
| Total Marks in ESE: | **NIL** | Marks in TA: | **20** |
| Minimum number of Class Tests to be conducted: | **Two** | | |

**Objective:** The course is introduced to develop one's outer and inner personality tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Personality Development is essential for overall development of an individual apart from gaining technical knowledge in the subject.

**Course Objectives**

Upon completion of this course, the student shall be able

- To understand the concept of personality and image;
- To develop leadership, listening and interacting skills;
- To develop attitudinal changes;
- To develop decision-making qualities; and
- To communication skill.

**UNIT I** **Personality concepts:** What is Personality – its physical and psychic aspects. How to develop a positive self-image. How to aim at Excellence. How to apply the cosmic laws that govern life and personality. How to improve Memory – How to develop successful learning skills. How to develop and effectively use one's creative power. How to apply the individual MOTIVATORS that make you a self-power personality.

**UNIT II** **Interpersonal Skills:** Leadership: Leaders who make a difference, Leadership: your idea, What do we know about leadership? If you are serious about Excellence. Concepts of leadership, Two important keys to effective leadership, Principles of leadership, Factors of leadership, Attributes. Listening: Listening skills, How to listen, Saying a lot- just by listening, The words and the music, How to talk to a disturbed person, Listening and sometimes challenging. How to win friends and influence people, How to get along with others. How to develop art of convincing others. How can one make the difference. How to deal with others particularly elders. Conflicts and cooperation.

**UNIT III** **Attitudinal Changes: Meaning of attitude,** benefits of positive attitudes, How to develop the habit of positive thinking.

**Negative attitude and wining:** What is FEAR and how to win it. How to win loneliness. How to win over FAILURE. How to win over PAIN. How to win over one's ANGER and others anger. What is stress and how to cope up with it? The art of self-motivation. How to acquire mental well-being. How to acquire physical well-being.

**UNIT IV** **Decision Making:** How to make your own LUCK. How to plan goals/objectives and action plan to achieve them. How to make RIGHT DECISION and overcome problems. How to make a Decision. Decision making: A question of style. Which style, when? People decisions: The key decisions. What do we know about group decision making? General aids towards improving group decision making.

**UNIT V** **Communication Skills: Public Speaking:** Importance of Public speaking for professionals. The art of Speaking - Forget the fear of presentation, Symptoms of stage fear, Main reason for speech failure, Stop failures by acquiring Information; Preparation & designing of speech, Skills to impress in public speaking & Conversation, Use of presentation aids & media.

**Study & Examination:** How to tackle examination, How to develop successful study skills.

**Group discussions:** Purpose of GD, What factors contribute to group worthiness, Roles to be played in GD.

**Course Outcomes:**

- The students will be able to develop inner and outer personality exposure;
- The students will be able to develop effective leadership qualities and interacting skills;
- The students will be able to develop positive attitude, motivating skills and develop winning philosophies;
- The students will be able to develop decision-making tools; and
- The students will be able to develop group presentation, public speaking and impressive conversation.

**Text Books:**

1. Basic Managerial Skills for all by E. H. McGrawth, prentice Hall India Pvt. Ltd., 2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

**Reference Books:**

1. How to Develop a Pleasing Personality by Atul John Rego, Better Yourself Books, Mumbai, 2000
2. How to Succeed by Brain Adams, Better Yourself Books, Mumbai, 1969
3. Personality: Classic Theories & Modern Research; Friedman ; Pearson Education, 2006
4. How to Win Friends and Influence People by Dale Carnigie, A. H. Wheeler 2006

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:37:57 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

## Scheme of Teaching and Examination

## B.E. VI Semester Computer Science &Engineering

| Sl. No. | Board of Study | Code No. | Subjects | Period Per Week | | | Scheme of Exam | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | Theory/Practical ESE | CT | TA | | |
| 1 | Computer Sc. & Engg. | 322651(22) | Computer Networks | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2 | Computer Sc. & Engg. | 322652(22) | Compiler Design | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Computer Sc. & Engg. | 322653(22) | Enterprise Resource Planning | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Computer Sc. & Engg. | 322654(22) | Software Engineering & Project Management | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | Computer Sc. & Engg. | 322655(22) | Computer Graphics | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | *Refer Table -1* | | Professional Elective -I | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 7 | Computer Sc. & Engg. | 322661(22) | Computer Networks Lab | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 8 | Computer Sc. & Engg. | 322662(22) | Software Engineering & Project Management Lab – With Minor Project | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 9 | Computer Sc. & Engg. | 322663(22) | Computer Graphics Lab | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 10 | Computer Sc. & Engg. | 322664(22) | Advanced Java Programming Lab | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 11 | Management | 300665(76) | Managerial Skills | - | - | 2 | - | - | 40 | 40 | 1 |
| 12 | Computer Sc. & Engg. | ---------- | Library | - | - | 1 | - | - | - | - | - |
| TOTAL | | | | 19 | 6 | 15 | 640 | 120 | 240 | 1000 | 34 |

**L:** Lecture **T:** Tutorial **P:** Practical
**ESE:** End Semester Examination **CT:** Class Test **TA:** Teachers' Assessment

**Note:** Industrial Training of eight weeks is mandatory for B.E. students. It is to be completed in two equal parts. The first part must have been completed in summer after IV semester. The second part to be completed during summer after VI semester after which students have to submit a training report which will be evaluated by college teachers during B.E. VII semester.

**Table 1: Professional Elective–I**

| S. No. | Board of Studies | Subject Code | Subject Name |
|---|---|---|---|
| 1 | Computer Science &Engg | 322671(22) | Digital Signal Processing |
| 2 | Computer Science & Engg | 322672(22) | Advanced Microprocessors & Micro Controllers |
| 3 | Information Technology | 322673(33) | Multimedia & Virtual Reality |
| 4 | Computer Science & Engg | 322674(22) | Inter-Networking with TCP/IP |
| 5 | Computer Science & Engg | 322675(22) | Management Information Systems |
| 6 | Computer Science & Engg | 322676(22) | Advanced Operating System |
| 7 | Computer Science & Engg | 322677(22) | Advanced Data Base Systems. |
| 8 | Computer Science & Engg | 322678(22) | Object Oriented Modelling & Design |

*Note:* 1/4th of total strength of students to minimum of twenty students is required to offer an elective in the college in a particular academic session.

1. Choice of elective course once made for an examination cannot be changed in future examinations.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:38:13 -08'00'

**Name of the Programme: Bachelor of Engineering ::::: Duration of the Programme: Four Years**

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Computer Networks** | Code: | **322651(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:**

- Provide students with an enhanced base of knowledge in current and reflective practice necessary to support a career in Computer Networking at advanced professional level.
- Understanding concept of local area networks, their topologies, protocols and applications
- Understanding the different protocols, software, and network architectures.

**COURSE OUTCOME**: On completion of this unit the student should be able to:

- describe the basis and structure of an abstract layered Network protocol model
- identify and apply basic theorems and formulae for the information-theoretic basis of communication and the performance of TCP/IP network protocols

**UNIT I** **Introduction:** OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN.
**Physical Layer:** Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications; Narrow band, broad band ISDN and ATM.

**UNIT II** **Data link layer** : Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM. Multiple Access Protocols – Link Layer Addressing – ARP – DHCP – Ethernet – Hubs, Bridges, and Switches. Ring Topology - Physical Ring – Logical Ring.
**Medium Access sub layer:** ALOHA, MAC addresses, Carrier sense multiple accesses. IEEE 802.X Standard Ethernet, wireless LANS. Bridges

**UNIT III** **Network Layer :** Forwarding and Routing – Network Service Models – Virtual Circuit and Datagram Networks – Router – Internet Protocol (IP) – IPv4 and IPv6 – ICMP – Link State Routing – Distance Vector Routing – Hierarchical Routing – RIP – OSPF – BGP – Broadcast and Multicast Routing – MPLS - Mobile IP – IPsec.

**UNIT IV** **Transport Layer:** Transport Layer Services – Multiplexing and Demultiplexing – UDP – Reliable Data Transfer – Go-Back-N and Selective Repeat. **Connection-Oriented Transport**: TCP – Segment Structure – RTT estimation – Flow Control – Connection Management – Congestion Control – TCP Delay Modeling – SSL and TLS. **Integrated and Differentiated Services**: Intserv – Diffserv.

**UNIT V** **Application Layer:** Principles of Network Applications – The Web and HTTP – FTP – Electronic Mail – SMTP – Mail Message Formats and MIME – DNS – Socket Programming with TCP and UDP. **Multimedia Networking:** Internet Telephony – RTP – RTCP – RTSP. **Network Security**: Principles of Cryptography – Firewalls – Application Gateway – Attacks and Countermeasures.

***TEXT BOOKS :***

1. Data Communications and Networking – Behrouz A. Forouzan.Third Edition TMH.
2. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, Third edition, 2006

***REFERENCE BOOKS :***

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:38:27 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Compiler Design** | Code: | **322652(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:**

- to understanding the fundamental principles in compiler design
- To provide the skills needed for building compilers for various situations that one may encounter in a career in Computer Science.

**COURSE OUTCOME**:

- After the course a student should have an understanding, based on knowledge of the underlying machine architecture, the limitations and efficiency of various design techniques of compilers implementation

**UNIT I** **INTRODUCTION:** Introduction to Compiler, single and multi-pass compilers, Translators, Phases of Compilers, Compiler writing tools, Bootstrapping, Backpatching. Finite Automata and Lexical Analyzer: Role of Lexical Analyzer, Specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata transition diagrams, Implementation of lexical analyzer Tool for lexical analyzer LEX, Error reporting.

**UNIT II** **SYNTAX ANALYSIS AND PARSING TECHNIQUES:** Context free grammars, Bottom-up parsing and top down parsing. Top down Parsing : elimination of left recursion, recursive descent parsing, Predicative Parsing ,Bottom Up Parsing : Operator precedence parsing, LR parsers, Construction of SLR, canonical LR and LALR parsing tables, Construction of SLR parse tables for Ambiguous grammar, the parser generator – YACC, error recovery in top down and bottom up parsing.

**UNIT III** **SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION :** Synthesized and inherited attributes, dependency graph, Construction of syntax trees, bottom up and top down evaluation of attributes, S-attributed and L-attributed definitions ,Postfix notation; Three address codes, quadruples, triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.

**UNIT IV** **RUNTIME ENVIRONMENT:** Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.

**UNIT V** **CODE OPTIMIZATION & CODE GENERATION:** Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator.

**Text Books:**

1. Compilers-Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D., Addison Wesley, 2nd Ed.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.

**Reference Books:**

1. Compiler design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
3. Compiler Design, Kakde.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:38:41 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Enterprise Resource Planning** | Code: | **322653(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVES:**

- To know the basics of ERP and business modules of ERP
- To understand the key implementation issues of ERP
- To be aware of some popular products in the area of ERP
- To appreciate the current and future trends in ERP

**COURSE OUTCOME:** Students will know the strategic importance of Enterprise Resource Planning.

**UNIT I** **INTRODUCTION:** ERP: An Overview, Enterprise – An Overview, Origin, Evolution and Structure: Conceptual Model of ERP, The Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, OLAP, Product Life Cycle Management(PLM), Supply chain Management(SCM)

**UNIT II** **ERP IMPLEMENTATION:** ERP Implementation Lifecycle, Implementation Methodology, Hidden Costs, Organizing the Implementation, Role of SDLC/SSAD, Object Oriented Architecture Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring

**UNIT III** **THE BUSINESS MODULES:** Business modules in an ERP Package, Finance, Manufacturing, Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

**UNIT IV** **THE ERP MARKET:** ERP Marketplace and Marketplace Dynamics: Market Overview, Marketplace Dynamics, The Changing ERP Market. ERP- Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications

**UNIT V** **ERP – PRESENT AND FUTURE:**ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into organizational culture Using ERP tool: ERP Market Place, SAP AG, PeopleSoft, Baan, JD Edwards, Oracle, QAD, SSA. Turbo Charge the ERP System, EIA, ERP and e-Commerce, ERP and Internet, Future Directions

**TEXT BOOK:**

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill, New Delhi, 2000

**REFERENCE BOOKS:**

1. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology, USA, 2001.
2. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", PHI, New Delhi, 2003



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:38:55 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Software Engineering & Project Management** | Code: | **322654(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:**

- To introduce software project and to understand about the different software processes & their uses.
- Understanding good coding practices, including documentation, contracts, regression tests and daily builds.
- To introduce ethical and professional issues and to explain why they are concern to software engineers.

To understand how Software engineering & Project Management is concerned with theories, methods and tools for professional software development.

**COURSE OUTCOME**:

After completion of this course, the students would be able to

- Select and implement different software development process models
- Extracting and analyzing software requirements specifications for different projects
- Developing some basic level of software architecture/design
- Applying standard coding practices, Identification and implementation of the software metrics
- Defining the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
- Applying different testing and debugging techniques and analyzing their effectiveness.
- Analyzing software risks and risk management strategies
- Defining the concepts of software quality and reliability on the basis of International quality standards.

**UNIT I** **Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software, legacy software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models. Process models: The waterfall model, Incremental process models, Evolutionary process models, specialized process models, The Unified process.

**UNIT II** **Software Requirements Specification (SRS):** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models: Context Models, behavioural models, Data models, Object models, structured methods.

**UNIT III** **Software Design:** Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Hallstead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

**UNIT IV** **Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. Metrics for Process and Products: Software Measurement, Metrics for software quality.

**UNIT V** **Software Project Management**: People – Product-Process-Project. Project scheduling and tracking: Basic concepts-relation between people and effort-defining task set for the software project-selecting software engineering task. Computer aided software engineering tools - CASE building blocks, taxonomy of CASE tools, integrated CASE environment.**Software Risk management:** Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

**TEXT BOOKS:**

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition. McGrawHill International Edition, 2005
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education,2004

**REFERENCE BOOKS:**

1. Software Engineering,A Precise Approach,Pankaj Jalote,Wiley India,2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering,Rajib Mall,PHI, 2005
4. Software Engineering, Principles and Practices,Deepak Jain,Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

**Name of the Programme: Bachelor of Engineering ::::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 00:39:09 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Computer Graphics** | Code: | **322655(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVE:** The primary objective of this course is to learn the basic principles of computer graphics. These topics will include the following:

- Transformational geometry -- utilizing transforms to positioning and manipulate objects in 3-dimensional space. This includes the positioning of virtual cameras and light sources.
- Rendering of complex models -- accurately drawing illustrations of complex objects with arbitrary camera and light source.

Curves and surfaces -- methods for rendering and shading curved objects

**COURSE OUTCOME**:

- Know and be able to describe the general software architecture of programs that use 3D computer graphics.
- Know and be able to discuss hardware system architecture for computer graphics. This includes, but is not limited to: graphics pipeline, frame buffers, and graphic accelerators/co-processors.
- Know and be able to use a current 3D graphics API (e.g., OpenGL or DirectX).
- Must be able to use the underlying algorithms, mathematical concepts, supporting computer graphics.

**UNIT I** Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

**UNIT II** **Output primitives** : Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

**UNIT III** **2-D geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. **2-D viewing** : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

**UNIT IV** **3-D object representation :** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods. **3-D Geometric transformations:** Translation, rotation, scaling, reflection and shear transformations, composite transformations. **3-D viewing:** Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**UNIT V** **Visible surface detection methods** : Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods. **Computer animation:** Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

**TEXT BOOKS:**

1. "Computer Graphics *C version*", Donald Hearn and M.Pauline Baker, Pearson Education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.

**REFERENCE BOOKS:**

1. "Computer Graphics", second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
2. "Computer Graphics Second edition", Zhig and Xiang, Roy Plastock, Schaum's outlines, Tata Mc- Graw hill edition.
3. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
4. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

**Name of the Programme: Bachelor of Engineering ::::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 00:39:23 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Computer Networks Laboratory** | Code: | **322661(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of experiments to be conducted in Computer Network Lab.**

1. Introduction to Local Area Network with its cables, connectors and topologies.
2. Installation of Switch. Hub their cascading and network mapping.
3. Installation of UTP, Co-axial cable, Cross cable, parallel cable NIC and LAN card.
4. Case Study of Ethernet (10 base 5,10 base 2,10 base T)
5. Installation and working of Net meeting and Remote Desktop.
6. Installation and working with Telnet (Terminal Network).
7. Installation and working with FTP (File Transfer Protocol).
8. Installation and Computers via serial or Parallel ports and enable the computers to share disk and printer port.
9. To connect two Personal Computer with Telephone line.
10. Installation of Modem and Proxy Server.
11. Working with Null Modem.
12. Installation of Windows 2003 server/ Windows 200 server.
13. Configuration of DHCP.
14. Introduction to Server administration.

**Recommended Books.**

1. Computer Network and internet by Dougles E. Comer (Pearson Education)
2. List of Software required :-
3. Windows 2003 server/Windows 2000 server.
4. List of Hardware required :-
5. LAN Trainer Kit LAN Card Cable, Connectors, HUB, Switch, Crimping Tools.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:39:39 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Software Engineering & Project Management Laboratory with Minor Project** | Code: | **322662(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

## INSTRUCTIONS TO BE STRICTLY FOLLOWED BY STUDENTS

1) A group of two to three students should develop software that could be developed during session.
2) Technology/Tool like (C/C++/VB/Gambas/PhP/Core Java/Servlet/ JSP .... Any other relevant tool) can be selected for Developing their project
3) Phase wise documentation of the project should be submitted (soft and hard copy).
4) All group members must have a copy of the documentation, which are to be checked by faculty Lab Incharge, phase wise.
5) Before the Final Practical examinations, every individual student should submit his own hardcopy of the documentation in a Punched Cardboard File Only, with a CD containing the softcopy of the same.
6) During Final Submissions, every copy of the documentation should be accompanied by a Submission Certificate duly signed by the Teacher In-charge and Head of Department

**Note:**
Initial 4 – 6 Weeks Instructor is supposed to teach/Cover PHP/MySQL or students are supposed to go through the spoken Tutorial Course on PhP

## SAMPLE EXPERIMENT

**AIM:** To perform the user's view analysis: Use case diagram for the coffee-maker.

The CSE Dep't has a new building in **CSVTU Campus.** We all know that Computer Engineers love caffeine, so the CSE department is planning on installing a Coffeemaker in a lounge across the hall from the 24-hour computer lab. Our job is to test and model the functionality of the Coffeemaker. We are only working with the logic code behind the hardware, so only a command line interface is used for manual testing. Here is a partial listing of requirements for the Coffeemaker system.

**2 TOOLS/APPARATUS:** Net beans 6.0, Microsoft Visio.

**3 STANDARD PROCEDURES:**
**3.1 Analyzing the Problem:**
According to the analysis of **nouns** and **verbs** we can have the following actors and use cases for the given system:

| Actors ( based on the nouns) | Use-cases(based on the verbs) |
|---|---|
| User(The person who makes coffee) | Waiting State |
| | Add a Recipe |
| | Edit a Recipe |
| | Delete a Recipe |
| | Check Inventory |
| | Add Inventory |
| | Purchase Beverage |

The use-cases based on the requirements stated in the problem are given in the designing part of the solution.

**3.2 Designing the Solution:**
Requirements - User Stories

| **Title : Waiting State** | | |
|---|---|---|
| **AccTest: checkOptions0** | **Priority: 1** | **Story Points: 2** |
| When the Coffee Maker is not in use it waits for user input. There are six different options of user input<br>1) Add a Recipe<br>2) Edit a Recipe | | |



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:39:54 -08'00'

3) Delete a Recipe
4) Check Inventory
5) Add Inventory
6) Purchase Beverage

| Title : Add a Recipe | | |
|---|---|---|
| **AccTest: addRecipe1** | **Priority: 1** | **Story Points: 2** |
| • Only three recipes may be added to the Coffeemaker. A recipe consists of a name. price and units of coffee, units of milk, units of sugar and units of chocolate.<br>• Each recipe name must be unique in the recipe list. Price must be handled as an integer.<br>• A status message is printed to specify if the recipe was successfully added or not. Upon completion the Coffeemaker is returned to the waiting state | | |

| Title : Delete a Recipe | | |
|---|---|---|
| **AccTest: Delete Recipe1** | **Priority: 2** | **Story Points: 1** |
| • A recipe may be deleted from the Coffeemaker if it exist in the list of recipes in the coffeemaker<br>• The recipes are listed by their name<br>• Upon completion a status message is printed and the Coffee Maker is returned to the waiting state | | |

| Title : Edit a Recipe | | |
|---|---|---|
| **AccTest: editRecipe1** | **Priority: 2** | **Story Points: 1** |
| • A recipe may be edited in the Coffeemaker if it exist in the list of recipes in the coffeemaker<br>• The recipes are listed by their name. After selecting a recipe to edit , the user will then enter the new recipe information<br>• A recipe name may not be changed<br>• Upon completion a status message is printed and the Coffee Maker is returned to the waiting state | | |

| Title : Add Inventory | | |
|---|---|---|
| **AccTest: addInventory1** | **Priority: 2** | **Story Points: 2** |
| • Inventory may be added to the machine at any time from the main menu and is added to the current<br>• Inventory in the Coffeemaker<br>• The type of Inventory in Coffeemaker are Coffee, milk,sugar and chocolate<br>• The Inventory is measured in Integer Units<br>• Inventory may be removed from the coffeemaker by purchasing a beverage<br>• Upon completion a status message is printed and the Coffeemaker is returned to the waiting state | | |

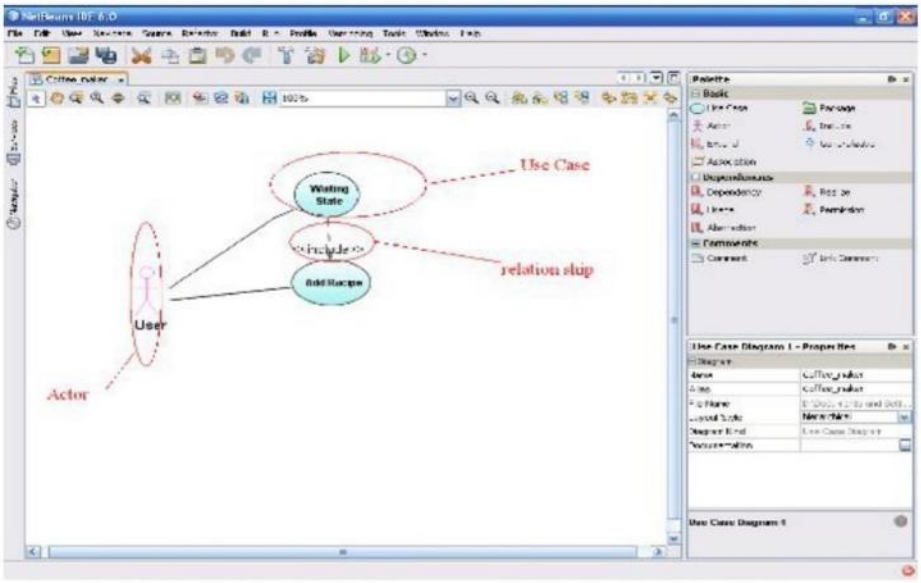
| Title : Check Inventory | | |
|---|---|---|
| **AccTest: checkInventory** | **Priority: 2** | **Story Points: 1** |
| • Inventory may be checked at any time from the main menu<br>• The units of each item in the inventory are displayed<br>• Upon completion the Coffeemaker is returned to the waiting state | | |
| **Title : Purchase Beverage** | | |
| **AccTest: pruchaseBeverage1** | **Priority: 1** | **Story Points: 2** |
| • The user selects a beverage and inserts an amount of money.<br>• The money must be an integer<br>• If the beverage is in the RecipeBook and the user paid enough money the beverage will be dispensed and any change will be returned.<br>• The user will not be able to purchase a beverage if they do not deposit enough money into the coffeemaker<br>• A users money will be returned if there is not enough inventories to make the beverage<br>• Upon completion, the Coffee maker displays a message about the purchase status and is returned to the main menu | | |

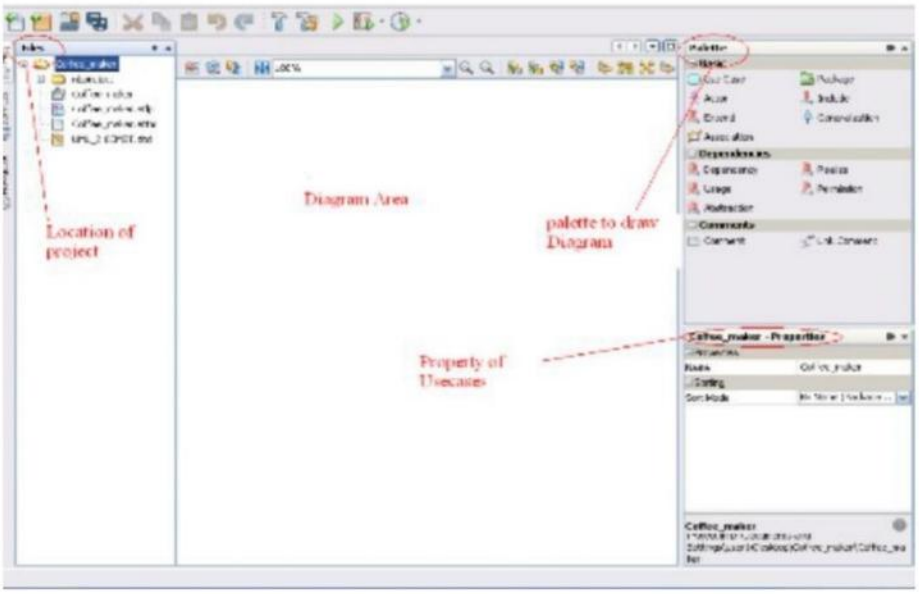


DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:40:08 -08'00'

### 3.3 Implementing the Solution

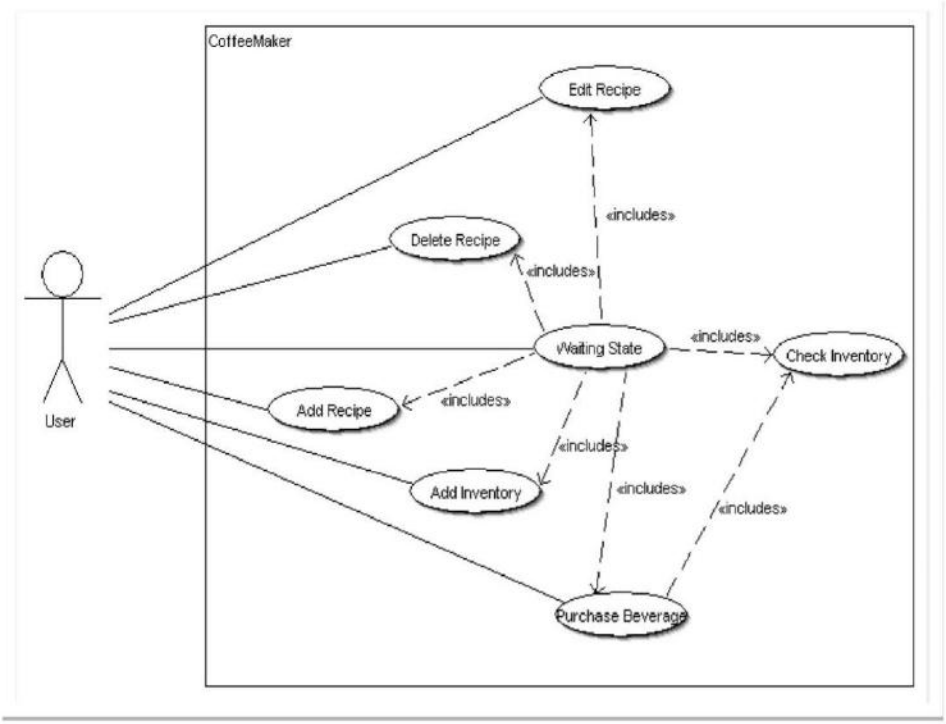
The use-case diagram can be drawn using the netbeans version 6.0 or higher






DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:40:21 -08'00'




Requirements – Use Cases

### 3.4 Testing the Solution

Here the problem statement is: CSE department is planning on installing a Coffeemaker in a lounge across the hall from the 24-hour computer lab so we have prepared the use-case accordingly:

The use-cases are tested to match up with the requirements stated in the above table and they are complying with the problem statement requirements.

| Requirements given in the problem statement(based on the verbs) | Use-cases(based on the verbs) |
|---|---|
| When the coffee Maker is not in use it waits for user input. There are six different options of user input | Waiting state |
| Only three recipes may be added to the Coffeemaker. A Recipe consists of a name. Price, and units of coffee, units of milk , units of sugar and units of chocolate | Add a Recipe |
| A recipe may be edited in the coffeemaker if it exist in the list of recipes in the Coffeemaker | Edit a Recipe |
| A recipe may be deleted from the Coffeemaker if it exists in the list of recipes in the Coffeemaker | Delete Recipe |
| Inventory may be checked at any time from the main menu | Check Inventory |
| Inventory may be added to the machine at any time from the main menu, and is added to the current inventory in the Coffeemaker | Add Inventory |
| The user selects a beverage and inserts an amount of money. The money must be an integer | Purchase Beverage |

### 4 Conclusions

The use-case diagram can provide the user's view for designing of the software product. And it can also be tested by matching up the requirements with the use-cases.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:40:37 -08'00'

**LIST OF EXPERIMENTS:**

**Expt: 1 - Aim:** Phases in software development project, overview, need, coverage of topics
**Tools/ Apparatus**: None.
**Procedure**:
1) Open an appropriate software engineering guide and study the software development life cycle and related topics.
2) Study the need of the software engineering.
3) Study the coverage of topics such as life cycle models and their comparisons.

**Expt: 2 - Aim:** To assign the requirement engineering tasks.
**Tools/ Apparatus:** None.
**Procedure:**
1) Identify the different requirement engineering tasks.
2) Assign these tasks to various students to set the ball rolling.
3) Ask the students to start working on the given tasks.

**Expt: 3- Aim:** To perform the system analysis: Requirement analysis, SRS (Allotted Project)
**Tools/ Apparatus:** None.
**Procedure:**
1) Assign the group of the students different tasks of system analysis.
2) Ask students to meet different users and start analysis the requirements.
3) Ask students to give presentations group-wise of their system requirements analysis.

**Expt: 4- Aim:** To perform the function oriented diagram: DFD and Structured chart
**Tools/Apparatus:** Netbeans 6.0. or IBM Rational Tools
**Procedure:**
1. Iidentify various processes, data store, input, output etc. of the system and ask students to analyse
2. Use processes at various levels to draw the DFDs.
3. Identify various modules, input, output etc. of the system and ask students to analyse.
4. Use various modules to draw Structured charts.

**Expt: 5- Aim:** To perform the user's view analysis: Use case diagram
**Tools/Apparatus:** Netbeans 6.0.
**Procedure:**
1) Identify various processes, use-cases, actors etc. of the system and ask students to analyse.
2) Use processes at various levels to draw the use-case diagram.

**Expt: 6- Aim:** To draw the structural view diagram : Class diagram, object diagram
**Tools/Apparatus:** Netbeans 6.0.
**Procedure:**
1) Identify various elements such as classes, member variables, member functions etc. of the class diagram
2) Draw the class diagram as per the norms.
3) Identify various elements such as various objects of the object diagram
4) Draw the object diagram as per the norms.

**Expt: 7- Aim:** To draw the behavioral view diagram : Sequence diagram, Collaboration diagram
**Tools/Apparatus:** Netbeans 6.0.
**Procedure:**
1) Identify various elements such as controller class, objects, boundaries, messages etc.of the sequence diagram
2) Draw the sequence diagram as per the norms.
3) Identify various elements such as for the sequence diagram of the collaboration diagram
4) Draw the collaboration diagram as per the norms.

**Expt: 8- Aim:** To draw the behavioral view diagram : State-chart diagram, Activity diagram
**Tools/Apparatus**: Netbeans 6.0.
**Procedure:**
1) Identify various elements states and their different transition of the state-chart diagram



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:40:52 -08'00'

2) Draw the state-chart diagram as per the norms.
3) Identify various elements such as different activity their boundaries etc. of the activity diagram
4) Draw the activity diagram as per the norms.

**Expt: 9- Aim:** To draw the implementation view diagram: Component diagram.
**Tools/Apparatus:** Netbeans 6.0.
**Procedure:**
1) Identify various elements of the componant diagram such as the various componants like client, server, network elements etc.
2) Draw the componant diagram as per the norms.

**Expt: 10- Aim:** To draw the implementation view diagram: deployment diagram
**Tools/Apparatus:** Netbeans 6.0.
**Procedure**:
1) Identify various elements such as the hardware components of the deployment diagram
2) Draw the deployment diagram as per the norms.

**Expt:11- Aim:** To perform various techniques for testing using the testing tool : unit testing, integration testing
**Tools/Apparatus:** Winrunner.
**Procedure:**
1) Identify various modules of the system so that they can be tested stand alone.
2) Identify the groups of the module that can be tested together in integration.
3) Perform the testing of the modules as a unit and in integration by using the testing tool.

**Expt: 12- Aim:** Aim: To draw UML diagrams using Rational rose software.
**Tools/Apparatus**: Rational rose software.
**Procedure:**
1) Identify various elements of the system to be drawn using the IDE.
2) Use the UML options of the rational rose to draw the diagrams from experiment 4 to 10.

**Expt: 13- Aim:** To draw UML diagrams using MS Visio software.
**Tools/Apparatus**: MS Visio software.
**Procedure**:
1) Identify various elements of the system to be drawn using the IDE.
2) Use the UML options of the MS Visio software to draw the diagram from experiment 4 to 10.

**REFERENCE BOOKS:**


- Fundamentals of Software engineering - Rajib Mall.
- Software design – From programming to architecture - Eric Braude
- Object-oriented software engineering – A use case driven approach – Ivar Jacobson(Computer language productivity award winner)


DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:41:05 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Computer Graphics Laboratory** | Code: | **322663(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of Programs:**

1. Write a program to draw the line using DDA algorithm.
2. Write a program to draw the line using Bresenham's algorithm.
3. Write a program to draw circle using Bresenham's algorithm.
4. Write a program to draw circle using mid-point algorithm.
5. Write a program to demonstrate draw ellipse using midpoint algorithm.
6. Write a program Rotation of Triangle.
7. Write a program Translation of Line.
8. Write a program to perform scaling of line.
9. Write a program shearing of Rectangle.
10. Write a program to implement boundary –fill algorithm.
11. Write a program to implement flood –fill algorithm.
12. Write a program to implement Bezier curve using four control points.
13. Write a program to implement Cohen Sutherland line clipping algorithm.
14. Write a program to implement Liang Barsky line clipping algorithm.
15. Write a program to implement face of a cartoon.

**Reference Book:**

1. Computer Graphics & Multimedia- G. S. Baluja -Dhanpat Rai & CO.
2. Computer Graphics Donald Hearn & M Pauline Baker-Pearson Pvt. Ltd.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:41:17 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Advanced Java Programming Laboratory** | Code: | **322664(22)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

Examples are compiled and tested in Eclipse/Net Beans IDE 6.0 or higher version with its integrated tomcat/glassfish server. Minimum 12 programs have to be executed.

**EXPERIMENT LIST:**

1. a) Program for printing Hello World
   b) Program for Printing System Date & Time JSP/SERVLET:
2. Program: For Telephone Directory
   In this example we will use getParameter() method of the request object for processing the telephone number , Here we would accept telephone no. from front end request is get done processed in server side and corresponding telephone no of entered user is displayed on screen as output
3. Write a server side program for Finding Factorial of number.
4. Write a Server side program in JSP/SERVLET for performing Addition of two no accept numbers from client side by using HTML form
5. Write a Server side program in JSP/SERVLET for calculating the simple interest accept the necessary parameters from client side by using HTML form
6. Write a Server side program in JSP/SERVLET for solving Quadratic Equation accept necessary parameters from HTML form
7. Write a Server side program in JSP/SERVLET for Income Tax Calculation
8. Write a Server side program in JSP/SERVLET for Calculation of Sales Commission
9. Program:Write a server side JSP/SERVLET program for checking prime number, accept number from html file handover the no to JSP/Servlet file process it and return the result
10. Install a database (MySQL or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form). Practice 'JDBC' connectivity. Write a java program/servlet/JSP/SERVLET to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page
11. Write a JSP/SERVLET which does the following job: Insert the details of the 3 or 4 users who register with the web site (Experiment -11) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database
12. Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount)) of each category. Modify your catalogue page in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.
13. Telephone Directory Example: With Database Connectivity with searching and sorting facility
14. Sessional and test results of CSVTU students are to be displayed on the web access to the web pages is given only to restricted users/students . Define MS Access database with user profile, accept name and password from web page and match it from database if it matches display the result page, otherwise show the message the permission is denied. Make the provision for changing password too
15. **HTTP** is a stateless protocol. Session is required to maintain the state. The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate() ). Modify your catalogue and cart JSP/SERVLET pages to achieve the above mentioned functionality using sessions.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:41:31 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of Program: | **Bachelor of Engineering** | | |
| Branch: | **Common to All Branches** | Semester: | **VI** |
| Subject: | **Managerial Skills** | Code: | **300665 (76)** |
| No. of Lectures: | **2/Week** | Tutorial Period: | **NIL** |
| Total Marks in ESE: | **NIL** | Marks in TA: | **40** |
| Minimum number of Class Tests to be conducted: | **Two** | | |

**Objective:**
The course is introduced to develop managerial skills tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Managerial skills are essential for overall professional development of an individual apart from gaining technical knowledge in the subject.

**Course Objectives**
Upon completion of this course, the student shall be able

- To define and explain the concept of managerial, written and oral communication skill;
- To understand the leadership skill;
- To develop self-appraisal and understand distinction between leader and manager;
- To develop positive attitude and thinking; and
- To understand managerial functions and develop creativity.

**UNIT I** **Managerial Communication Skills:** Importance of Business Writing: writing business letters, memorandum, minutes, and reports- informal and formal, legal aspects of business communication, oral communication- presentation, conversation skills, negotiations, and listening skills, how to structure speech and presentation, body language.

**UNIT II** **Managerial skills - Leadership**: Characteristics of leader, how to develop leadership; ethics and values of leadership, leaders who make difference, conduct of meetings, small group communications and Brain storming, Decision making, How to make right decision, Conflicts and cooperation, Dissatisfaction: Making them productive.

**UNIT III** **Proactive Manager:** How to become the real you: The journey of self-discovery, the path of self-discovery, Assertiveness: A skill to develop, Hero or developer, Difference between manager and leader, Managerial skill check list, team development, How to teach and train, time management, Stress management, Self-assessment.

**UNIT IV** **Attitudinal Change:** Concept of attitude through example, benefits of right attitude, how to develop habit of positive thinking, what is fear? How to win it? How to win over failure? How to overcome criticism? How to become real you? How to Motivate? How to build up self confidence?

**UNIT V** **Creativity**: Creativity as a managerial skill, Trying to get a grip on creativity. Overview of Management Concepts: Function of Management: Planning, organizing, staffing, controlling.

**Course Outcome**

- The students will be able to develop formal and informal, negotiation, written and oral communication skill;
- The students will be able to develop manage groups, resolve conflicts and leadership skill and decision making qualities;
- The students will be able to develop self-appraisal, teaching, training and managing stress and time;
- The students will be able develop positive thinking, motivating team members and winning race; and
- The students will be able to develop creativity and fundamental management functions.

**Text Books:**

1. Basic Managerial Skills for all by E.H. Mc Grawth, Prentice Hall India Pvt Ltd,2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

**Reference Books:**

1. How to develop a pleasing personality by Atul John Rego, Better yourself bools, Mumbai,2006
2. The powerful Personality by Dr. Ujjawal Patni & Dr. Pratap Deshmukh, Fusion Books, 2006
3. How to Success by Brian Adams, Better Yourself books, Mumbai, 1969



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:41:44 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Digital Signal Processing (Professional Elective – I)** | Code: | **322671(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objective**:
- This course introduces students to the fundamental techniques and applications of digital signal processing
- To develop skills for analyzing and synthesizing algorithms and systems that process discrete time signals, with emphasis on realization and implementation.

**Course Outcome:**
Upon completion of this course, students will be able to:
- Describe and analyze discrete time signals in the time domain and frequency domain.
- Apply digital signal processing techniques to analyze & design discrete time signals and systems
- Design and apply digital filters

**UNIT I** **DISCRETE-TIME SIGNALS:** Signal classifications, frequency domain representation, time domain representation, representation of sequences by Fourier transform, properties of Fourier transform, discrete time random signals, and energy and power theorems.

**UNIT II** **SAMPLING OF TIME SIGNALS:** Sampling theorem, application, frequency domain representation of sampling, and reconstruction of band limited signal from its samples. Discrete time processing of continuous time signals, changing the sampling rate using discrete time processing.

**UNIT III** **Z-TRANSFORM:** Introduction, properties of the region of convergence, properties of the Z-transform, inversion of the Z-transform, applications of Z-transform.

**UNIT IV** **BASICS OF DIGITAL FILTERS:** Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite Impulse response (IIR) system. Fundamentals of digital filtering, various types of digital filters, design techniques of digital filters: window technique for FIR, bi-linear transformation and backward difference methods for IIR filter design, analysis of finite word length effects in DSP, DSP algorithm implementation consideration. Applications of DSP.

**UNIT V** **DISCRETE AND FAST FOURIER TRANSFORM DFT and FFT:** Discrete Fourier transforms properties of DFT, circular convolution, linear convolution using DFT, fast Fourier transform: Radix 2 FFT algorithm, decimation in time, decimation in frequency, bit reversal.

**TEXT BOOKS:**
1. Digital Signal Processing: Proakis and Manolakis; PHI
2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya; TMH

**REFERENCE BOOKS:**
1. Digital Signal Processing: Alon V. Oppenhelm; PHI
2. Digital Signal processing (II-Edition): Mitra, TMH



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:41:57 -08'00'

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)**

Semester: VI
Subject: **Advanced Microprocessors & Micro-Controllers**
Total Theory Periods: **40**
Total Marks in End Semester Exam: **80**
ESE Duration: **Three Hours**

Branch: **Computer Sc. & Engg.**
Code: **322672(22)**
Total Tutorial Periods: **Nil**
Class Tests to be conducted: **02**

**Course Objective:**
- To understand the architecture 80286, 80386 and 80486 microprocessors.
- To study the architecture of microcontroller 8051.
- To study the instruction set and programming of 8051.
- To understand various interfacing concepts.

**Course Outcome:**
- After successful completion of this course students will be able to explain
- The architecture, programming and addressing modes of Intel 86 family processors.
- Various interfacing concepts circuits necessary for various applications.
- Concepts of microcontroller 8051

**UNIT-I** Intel 80286,80386 and 80486 microprocessors- System architecture, Modes- Real mode- Protected mode - Virtual 8086 mode, Segmentation and Paging, Protection schemes, Management of task, Enhanced instructions

**UNIT-II** Intel Pentium processor –System architecture-Branch prediction-Pentium memory management, Pentium Pro –Architecture and Special features, Pentium 4- Architecture-memory system-Hyper Threading Technology.

**UNIT-III** Reduced Instruction Set Computers (RISC)- Instruction execution characteristics, The use of a large register file, Compiler based Register optimization, Reduced Instruction Set Architecture, RISC Pipelining, MIPS R4000, SPARC.

**UNIT-IV** The ARM processors- ARM registers- ARM instructions- Memory access instructions and addressing modes, register move instructions, arithmetic and logic instructions and branch instructions (Programming not required) , CISC vs RISC.

**UNIT-V** 8051 Micro controller hardware- I/O pins, ports and circuits- External memory- Counters and Timers- Serial Data I/O- Interrupts. 8051 instruction set- Addressing modes- Assembly language programming- I/O port programming- Timer and counter programming- Serial communication- Interrupt programming- 8051 Interfacing to LCD, Sensors and Keyboard.

**Text Books:**

1. Advanced Microprocessors and Peripherals, 2nd Edn – A.K. Ray, K.M. Bhurchandi, Tat McGraw Hill
2. The 8051 Microcontroller Archetecture Programming and Application, 2nd Edn – Kennath J Ayala, Penram International Publishers (India)

**Reference Books:**

1. The 8051 Microcontroller and Embedded Systems – Mohammed Ali Mazidi and Jancie Gillispie Mazidi, Pearson Education Asia
2. Computer Organization and Architecture designing for performance, 7th Ed – William Stalling, Pearson Education
3. Computer Organization, 5th Edn – C.Hamacher, Z. Vranesic, S. Zaky, Mc Graw Hill
4. Microprocessors and Interfacing – Douglas V Hal, McGraw Hill.
5. The Intel Microprocessors 8086/88, 80286,80386,80486,Pentium ,Pentium Pro, PentiumII, PentiumIII, Pentium 4
6. Archetecture,Programming and interfacing – Barry.B.Brey, PHI.
7. Microprocessors and Microcontrollers : Architecture, Programming and System Design 8085, 8086, 8051, 8096 K. Kant, PHI.
8. Microprocessor, Microcomputer and Applications, 3rd Edn – A. K. Mukopadhyaya, Narosa.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:42:10 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Multimedia and Virtual Reality (Professional Elective – I)** | Code: | **322673(33)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective:**

- To understand the fundamental issues and problems in the representation, manipulation, and delivery of multimedia content particularly in a networked environment.
- To understand the concepts of multimedia components.
- To understand the concepts and application of Virtual Reality System,
-

**Course Outcomes:** Upon the completion of the course, the student should be able to:

- Know the fundamental video, audio, image, text processing techniques
- Acquire the basic skill of designing video compression, audio compression, image compression, text compression.
- Know the basic techniques in designing video transmission systems: error control and rate control
- Know the technologies related to virtual reality and application of virtual reality system.
- Familiar with VRML programming.

**UNIT I** **INTRODUCTION:** Concept of Multimedia, media & data stream, Main properties of multimedia system, Data stream characteristics of continuous media, multimedia Applications, Hardware and software requirements, Multimedia Products & its evolution.

**UNIT II** **COMPONENTS OF MULTIMEDIA:** Text, Basic sound concepts, MIDI, Speech, Basic concept of Images, Graphics format, Overview of image processing, Basic concepts of Video & animation, Conventional system, Transmission, Enhanced system, High Definition system, Computer based animation, Design & authoring Tools, Categories of Authority Tools, Types of products

**UNIT III** **DATA COMPRESSION:** Coding requirement, Source, entropy, hybrid coding, JPEG, MPEG, Text compression using static Huffmann technique, Dynamic Huffmann Technique, Statistical coding techniques.

**UNIT IV** **OPTICAL STORAGE MEDIA:** Videodisk and other WORMS, Compact Disk digital audio, Advantage of CD-DA Frames tracks blocks of CD-DA, CD-ROM, and Further CD-Rom based developments, Principles of CDWO, Prospects of CD technologies.

**UNIT V** **VIRTUAL REALITY:** Introduction to Virtual reality & Virtual reality Systems, Related Technologies: Tele-operation & augmented reality system VRML Programming, Domain Dependent Application like Medical, Visualisation Visibility computation Time Critical rendering.

**TEXT BOOKS:**

1. Multimedia System Design, Andleigh and Thakarar , PHI, 2003.
2. Multimedia Technology & Application, David Hillman, Galgotia Publications.

**REFERENCE BOOKS:**

1. Multimedia Computing Communication and Application, Steinmetz, Pearson Edn.
2. Virtual Reality Systems, John Vince, Pearson Education.
3. Fundamentals of Computer Graphics and Multimedia, D.P. Mukherjee, PHI



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:42:29 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Inter-Networking with TCP/IP (Professional Elective – I)** | Code: | **322674(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**

- Understand the architecture of the Internet protocols as a layered model.
- Describe the functions implemented by each protocol, the design of the protocol and the characteristics of typical implementations.
- Analyze the relationships and dependencies between the protocols.

**Course Outcomes:** At the end of this course student will be able to:

- Describe the architecture, design and behaviours of the internet and of the TCP/IP suite of protocols.
- Describe the concepts and techniques that have been used to design and implement the TCP/IP Internet technology
- Describe the issues that are driving the development of new protocols to broaden and enhance the operation of the Internet.

**UNIT I** **INTRODUCTION:** Introduction to internetworking, Overview of OSI Model TCP/IP protocol suite, Basics of switching technologies and switches, Comparisons of different models, Gateways.

**UNIT II** **INTERNET PROTOCOL:** Purpose of Internet Protocol, Internet datagram, Options, Checksum, ARP and RARP, Routing Methods: Routing Table and Routing module, ICMP, IGMP. **IP Addresses:** Introduction, Address Classification, A sample internet with classful addressing, Subnetting, Supernetting, Classless addressing, Security at the IP Layer, IPSec, IPv4 and IPv6 packet formats.

**UNIT III** **ROUTING PROTOCOLS: UNICAST ROUTING PROTOCOLS** Interior and Exterior routing, RIP, OSPF, BGP, **Multicasting:** Introduction, Multicast Routing, Multicast Routing Protocols, Multicast Trees, DVMRP, MOSPF, CBT,PIM, MBONE.

**UNIT IV** **TRANSPORT CONTROL PROTOCOL: TCP** TCP operation, Segment, Sliding window, Silly window, Options, TCP state machine, Karn's Algorithm, Congestion control- Leaky bucket and Token bucket algorithms. **UDP:** User Datagram, UDP operations, Checksum calculation.

**UNIT V** **TCP/IP OVER ATM NETWORKS:** ISDN and B-ISDN, ATM reference model, ATM Switch, Interconnection Network, Virtual circuit in ATM, Paths, Circuits and identifiers, ATM cell transport and adaptation layers, packet type and multiplexing, IP Address binding in an ATM Network, Logical Subnet Concept and Connection Management.

**Text Books:**

1. Internetworking with TCP/IP by Comer (Vol. 1)(PHI Pub.)
2. TCP/IP Protocol suite by Behrouz A. Forouzan.(TMH Pub.)

**Reference Books:**

1. Computer Networking by James F. Kurose, Keith W. Ross (Pearson Education)
2. TCP/IP Illustrated By Wright and Stevens (Vol.2) (Pearson Education)
3. An Introduction to Computer Networks by Kenneth C. Mansfield Jr. James L. Antonakes (PHI)



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:42:43 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Management Information Systems (Professional Elective – I)** | Code: | **322675(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objective:**

- Understand the importance of determining information system requirements for all management levels by describing the differences between various types of information systems
- Understand how information systems are developed
- Apply critical-thinking skills in identifying information systems problems and investigate existing literature about hardware and software solutions to problems.

**Course Outcome:** At the completion of the course student will be able to -

- Describe the advances in networking, data communications and the Internet and how they affect the way business is conducted.
- Identify which information technology tools are used to solve various business problems.
- Display proficiency solving business problems using modern productivity tools (e.g., spreadsheet, database) or creating custom programs.

**UNIT I** **MANAGEMENT & ORGANIZATIONAL SUPPORT SYSTEMS FOR DIGITAL FIRM:** Definition of MIS; Systems approach to MIS: Report writing s/w, MIS and Human factor considerations, concept of organizational information sub-system, MIS & problem solving. Case Studies.

**UNIT II** **INFORMATION SYSTEMS & BUSINESS STRATEGY:** Information Management. Who are the users? Manager & Systems, Evolution of Computer based information system (CBIS), Model of CBIS. Information services organization : Trend to End-User computing, justifying the CBIS, Achieving the CBIS, Managing the CBIS, Benefits & Challenges of CBIS implementation. Strategic Information System, Business level & Firm level Strategy, Case Studies.

**UNIT III** **INFORMATION SYSTEMS IN THE ENTERPRISE:** Systems from Management & Functional perspective & their relationship: Executive Information System, Decision Support System Sales & Marketing Information System, Manufacturing Information System, Human-Resource Information System. Finance & Account Information System. Case Studies.

**UNIT IV** **INFORMATION TECHNOLOGY FOR COMPETITIVE ADVANTAGE:** Firm in its environment, What are the information resources ? Who manages the information resources ? Strategic planning for information resources. End-User Computing as a strategic issue, Information resource management concept. Case Studies.

**UNIT V** **E-COMMERCE & INTERNATIONAL INFORMATION SYSTEM:** Introduction to E-Commerce, Business Intelligence. E-Commerce strategy, Electronic Data Interchange, E-commerce methodology, E-commerce technology, Business application of the Internet. Electronic Business success strategies. Managing International Information Systems: IIS architecture, Global business drivers , challenges, strategy: divide, conquer, appease, cooptation, business organization, problems in implementing global information systems, Computer crime, ethics & social issues.

**Text Books:**

1. MIS A Concise Study, S.A. Kelkar, PHI, 2nd Ed.
2. MIS managing the digital firm, Kenneth C. Laudon & Jane P. Laudon (Pearson Education).

**Reference Books :**

1. MIS, Suresh K. Basandra (Wheelers)
2. Introduction to computer Information System for Business, Mark G. Simkin, S. Chand & Co., 1996.
3. Analysis & Design of Information Systems, James A. Senn. MCGraw-Hill International.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:43:05 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Advanced Operating System (Professional Elective – I)** | Code: | **322676(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**
To understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems); Hardware and software features that support these systems.

**Course Outcomes:** At the end of this course student will be able to:
- Outline the potential benefits of distributed systems.
- Describe the internal architecture of Unix operating system.
- Summarize the major security issues associated with distributed systems along with the range of techniques available for increasing system Security.
- Operate different operating system with ease.

**UNIT I** **INTRODUCTION TO DISTRIBUTED OPERATING SYSTEM:** What are distributed OS? Examples of distributed OS, Resource sharing, challenges in designing distributed OS. Distributed OS architectures, software layers, Architectural Model. The Operating System Layer, Protection, Processes and Threads, Communication and invocation, Operating System Architecture. Distributed File System : File Service Architecture, Sun Network File System, the Andrew File System, Recent Advances, Name Services : Name services and domain name systems, Directory and discovery services, The Global name service, X .500 directory service.

**UNIT II** **SECURITY AND DISTRIBUTED ALGORITHM :** Overview of security techniques, Cryptographic algorithms, digital signatures, Cryptographic pragmatics. Distributed Algorithms: Distributed algorithm design principles and issues such as coordination, agreement. Examine source of difficulties such as timing, interaction models, and failures.

**UNIT III** **STRUCTURE OF UNIX OPERATING SYSTEM :** Overview of UNIX, Internal architecture of UNIX, Classification of UNIX command Handling files, Handling directories, File – Memory – I/O – Process management in UNIX, Administration of UNIX system, Shell Programming environment.

**UNIT IV** **STRUCTURE OF WINDOWS OPERATING SYSTEM :** Overview of WINDOWS OS, Internal architecture of WINDOWS OS, Classification of WINDOWS OS command, Handling files, Handling directories, File – Memory – I/O – Process management in WINDOWS OS, Administration of WINDOWS OS system, WINDOWS programming environment.

**UNIT V** **CASE STUDY OF OPERATING SYSTEMS:** Case Study of Process Management, Memory Management, File Management, I/O Management, System calls for WINDOWS, UNIX, LINUX etc.

**Text Books:**
1. Distributed OS, A.S Tanenbaum, PHI.
2. Distributed Operating System By P. K. Singha , IEEE Press
3. Understanding UNIX, K. Srirengan, PHI.

**Reference Books:**
1. Handbook of WINDOWS OS, IEEE press.
2. Operating System , Milan, TMH.
3. LINUX OS, BPB publication.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:43:36 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Advanced Data Base Systems (Professional Elective – I)** | Code: | **322677(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objective**

- Introduce basic concepts and major techniques in DBMS implementations. These include concepts and techniques for data storage, query processing, and transaction management.
- Introduce research development ability in databases.

**Course Outcome:** Upon completion of this course, students should be able to:

- Explain in detail DBMS architecture.
- Explain in detail query processing and techniques involved in query optimization.
- Explain the principles of concurrency control and recovery management.
- Explain the Security management in Databases

**UNIT I** **DISTRIBUTED DATABASE DESIGN:** Design strategies, Distribution design issues, Fragmentation, Allocation, Oracle DDB design, Distributed database system architecture, Date's rule for DDBS.

**UNIT II** **DATA REPLICATION & QUERY PROCESSING IN DDBS :** Classification of replica control strategies, Consistency & Request ordering, The Gossip Architecture, Process groups & ISIS, Replication in Oracle, Query optimization in Centralized system, Objective of query processing, Query decomposition, Distributed query optimization algorithms, Query optimization in Oracle.

**UNIT III** **TRANSACTION PROCESSING & RECOVERY:** Centralized & client server architecture, server systems architectures, parallel & distributed systems, distributed data storage, Transaction property, distributed transactions, commit protocols, concurrency control in distributed database, availability ,heterogeneous distributed databases, Distributed deadlock management, recovery concepts, recovery techniques based on deferred update & on immediate update shadow paging, The ARIES Recovery Algorithm, Recovery in multi-database systems, database backup and recovery from catastrophic failures, Reliability concept & measure, Site failure & network portioning, directory systems, Database recovery in Oracle.

**UNIT IV** **SECURITY MANAGEMENT & PL/SQL:** Various aspect of database security, Basic model of database access control, TCSEC Policy identification, Security models, Identification-Authentication- Authorization, Statistical databases, Data encryption, Security in Oracle, JDBC, Purpose of PL/SQL, PL/SQL block, structure & type, PL/SQL syntax & programming.

**UNIT V** **DIFFERENT DATABASES:** Parallel databases: Introduction, I/O parallelism. Interquery-intraquery-intraoperationinteroperation parallelism design of parallel systems.Client/Server DBS, Oracle DBMS, Distributed processing in Oracle, Oracle network protocols, Network administration in Oracle. Theory of OO databases, Multimedia databases, Real time databases.

**Text book:**

1. Database system concepts , 4th edition, Silberschatz-Korth-Sudarshan, TMH
2. Fundamentals of database systems 3rd edition, Elmasri & Navathe, Pearson education

**References:-**

1. Database concepts & systems ,2nd edition , Ivan Bayross, SPD
2. Database Management System, Rajesh Narang, PHI.
3. An Introduction to database systems, 7th edition, C.J. Date , Pearson education

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:43:50 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Computer Science & Engineering** | Semester: | **VI** |
| Subject: | **Object Oriented Modeling & Design (Professional Elective – I)** | Code: | **322678(22)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **One per Unit** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objective:**
- Understand the basic steps of Object Oriented Analysis and Design.
- Gain practical knowledge in the UML diagrams and notations.
- Build an object-oriented model for a project using UML.

**Course Outcome:** Upon completion of this course student will be able to-
- Understand basic object-oriented concepts for designing a solution.
- Apply an iterative, use case-driven process to the development of a robust design model.
- Use the UML to represent the design model.
- Apply the OO concepts abstraction, encapsulation, inheritance, hierarchy, modularity, and polymorphism to the development of a robust design model.
- Design a software system using object-oriented software engineering paradigm.

**UNIT I** **Introduction and Modeling Concepts: Introduction-** What is Object-Orientation?, What is Object-Oriented Development?, Object-Oriented themes, Evidence for usefulness of Object-Oriented Development, OO Modeling history.
**Modeling Concepts:** Modeling as design technique-Modeling, Abstraction, The three Models. Class Modeling- Object and Class, Links and Associations Concepts. Generalization and Inheritance, A Sample Class Model, Navigation of Class Models. Advanced Class Modeling –Advanced Objects and Class Concepts, Association ends, N-array associations, Aggregation, Abstract Classes, Multiple Inheritance, Metadata, Reification, Constrains, Derived Data, and Packages.

**UNIT II** **State Modeling and Interaction Modeling:** State Modeling- Events and States, Transition & Conditions, State diagrams, State diagram behavior, Nested State diagrams, Concurrency. Advanced State Modeling- Nested State diagram, Nested States, Signal Generalization, Concurrency, A Sample State Model, Relation of Class and State Models. Interaction Model- Use Case Models, Sequence Models, Activity Models. Advanced Interaction Modeling- Use Case relationships, Procedural Sequence Models, Special Constructs for activity Models.

**UNIT III** **Analysis and Design:** Process Overview- Development Stages, Development Life cycle. System Conception- Developing a System concept, Elaborating a Concept, Preparing a Problem statement. Domain Analysis- Overview of Analysis, Domain Class Model, Domain State Model, Domain Interaction Model, Iterating and Analysis. Application Analysis- Application Interaction Model, Application Class Model, Application State Model, Adding Operations.

**UNIT IV** **System design and class Design: System design:** Overview of System Design, Estimating Performance, Making a Reuse Plan, Breaking a System into Subsystems, Identifying Concurrency, Allocating Subsystems, Management of Data Storage, Handling Global Resources, Choosing Software Control Implementation, Handling Boundary Conditions, Setting Trade-off Priorities, Common Architectural Styles, Architecture of the ATM System.
**Class design:** Overview of Object Design, Bridging the gap, Realizing Use Cases, Designing Algorithms, Recursing Downward, Refactoring, Design Optimization, Reification of Behavior, Adjustment of Inheritance, Organizing a Class Design, ATM Example

**UNIT V** **Implementation:** Implementation Modeling- Overview of Implementation, fine-tuning classes, Fine tuning generalizations, realizing Associations, Testing. OO Languages- Introduction, Abbreviated ATM Model, Implementing Structure, Implementing Functionality. Databases- Introduction, Abbreviated ATM Model, Implementing Structure-basic and advanced, Implementing Structure for the ATM Example, Implementing functionality, OO Databases. Programming Style-OO Style, Reusability, Extensibility, Robustness, Programming in-the-large.

**Text Books:**
1. Object – Oriented Modeling and Design with UML, Michael R Blaha and James R Rumbaugh, 2nd Edition, Pearson Education, India.
2. Object oriented systems development, Ali Bahrami, McGraw-Hill Higher Education, 1999.

**Reference Books:**
1. Object Oriented Analysis & Design, Atul Kahate, Tata McGraw-Hill Education

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:44:04 -08'00'

**Name of the Programme: Bachelor of Engineering ::::: Duration of the Programme: Four Years**

2. Object-Oriented Analysis and Design with Applications, Third Edition, Grady Booch, Robert A. Maksimchuk Michael W. Engle, Bobbi J. Young, Ph.D., Jim Conallen, Kelli A. Houston

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:44:39 -08'00'

## *Chhattisgarh Swami Vivekanand Technical University,Bhilai*

**Scheme of teaching and examination**

**B.E. VII Semester Computer Science & Engineering**

| S.No | Board of Study | Subject Code | Subject Name | Periods per week | | | Scheme of Exam Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Information Technology | 322731(33) | Mobile Computing & Application | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 2 | Comp. Science & Engg. | 322732(22) | Parallel Processor and Computing | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 3 | Comp. Science & Engg. | 322733(22) | Network Programming | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 4 | Comp. Science & Engg. | 322734(22) | Cryptography & Network Security | 3 | 1 | | 80 | 20 | 20 | 120 | 4 |
| 5 | Refer Table-2 | | Professional Elective-2 | 4 | | | 80 | 20 | 20 | 120 | 4 |
| 6 | Comp. Science & Engg. | 322761(22) | Soft Computing Lab (Matlab/Sci lab) | | | 4 | 40 | | 20 | 60 | 2 |
| 7 | Comp. Science & Engg. | 322762(22) | Network Programming Lab | | | 4 | 40 | | 20 | 60 | 2 |
| 8 | Information Technology | 322763(33) | Android Lab | | | 4 | 40 | | 20 | 60 | 2 |
| 9 | Comp. Science & Engg. | 322764(22) | Minor Project | | | 5 | 100 | | 40 | 140 | 3 |
| 10 | Management | 322765(76) | Innovative & Entrepreneurial Skills | | | 2 | | | 40 | 40 | 1 |
| 11 | Comp. Science & Engg. | 322766(22) | ** Practical Training ** Evaluation / Library | | | 1 | | | 40 | 40 | 1 |
| | | | TOTAL | 16 | 4 | 20 | 620 | 100 | 280 | 1000 | 31 |

L:Lecture T:Tutorial P:Practical ESE: End Semester Examination CT: Class Test

TA: Teacher's Assessment

Note 1: Duration of All theory papers will be of Three Hours

Note 2: ** To be completed after VI semester and before the commencement of VII Semester

Table-2 : Professional Elective-2

| S. No. | Board of Study | Subject Code | Subject |
|---|---|---|---|
| 1 | Computer Science & Engg. | 322740(22) | Digital Image Processing |
| 2 | Computer Science & Engg. | 322741(22) | Advanced Computer Architecture |
| 3 | Computer Science & Engg. | 322742(22) | Operation Research |
| 4 | Computer Science & Engg. | 322743(22) | E-Commerce & Strategic IT |
| 5 | Computer Science & Engg.. | 322744(22) | Natural Languages Processing |
| 6 | Computer Science & Engg. | 322745(22) | OODBMS |
| 7 | Computer Science & Engg. | 322746(22) | Cloud Computing |
| 8 | Computer Science & Engg. | 322747(22) | Grid Computing |

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:44:56 -08'00'

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY**
**BHILAI (C.G.)**

| | |
|---|---|
| **Semester: VII** | **Branch: Computer Science & Engg.** |
| **Subject: Mobile Computing and Application** | **Code: 322731(33)** |
| **Total Theory Periods: 40** | **Total Tutorial Periods: 12** |
| **Total Marks in End Semester Exam: 80** | **Minimum number of CT to be conducted: 02** |

**Course Objective**

- To introduce the fundamental design principles & issues in cellular & mobile communications.
- To enable the student to understand the basic features of cellular-mobile communication systems and digital radio system.
- To motivate students to understand the different technology for working of mobile devices, their advantages and disadvantages and emerging problems.

**Unit- I Introduction, Cell Coverage &, Frequency Management:** Mobile and wireless devices, Frequencies for radio transmission, A basic cellular system, Cell Size. Elements of cellular radio systems, Design and Interference, Concept of frequency reuse, cell splitting, Channels, Multiplexing, Access Techniques, Medium Access control, Spread spectrum, Specialized MAC, Cell Throughput,, Co-channel interference reduction factor, Frequency management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment, Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.

**Unit- II GSM Architecture & Services:** GSM Services and Features, GSM System Architecture, GSM Radio Subsystem, GSM Channel Types, Example of a GSM Call, Signal Processing in OSM, Channel Coding for Data Channels, Channel Coding for Control Channels, Frequency and Channel Specifications. **New Data Services:** DECT Functional Concept, DECT Radio Link, Personal Access Communication Systems, PACS System Architecture, PACS Radio Interface, UMTS

**UNIT-III: Wireless Networks:** Wireless LAN, Hidden Nodes in Wireless Networks, Ordered MAC Techniques and Wireless Networks, Deterministic MACs for Wireless Networks, Comparison Of MAC Techniques for Wireless Networks; Infrared V/S Radio Transmission; IEEE 802.11, Architecture, Layers, Management; HIPERLAN; Bluetooth; Wireless Broadband (WiMAX), RFiD, Java Card., WLL.

**UNIT-IV: Mobile network and Transport layer:** Mobile Network Layer; Mobile IP, DHCP, ADHOC Networks; Mobile Transport Layer; Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP; Fast Transmit/Fast Recovery, Transmission/Time Out Freezing, Selective Retransmission, Transaction Oriented TCP.

**UNIT–V: Mobile System Development and Support:** Wireless Application Protocol (WAP) – WAP Model, WAP Gateway, WAP Protocols WAP User Agent Profile and Caching, Wireless Bearers for WAP, WAP Developer Toolkits, Mobile Station Application Execution Environment Third-Generation Mobile Services - Paradigm Shifts in Third-Generation Systems W-CDMA and cdma2000, Improvements on Core Network, Quality Service in 3G Wireless Operating System for 3G Handset, Third- Generation Systems and Field Trials, Other Trial Systems, Impact on Manufacture and Operator Technologies.

**Course Outcome:** After successful completion of the course students will be able to

- Understand the basic physical-layer architecture of a mobile communication system.
- Understand various multiple-access techniques for mobile communications, and their advantages and disadvantages.
- Students will be able to acknowledge about the working and development of mobile and wireless devices in detail, services provided by them and recent application development trends in this field.

**Text Books**

1. Mobile Communications – Schiller, Jochen; 2nd Indian Reprint, Pearson Education Asia – Addison Wesley Longman PTE. Ltd.
2. Wireless Communication Principles and Practice, Theodore S Rappaport, 2nd Ed, Pearson Education.

**Reference Books:**

1. Mobile Data Wireless LAN Technologies – Dayem, Rifaat A.; Prentice Hall International.
2. The Essential Guide to Wireless Communication Applications – Dornan, A.; 1st Indian Reprint, Pearson Education Asia.
3. Sandeep Singhal, "The Wireless Application Protocol", Pearson Education Asia,
4. P. Stavronlakis, "Third Generation Mobile Telecommunication systems", Springer Publishers.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:45:17 -08'00'

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY**
**BHILAI (C.G.)**

| | |
|---|---|
| **Semester: VIII** | **Branch: Computer Science & Engg.** |
| **Subject: Parallel processor and computing** | **Code: 322732(22)** |
| **Total Theory Periods: 40** | **Total Tutorial Periods: 12** |
| **Total Marks in End Semester Exam: 80** | **Minimum number of CTs to be conducted: 02** |

**Course Objective**

- To develop structural intuition of how the hardware and the software work, starting from simple systems to complex shared resource architectures.
- Get a broad understanding of parallel computer architecture and different models for parallel computing
- To understand concepts related to memory consistency models, cache coherence, interconnection networks, and latency tolerating techniques.
- To know about current practical implementations of parallel architectures.
- To learn how to design parallel programs and how to evaluate their execution

**UNIT-I: Introduction & Technique of Parallelism:** Trends towards parallel computing, parallelism in Uni-processor systems, Architectural classification schemes, Amdahl's law, Moore's law, Principles of Scalable Performance, Parallel Processing in Memory, Parallel Algorithms, Parallel Algorithm Complexity, Models of Parallel Processing, Cache coherence, Cache coherence Protocols.
**UNIT-II: Pipeline & Vector Processing:** Conditions of Parallelism: Data & Resource dependencies, Program flow mechanisms: Control-flow .vs. Data flow computers Principle of pipelining and vector processing: principles of linear pipelining, classification of pipeline processors. General pipelines and reservation tables. Instruction and arithmetic pipelines, vector processing, architecture of Cray –1, Pipeline hazards, VLIW computers, Array Processing.
**UNIT-III : Parallel Models & Mesh-Based Architectures:** PRAM and Basic Algorithms, Data Broadcasting, Parallel Prefix Computation, Shared- Memory Algorithms, Parallel Selection Algorithm, Sorting and Selection Networks, Selection Networks, Circuit-Level Examples, Tree-Structured Dictionary Machine, Parallel Prefix Networks, Sorting on a 2D Mesh or Torus, Routing on a 2D Mesh or Torus, Types of Data Routing Operations, Greedy Routing Algorithms, Wormhole Routing, Numeric al 2 D Mesh Algorithms, Other Mesh-Related Architectures, Meshes of Trees, Low-Diameter Architectures, Hyper-cubes and Their Algorithms, Sorting and Routing on Hypercubes, Bitonic Sorting on a Hypercube, Dimension-Order Routing, Broadcasting on a Hypercube, Other Hypercubic architectures, Butterfly and Permutation Networks, Plus-or-Minus-2'Network, The Cube-Connected Cycles Network , Shuffle and Shuffle–Exchange Networks, A Sampler of Other Networks, Star and Pancake Networks, Ring-Based Networks.
**UNIT-IV: Multiprocessor architecture and Programming:** Emulation and Scheduling, Emulations among Architectures, Distributed Shared Memory, Data Storage, Input, and Output, Multithreading and Latency Hiding, Parallel I/O Technology, Defect-Level Methods, Fault-Level Methods, Error-Level Methods, Parallel Programming Parallel Operating Systems, Parallel File Systems.
**UNIT-V: Parallel System Implementations:** Shared-Memory MIMD Machines, Variations in Shared Memory, MIN-Based BBN Butterfly, Vector-Parallel Cray Y-MP, CC-NUMA Stanford DASH, Message-Passing MIMD Machines, Data-Parallel SIMD Machines, Processor and Memory Technologies.
**Outcomes:** On completion of this subject the student is expected to:

- Have an understanding of parallel algorithms, analysis and architectures.
- Be able to reason about ways to parallelize a problem
- Design and analyze the algorithms that execute efficiently on parallel computers

**Name of Text Books:-**

1. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs.(MGH).
2. Parallel Computers: Arch.& Prog., Rajaraman & Siva Ram Murthy, PHI.

**Name of Reference Books :-**

1. Parallel Computer 2 –Arch..& Algo., Adam Hilger, R.W. Hockney, C.R. Jesshope,.
2. Advanced Computer Architecture with Parallel Programming", K. Hwang, MGH.
3. Parallel computing- Theory and practice - Michael J Quinn- Mc Graw Hill

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:45:45 -08'00'

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY**
**BHILAI (C.G.)**

**Semester: VIII** | **Branch: Computer Science & Engg.**
**Subject: Network Programming** | **Code: 322733(22)**
**Total Theory Periods: 40** | **Total Tutorial Periods: 12**
**Total Marks in End Semester Exam: 80** | **Minimum number of CTs to be conducted: 02**

**Course Objective**

- The main goal of this course is to enable the students to develop the necessary skills for developing robust & high performance scalable network applications.
- To learn about raw sockets and socket programming.
- To understand simple network management protocols and basics of TCP &UDP sockets.

**Unit- I Networking & TCP/IP:** Communication protocols, Network architecture, UUCP, XNS, IPX/SPX for LANs, TCP & IP headers, IPv4 & v6 address structures, Programming Applications: Time & date routines, Internet protocols: Application layer, Transport layer, Network layer, Datalink layer protocols, Chat, Email, Web server working method & programming.

**UNIT-II Socket Programming:** Creating sockets, Posix data type, Socket addresses, Assigning address to a socket, Java socket programming, Thread programming, Berkeley Sockets: Overview, socket address structures, byte manipulation & address conversion functions, elementary socket system calls – socket, connect, bind, listen, accept, fork, exec, close, TCP ports (ephemeral, reserved), Berkeley Sockets: I/O asynchronous & multiplexing models, select & poll functions, signal & *fcntl* functions, socket implementation (client & server programs), UNIX domain protocols.

**UNIT- III APIs & Winsock Programming:** Windows socket API, window socket & blocking I/O model, blocking sockets, blocking functions, timeouts for blocking I/O, API overview, Different APIs & their programming technique, DLL & new API's, DLL issues, Java Beans.

**UNIT- IV Web Programming & Security:** Java network programming, packages, RMI, Overview of Javascript, WAP architecture & WAP services, Web databases, Component technology, CORBA concept, CORBA architecture, CGI programming, Firewall & security technique, Cryptography, Digital Signature.

**UNIT- V Client Server Programming:** Client side programming: Creating sockets, implementing generic network client, Parsing data using string Tokenizer, Retrieving file from an HTTP server, Retrieving web documents by using the URL class. Server side programming: Steps for creating server, Accepting connection from browsers, creating an HTTP server, Adding multithreading to an HTTP server.

**Course Outcome:** After successful completion of the course, students will be

- Familiar with protocols, network interfaces, and Design/performance issues in local area networks and wide area networks,
- Familiar with basics of Socket and Socket programming.
- Familiar with contemporary issues in networking technologies,
- Familiar with network tools and network programming.
- Familiar with client server programming

**Text Books:-**

1. UNIX Network Programming, Steven.W.R, PHI (VOL I& II)
2. Window Socket Programming by Bobb Quinn and Dave Schutes

**Reference Books :-**

1. Windows Network Programming, Davis.R., ddison Wesley
2. Network Programming With Windows Socket By Baner .P., PH New Jersey

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:45:58 -08'00'

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY**
**BHILAI (C. G.)**

Semester: **VIII**
Subject: **Cryptography and Network Security**
Total Theory Periods: **40**
Total Marks in End Semester Exam: **80**
Minimum number of class tests to be conducted: **02**

Branch: **Computer Science & Engg.**
Code: **322734(22)**
Total Tutorial Periods: **12**
Assignments: **1 per Unit**

**Course Objective:**

- To understand the principles and practices of cryptography and network security
- To understand the practical applications that have been implemented and are in use to provide network security

**UNIT I: Overview:** Security trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security. **Symmetric (Private Key) Ciphers: Classical Encryption Techniques:** Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. **Block Ciphers and the Data Encryption Standard:** Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles.

**UNIT II: Symmetric Ciphers** (continued): **Basic Concepts in Number Theory and Finite Fields:** Groups, Rings, and Fields, Modular Arithmetic, the Euclidian algorithm, Finite Fields of the Form GF(p), Polynomial Arithmetic, Finite Fields of the Form GF($2^n$). **Advanced Encryption Standard:** The Origins AES, Evaluation criteria for AES, the AES Cipher. **Stream cipher**: Stream ciphers and RC4. **Confidentiality using symmetric encryption**: Placement of encryption function, traffic confidentiality, key distribution.

**UNIT III: Asymmetric (Public Key) Ciphers: Introduction to Number Theory:** Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms. **Public-Key Cryptography and RSA:** Principles of Public-Key Cryptosystems. **Key Management-Other Public-Key Cryptosystems:** Key management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

**UNIT IV**: **Asymmetric Ciphers (continued): Message Authentication and Hash functions**: Message authentication requirements, authentication functions, Message authentication codes, Hash functions, Security of Hash functions and MAC, SHA, HMAC, CMAC. **Digital Signatures and Authentication protocols**: Digital signature, Authentication protocols, Digital signature standards,

**UNIT V: Network Security applications: Authentication applications:** Kerberos, X.509 Authentication services, Public key infrastructure. **Electronic mail security**: PGP, S/MIME. Overview of IP Security. **Web Security**: Web security considerations, SSL and TLS, Secure electronic transaction. **System Security:** Intruders, Intrusion detection, password management, viruses and related threats, virus counter measures, Firewall design principles, and trusted systems.

**Course Outcome**: after successful completion of this course, the students will be able to explain

- Conventional encryption algorithms for confidentiality and their design principles
- Public key encryption algorithms and their design principles
- Use of message authentication codes, hash functions , digital signature and public key certificates
- Network security tools and applications
- System-level security issues like threat of and countermeasures for intruders and viruses, and the use of firewalls and trusted systems.

**Text Book:**

1. William Stallings, "Cryptography and Network Security, Principles and Practices", Pearson Education, Prentice Hall, 4th Edition.
2. Cryptography and Network Security, Atul Kahate, McGraw Hill Education (India) Private Limited; Third edition.

**Reference books:**

1. Applied Cryptography: Protocols & Algorithms, Schneier & Bruce, MGH International.
2. Cryptography and Security – by Dr T R Padmanabhan N Harini , Wiley India Pvt Ltd, 2011.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:46:11 -08'00'

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY**
**BHILAI (C. G.)**

Semester: **VII** Branch: **Computer Science & Engg.**
Subject: **Soft Computing Lab** Code: **322761(22)**
Total practical Periods: 42 Total Marks in End Semester Exam: **40**

**Course Objective:**

- To introduce students tools and techniques of Soft Computing;
- To develop skills thorough understanding of the theoretical and practical aspects of Soft Computing.
- Introduce students to fuzzy systems, fuzzy logic and its applications
- To familiarize with neural networks and learning methods for neural networks;
- To introduce basics of genetic algorithms and their applications in optimization and planning;

**Course outcome:** After successful completion of the course students will be able to -

- Understand the need for Soft Computing;
- Understand different uses of Soft Computing in various areas;
- Understand the steps involved in the development of Soft Computing;
- Acquire a working knowledge of some popular tools for Soft Computing;
- Design, implement and verify computing systems by using appropriate Soft Computing techniques and tools

**NOTE:** All programming should be done using C/C++/Java//MATLAB/SciLab.

1. Write Matlab/Scilab Program for Following
   - AREA = ?$r^2$ (USING ARITHMETIC OPERATOR).
   - e ? ?(150) (USING EXPONENTIAL OPERATOR).
   - y = $Sin^2$ ? /3 + $Cos^2$ ? /3 (USING TRIGONOMETRY OPERATOR).
   - y = Cos ? /4 + iSin ? /4 (USING COMPLEX NUMBER).
   - y= $\log_{10}(10^6)$ (USING LOGARITHMS OPERATOR).
2. Compute y- coordinates of a STRAIGHT LINE y = mx + c, where slope of line m =0.5 , intercept c= -2 and x- coordinates : x = 0 to 10 for 0.5 increments.
3. Create following vectors t with 10 elements 1 to 10.
   x = t sin(t) [ A MULTIPLE VECTORS}
   y = (t-1) / (t+1) [ A DIVIDE VECTORS}
   z = [sin(t2)/ (t2) [ A EXPONENTIAL VECTORS}
4. PLOT y = Sin x where 0 ?x? 2? .
5. PLOT y = $e^{-0.4x}$ Sin x where 0 ?x? 4?.
6. Write a script file to draw a unit circle.
7. Write a function factorial to compute the factorial *n!* for any integer n.
8. Write a function factorial to compute factorial *n!* using RECURSION for any integer n.
9. Write a function file *crossprod* to compute the cross product of two vectors u and v.
10. Write a Matlab program *(m.file)* to calculate union, intersection, complement and difference of two fuzzy sets.

Find whether the given matrix is (a) reflexive (b) tolerance and (c) transitivity matrix or not.

*R* =

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 | 1 |

by writing an *M*-file.

11. Find whether the given matrix is symmetry or not

*R* =

| | | | | |
|---|---|---|---|---|
| 1 | 0.5 | 0.3 | 0.6 | 0 |
| 0.5 | 1 | 0.7 | 0.5 | 0.9 |
| 0.3 | 0.7 | 1 | 0.6 | 0 |
| 0.6 | 0.5 | 0.6 | 1 | 0.5 |
| 0 | 0.9 | 0 | 0.5 | 1 |

by aMatlab program.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:46:25 -08'00'

**12.** Find the fuzzy relation between two vectors $R$ and $S$

$R =$

| | |
|---|---|
| 0.7 | 0.5 |
| 0.8 | 0.4 |

$S =$

| | | |
|---|---|---|
| 0.9 | 0.6 | 0.2 |
| 0.1 | 0.7 | 0.5 |

Using max–product and max-min method by a Matlab program

**13.** Use Matlab command line commands to display the Gaussian membership function. Given $x$ = 0–10 with increment of 0.1 and Gaussian function is defined between 0.5 and –5.

**14.** Use Matlab command line commands to display the triangular membership function. Given $x$ = 0–10 with increment of 0.2 triangular membership function is defined between [3 4 5]

**15.** Consider the water tank with following rules
1. IF (level is okay) THEN (valve is no_change) (1)
2. IF (level is low) THEN (valve is open_fast) (1)
3. IF (level is high) THEN (valve is close_fast) (1)

Using *Mamdani* method and *max–min* method for *fuzzification* and method of *centroid* for *defuzzification* method construct a FIS. Before editing that rules, membership functions must be defined with membership function editor

**16.** Use Matlab's Fuzzy Logic Toolbox to model the tip given after a dinner for two, where the food can be disgusting, not good, bland, satisfying, good, or delightful, and the service can be poor, average, or good. To get started, you type fuzzy in a Matlab window. Then use the fuzzy inference system and membership function editors to define and tune your rules.

**17.** Derive expressions for the weights and thresholds of a McCulloch-Pitts neuron that can compute the following input-output mappings:

| *in1* | *in2* | *out* |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

Write Matlab code for the above ANN.

**18.** Write a program in Matlab to implement Roulette wheel and ranking selection method. Design 128, 64, 32, 16, 8 and 4-level uniform quantizers and quantize the gray-level image, lena.pgm. Compare the results by these six different quantizers. Explain the artifacts (e.g., the visibility of undesirable contours).

**19.** Divide the image lena.pgm into blocks and each block has the size 4 x 4 pixels. Replace each block by the intensity of the (2, 2) pixel within the block. The new image will be 1/4th the size in both dimensions. Display the down-sampled image Spatial Transforms and Filtering

**20.** Apply power law transformation to the city.pgm image taking different values for gamma ($\gamma = 3$, $\gamma = 4$, and $\gamma = 5$).

**21.** Compute and plot (show the image and its histogram) the histogram of lena.pgm and city.pgm. Comment on what information can be discerned about the images from an examination of the histogram.

**22.** Apply histogram equalization to the input images legrain.pgm and darkgrain.pgm; submit your code and the output images.

**23.** Extract the gradient parts from the input image brain.pgm. Perform edge detection, Segmentation and Object recognition

**24.** Extract the rice objects from the input image rice.pgm.

**25.** Develop an imaging application to detect and count text lines and number of words in a scanned document.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:46:39 -08'00'

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY**
**BHILAI (C. G.)**

Semester: **VII** | Branch: **Computer Science & Engg.**
Subject: **Network Programming Lab** | Code: **322762(22)**
Total practical Periods: 42 | Total Marks in End Semester Exam: **40**

- Minimum 12 experiments to be performed
- All network programs must be executed in UNIX environment.

1. Write an echo program with client and iterative server using TCP.
2. Write an echo program with client and concurrent server using TCP.
3. Write an echo program with client and concurrent server using UDP.
4. Write a client and server program for chatting.
5. Write a program to retrieve date and time using TCP.
6. Write a program to retrieve date and time using UDP.
7. Write a client and server routines showing Blocking I/O.
8. Write a client and server routines showing I/O multiplexing.
9. Write an echo client and server program using Unix domain stream socket.
10. Write an echo client and server program using Unix domain Datagram socket.
11. Write a client and server program to implement file transfer.
12. Write a client and server program to implement the remote command execution
13. Write a client program that gets a number from the user and sends the number to server for conversion into hexadecimal and gets the result from the server.

**Text Books:**

1. Steven.W.R: UNIX Network Programming, PHI (VOL I& II)

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:46:54 -08'00'

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY**
**BHILAI (C. G.)**

Semester: **VII**
Subject: **Android Lab**
Total practical Periods: 42

Branch: **Computer Science & Engg.**
Code: **322763(33)**
Total Marks in End Semester Exam: **40**

**Course objective:**

- Understanding the working of Android applications
- To learn how to create GUI and handle events in Android applications.
- Understanding development of applications with data storage, APIs and Databases

**Suggested List of Experiments (but should not be limited to)**

1. Download and setup Android Environment
2. Using the Development environment
   a. Create a new Project using wizard
   b. Add source and resource files.
   c. Import existing projects into workspace
   d. Create testing Emulator
   e. Compile and run the project
   f. Debug the project
   g. Debug on android device.
3. XML Files
   a. AndroidManifest.xml
      a.i. Edit the manifest and change min sdk and target sdk of application.
      a.ii. Add main activity entries in manifest.
      a.iii. Add second activity entries in manifest.
      a.iv. Add Entries for Service, Broadcast receivers.
      a.v. Add uses permissions for reading files, internet, camera.
   b. Layouts
      b.i. Create Linear Layout in xml
      b.ii. Create Relative Layout in xml
      b.iii. Create frame layout in xml
      b.iv. Create a complex mixed layout using all above layouts
   c. Drawables
      c.i. Create xml drawable for rectangular, oval and other basic shapes
      c.ii. Create xml drawable with Layer list for complex shapes.
   d. Values
      d.i. Create strings.xml to store all your application strings.
      d.ii. Create color.xml to store all your color values
      d.iii. Create styles.xml to store all your custom themes and style objects
   e. Alternate resources based on qualifiers
      e.i. Create separate drawables folders and xml files based on screen density (LDPI, MDPI, HDPI, XHDPI, XXHDPI)
      e.ii. Create separate styles.xml based on different android versions.
      e.iii. Create separate layout folders based on device screen sizes and orientations.
4. Creating User Interface
   a. Create application with Basic Views (Textview, Button, ListView)
   b. Create application with different Layouts (Linear, Relative, Frame)
   c. Create application to handle and respond on click using Click Listeners
5. Assets and Images
   a. Create application which will access files from Assets folder (Images, sounds, Custom Fonts)

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:47:13 -08'00'

6. Application Fundamentals
   a. Activities
      a.i. Create application with one activity and display a layout created in xml.
      a.ii. Create application which will log all activity lifecycle events using Android log api.
      a.iii. Create application which should be Saving and restoring app state (eg textview text, checkbox checked state)
   b. Intents
      b.i. Create application which will start another activity using intent.
      b.ii. Create an activity which will pass data to second activity using intent.
      b.iii. Create activity which will start second activity and get response back from second activity.
   c. Services
      c.i. Create
7. Content Providers
   a. System provided content providers
      a.i. Create application which can access/modify Contacts of device.
      a.ii. Create application which can access & display Images available on device.
      a.iii. Create application which can access and play Media files (Audio & Video)
   b. Custom Contact providers
      b.i. Create application which will provide some data to other applications using ContentProvider system.
8. Broadcast Receivers
   a. Create application to Listen to following system events using Receivers
      a.i. Incoming SMS
      a.ii. In and outgoing Phone Call
      a.iii. Low Battery
      a.iv. Storage state changed
   b. Create application which will broadcast Custom event to custom Receivers.
9. Create application which will display following Notifications
      a.i. Toast notification
      a.ii. Status bar notification
      a.iii. Dialog notification
10. Preference & Data Storage
   a. Create application which will save and read back data using Shared Preference
   b. SQLite database
      b.i. Create app to create database using Open helper
      b.ii. Create app to read, write and delete database entries
11. Networking & Web API
   a. HTTP connectivity
      a.i. Create app to connect and fetch data from a Http server/ website using URLConnection
      a.ii. Create app to connect and fetch data from a Http server/ website using HTTPClient library
      a.iii. Create app to connect and post data to Http server/ website using URLConnection
      a.iv. Create app to connect and post data to Http server/ website using HTTPClient library
   b. TCP Sockets or Sockets
      b.i. Create a server app using tcp socket, it will send "Welcome" to client when its connected.
      b.ii. Create a client app using tcp socket, it will send "Hello" to server once connected.
12. Google API
   a. Create application using Maps api, it should display marker on current location of user
   b. Create application which will display ads using Admob api
13. Accessing android hardware
   a. Create Application to take picture and save it to file storage using camera api
   b. Create application to display current direction using sensor api
   c. Create application to show a toast if phone is waved in air.
   d. Create application to show list of paired and nearby bluetooth devices.
14. Facebook SDK
   a. Create application which can share link on facebook using Facebook sdk.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:47:29 -08'00'

b. Create application which can share photo on facebook using Facebook sdk.

15. Publish to playstore
   a. Enable Obfuscation for your application using Proguard
   b. Export Signed application package
   c. Prepare Store listing
   d. Upload and publish apk

**COURSE OUTCOMES: Once the student has successfully completed this course, he/she will be able to answer the following questions or perform following activities:**

- Understands basic concepts and technique of developing applications for the Android phone.
- Able to use the SDK and other development tools.
- Acquaintances with how to publish Android applications to the Android Market.

**Reference Books:**

Head First Android- By Jonathan Simon

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:47:45 -08'00'

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY**
**BHILAI (C.G.)**

**Semester: VII** | **Branch: Computer Science & Engg.**
**Subject: Digital Image Processing** | **Code: 322740(22)**
**Total Theory Periods: 50** | **Total Tutorial Periods: NIL**
**Total Marks in End Semester Exam: 80** | **Minimum number of CT to be conducted: 02**

**Course Objective**

- Cover the basic theory and algorithms that are widely used in digital image processing
- Expose students to current technologies and issues that are specific to image processing systems
- Develop hands-on experience in using computers to process images
- Develop critical thinking about shortcomings of the state of the art in image processing

**UNIT I: Introduction:**
Image formation model, Spatial & Gray level resolution, Image enhancement in special domain: Piecewise transformation functions, Histogram equalization, Histogram specification, image averaging, spatial filters-smoothing and sharpening, Laplacian filter, Canny edge detector.

**UNIT II: Image Enhancement in Frequency Domain & Image segmentation :**
2D discrete Fourier transform & its inverse, filtering in frequency domain, Ideal & Gaussian low pass filters, High pass filtering, FFT, Line detection, Edge detection, Edge linking & boundary detection, Thresholding, Region based segmentation.

**UNIT III: Morphological Image Processing:**
Logic operations involving binary image, Dialation & Erosion, Opening & Closing, Applications to Boundary extraction, region filling, connected component extraction.

**UNIT IV: Image compression:**
Coding redundancy- Huffman coding, LZW coding, run length coding, Lossy compression- DCT, JPEG, MPEG, video compression.

**UNIT V: Image representation & 3D:**
Boundary descriptors, Shape numbers, Texture, Projective geometry, Correlation based and feature based stereo correspondence, shape from motion, optical flow.

**Outcomes:** After successful completion of the course, student will be able to

- Describe, analyze and reason about how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation.
- Apply principles and techniques of digital image processing in applications related to digital imaging system design and analysis.
- Analyze and implement image processing algorithms.

**Name of Text Books:-**
1. Ganzalez and Woods, Digital Image Processing, Pearson education.
2. Sonka and Brooks, Image Processing, TSP ltd,

**Name of Reference Books:-**
1. Jain and Rangachar, Machine Vision, MGH.
2. Schalkoff, Digital Image Processing, John Wiley and sons.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:47:58 -08'00'

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY**
**BHILAI (C.G.)**

**Semester: VII** | **Branch: Computer Science & Engg.**
**Subject: Advanced Computer Architecture** | **Code: 322741(22)**
**Total Theory Periods: 50** | **Total Tutorial Periods: NIL**
**Total Marks in End Semester Exam: 80** | **Minimum number of CT to be conducted: 02**

**Course Objective**

- To provide in-depth coverage of current and emerging trends in computer architectures, focusing on performance and the hardware/software interface.
- To analyzing fundamental issues in architecture design and their impact on application performance.

**UNIT I: Pipeline:**
Linear: pipeline processor, Non linear pipeline processor, Instruction pipeline design, Mechanisms, Dynamic instruction scheduling, Arithmetic pipeline design, Super-scalar processors, VLIW architecture.

**UNIT II: Memory Hierarchy and I/O Organization ON:**
Cache memories, Cache coherence, High bandwidth memories, High bandwidth I/O, Disk I/O, Bus specifications and standards.

**UNIT III: Parallel Computer Models & Program Parallelism:**
Classification of Machines, SISD, SIMD & MIMD, Condition of parallelism, data and resource dependencies, Program partitioning & scheduling, grain size latency, control flow versus data control, data flow architecture.

**UNIT IV: synchronous Parallel processing :**
Vector instruction types, vector access memory schemes, vector and symbolic processors, SIMD architecture, SIMD parallel algorithms, SIMD computers and performance enhancements.

**UNIT V: System Interconnection:**
Network properties and routing, static interconnection networks, dynamic interconnection networks, Multiprocessor system interconnection, Multistage & combining networks.

**Course Outcomes:** After successful completion of this course, students will be

- Discuss the organization of computer-based systems and how a range of design choices are influenced by applications
- Differentiate different processor architectures and system-level design processes.
- Understand the components and operation of a memory hierarchy and the range of performance issues influencing its design.
- Understand the organization and operation of current generation parallel computer systems, including multiprocessor and multi core systems.
- Understand the principles of I/O in computer systems, including viable mechanisms for I/O and secondary storage organization.

**Text Books:-**

1. Flynn Computer Architecture: Pipelined and parallel processor design, JB, Boston.
2. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs. (MGH).

**Reference Books:-**

1. Parallel Computer 2 –Arch..& Algo, R.W. Hockney, C.R. Jesshope, Adam Hilger.
2. Advanced Computer Architecture with Parallel Programming, K. Hwang, MGH.
3. Parallel Computing, Theory and Practice, Michel J. Quinn, MGH.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:48:14 -08'00'

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY**
**BHILAI (C.G.)**

| | |
|---|---|
| **Semester: VII** | **Branch: Computer Science & Engg.** |
| **Subject: Operation Research** | **Code: 322742(22)** |
| **Total Theory Periods: 50** | **Total Tutorial Periods: NIL** |
| **Total Marks in End Semester Exam: 80** | **Minimum number of CT to be conducted: 02** |

**Course Objective**

- To introduce use quantitive methods and techniques for effective decisions–making; model formulation and applications those are used in solving business decision problems.
- To model decision making problems using major modeling formalisms of artificial intelligence and operations research, including propositional logic, constraints, linear programs and Markov processes,
- To evaluate the computational performance of search, satisfaction, optimization and learning algorithms.
- To apply search, satisfaction, optimization and learning algorithms to real world problems.

**UNIT –1 Linear Programming:** LP formulations, Graphical method for solving LP with 2 variables, Simplex method, Application of simplex method for maximization and minimization of LP problems, Artificial variable technique for finding the initial basic feasible solution, The Big-M method, Degeneracy in simplex method, Duality theory in LP, Dual simplex method.

**UNIT-2: Transportation Model:** North – West comer rule, Least cost method, Vogel's Approximation method, Modi Method, Assignment problem, Dynamic Programming: Basic concepts, Bellman's optimality principle, Dynamic programming approach in decision making, Optimal subdivision problem.

**UNIT- 3: Inventory Model:** Introduction to the inventory problem, Deterministic models, The classical EOQ (Economic order quantity) model, Purchasing model with no shortage, Manufacturing model with no shortage, purchasing model with shortage, Manufacturing model with shortage, Inventory models with probabilistic demand.

**UNIT –4: Sequencing and Queuing Theory:** Sequencing problem, Johnson's algorithm for processing N-jobs through 2 machine problem, N-jobs through 3 machine problem, 2- job through N machine by graphical method, Characteristics of queuing system- steady state M/M/1, M/M/1K and M/M/C queuing models.

**UNIT- 5: CPM and PERT:** Arrow network, Time estimates – Earliest expected time, Latest allowable occurrence time and slack, Critical path, Probability of meeting scheduled date of completion of project, Calculation on CPM network, Various floats for activities, Critical Path, Updating project, Operation time cost trade off curve & project time cost trade off curve, selection of schedule based on cost analysis.

**Course Outcome:**

- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimization problems.
- Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.

**Name of Text Books:-**

1. Operation Research, Panneerselvam, Prentice Hall of India
2. Operation Research: An Introduction - Hamdy a. Taha, Prentice Hall of India

**Name of Reference Books:-**

1. Gillett B.E, Introduction to Operation Research- A Computer Oriented algorithmic approach, Mc Graw Hill.
2. Kanti Swarup, Gupta.P.K.,Man Mohan, Operations Research, Sultan Chand & Sons.
3. Vohra N.D., Quantitative Techniques in Managemental, T.M.H.
4. Zoints. S.,Linear & Integer Programming,Prentice Hall.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:48:29 -08'00'

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY**
**BHILAI (C.G.)**

**Semester: VII** | **Branch: Computer Science & Engg.**
**Subject: E-Commerce and Strategic IT** | **Code: 322743(22)**
**Total Theory Periods: 50** | **Total Tutorial Periods: NIL**
**Total Marks in End Semester Exam: 80** | **Minimum number of CT to be conducted: 02**

**Course Objective:**

- To understand the business impact and potential of e-commerce
- To learn about the technologies required to make e-Commerce viable
- To learn e-commerce from an enterprise point of view
- To learn about the working of various electronic payment systems

**UNIT –Introduction:**
What is E-Commerce, Forces behind E-Commerce, E-Commerce Industry Framework, and Brief History of E-commerce. Inter Organizational E-Commerce, Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce, Architectural framework

**Unit–II -Network Infrastructure:**
LAN, Ethernet (IEEE standard 802.3) LAN , WAN , Internet, TCP/IP Reference Model, Domain Name Server , Internet Industry Structure.

**UNIT–III: Electronic payment systems**:
Types of electronic payment systems, digital token-based electronic payment systems, smart cards & electronic payment systems, credit card based electronic payment systems, risk and electronic payment systems, designing electronic payment systems.

**UNIT–IV: Information Distribution and Messaging:**
FTP,E-Mail, www server, HTTP, Web service implementation, Information publishing , Web Browsers, HTML, Common Gateway Interface

**UNIT –V: Mobile & wireless computing fundamentals:**
Mobile computing framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications, personal communication service.

**Course outcome:** After successful completion of the course, students

- Will be able to apply the skills necessary for large-scale web based e-commerce project development.
- Will be able to work on information distribution and messaging services in e-commerce application.
- Will be able to work on business applications of wireless and mobile technologies for e-commerce.

**Text books:**

1. Frontiers of E-commerce by Kalakota & Whinston, Addison Wesley.
2. E-business road map for success by Dr. Ravi Kalakota& Marcia Robinson, Addison Wesley.

**Reference book:**

3. Electronic Commerce by Bharat Bhasker, TMH.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:48:42 -08'00'

**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY**
**BHILAI (C.G.)**

**Semester: VII** | **Branch: Computer Science & Engg.**
**Subject: Natural Language Processing** | **Code: 322744(22)**
**Total Theory Periods: 50** | **Total Tutorial Periods: NIL**
**Total Marks in End Semester Exam: 80** | **Minimum number of CT to be conducted: 02**

**Course objective:**

- To understand the concepts of morphology, syntax, semantics and pragmatics of the language.
- To recognize the significance of pragmatics for natural language understanding
- To describe the simple system based on logic and demonstrate the difference between the semantic presentation and interpretation of that presentation
- To describe the application based on natural language processing and to show the points of syntactic, semantic and pragmatic processing

**Unit –I: Introduction and syntactic processing**
The study of Language, Linguistic background, Grammars and Parsing, Features and Augmented Grammars, Grammars for Natural Language, towards efficient parsing, Ambiguity Resolution.

**Unit –II: Semantic interpretation**
Semantics and Logical Form, Linking Syntax and Semantics, Ambiguity Resolution, Strategies for Semantic Interpretation, Scoping and the Interpretation of Noun Phrases.

**Unit –III: Pragmatics**
Discourse: Reference Resolution, Syntactic and Semantic coherence, Text Coherence, An Inference based resolution algorithm. Dialogue and Conversational Agents: What makes dialogue different? Dialogue structure and coherence.

**Unit –IV: Natural Language generation**
Introduction to language generation, architecture for generation, surface realization, systemic grammar, functional unification grammar, discourse planning.

**Unit –V: Machine translation**
Language Similarities and Differences, transfer metaphor, syntactic transformations, lexical transfer, idea of Interlingua, direct translation, using Statistical Techniques

**Course Outcomes:** After successful completion of the course, students

- Can set up, implement and evaluate natural language technology experiment step by step
- Will be familiar with a sample of machine learning techniques and can assess which ones are suitable for a given problem
- Can explain the interaction between rule based and probabilistic methods in language technology.

**Text Books:**
1. Speech and Language Processing, by Jurafsky, D. & Martin, J.H.
2. Natural Language Understanding, Allen, J

**Reference Books:**
1. Foundations of General Linguistics by Atkinson, M, Kilby, D A & Roca, I
2. An Introduction to Language by Fromkin, V & Rodman, R
3. Natural Language Processing for Prolog Programmers by Covington, M A
4. Natural language processing in Prolog: an introduction to computational linguistics by Gazdar, G& Mellish.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:48:57 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

**Semester: VIII** | **Branch: Electrical Engg.**
**Subject: Project Phase-II** | **Code: 324864(24)**
**Total practical periods: 60** | **Total Marks in end Semester Exam: 100**

In Project Phase-II the students would carry forward their work from Phase-I.

Attendance register will be maintained and students are expected to work in the respective labs. They should have regular meetings with their guides and inform the timely progress of their work.

In Phase-II the students are expected to complete the detailed design of the proposed work, implement the algorithms / techniques used on hardware/software, obtain the results and make a comparison with the existing system.

In Phase-II there shall be two assessments by the same review committee as in Phase-I. The students shall make presentation on the progress made before the committee. The first review should be held within 4 weeks after the completion of the overall design of the proposed work and the final review would be held at the end of 12 weeks but within the schedule. During the final review the students have to make a 15 min presentation. The internal assessment marks would be awarded based on the interaction with the guide, attendance record, presentations and the complete project report duly signed by the supervisor and the head of the department. The length of the report should be within 50 to 100 pages.

Every group should be encouraged to send a paper for publication in a journal or conference. A copy of the paper published/communicated with an acknowledgement from the guide for having communicated to the journal or conference should be attached as annexure to the report of the project work. Such students should be benefitted with additional marks during their internal assessment.

The final evaluation of Project Work for Phase-II shall be done based on the project report submitted and a Viva-Voce Examination by a team consisting of the an Internal examiner and an External Examiner appointed by the university. In view of proper evaluation of each project, it is expected that the team will not evaluate more than ten groups/ 30 students.

## Guidelines for preparing the Project Report

### I. General Guidelines

- The report must be written in English and be word processed on single side of paper. The numbers of pages should not exceed 100.
- Every chapter must begin on new page.
- Page numbers are mandatory and should be in Arabic numerals put at the bottom (centre) with all preliminary pages numbered in lower case Roman script.
- Spell checks should be carried out.
- Equations, figures and tables should be numbered as per the chapter number (E.g. Fig. 3.1 for first figure in chapter 3) and they should be cited in the text in proper and suitable manner.
- Appropriate Caption to each figure and Heading to each table should be provided.
- Maintain uniformity in writing the report.
- Reports are to be bound in sky blue colored hard cover with written materials in black script on the cover page of the report.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:49:11 -08'00'

## II. Report Format

- Report Title Page (Outer Cover) as per the format given in Annexure I (should be printed in Black color on a blue background) ( Annexure – I)
- Report Title Page (Inner Cover) as per the format given in Annexure I (should be printed in Black on white background)
- Declaration by the students (Annexure – II)
- Certificate from Supervisor/s (Annexure – III)
- Certificate from Examiners (Annexure – IV)
- Acknowledgements
- Abstract
- Table of Contents
- List of Tables
- List of Figures
- Chapters
- Appendix
- References

## III. Components of the Report

- **Preliminary Pages**
  The preliminary pages must include the title page, the certificates, acknowledgements, abstract, Table of Contents, List of Tables and List of Figures.
- **Abstract**
  The Abstract should be a comprehensive restatement of the document's purpose, scope, methods, results, conclusions, findings, and recommendations. The length should not exceed one page.
- **Introduction**
  The introduction provides the students with background information for the project work. Its purpose is to establish a framework, so that the students can understand how it is related to other area. The Introduction has multiple purposes, namely to create student interest in the topic or the motivation, objectives of the problem that leads to the study, and the contribution made by the students.
- **Literature Review and Theory**
  This should deal with review of the associated theory or the related background of their work. It shares with the students the results of other studies that are closely related to the study being reported and provides a framework for establishing the importance of the study. It can serve as a benchmark for comparing the results of the study with other findings.
- **Methodology**
  This section specifies the design utilized in the proposed work. It should detail the context of their work, indicating how the design was selected, discuss techniques for data collection, and explain the underlying rationale for these decisions. It may be useful to discuss the strengths and weaknesses of the chosen design.
- **Results Analysis and Discussions**
  The analysis compares the findings of the study. It may point out similarities and differences, agreements and contradictions, and explanations for these relationships.
- **Conclusions and Future Scope**
  Although this section does not need to be long, the students have an opportunity to tie up loose ends, summarize findings, and draw inferences. Specific recommendations are a good way of concluding

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:49:25 -08'00'

the report. The students should recommend possible changes in current practices, suggest new methods or analysis, or propose changes.

- **References and Appendices**

**IV. Typing of the Project Report**

- Type of paper: Executive bond (white)
- Paper size: A4 size
- Font: Times new roman
- Font size ( chapter title): 22 bold
- Font size ( heading): 16 bold
- Font size( sub heading): 14 bold
- Font size ( body of the text): 12 normal
- Font size (footnote): 10 normal
- Margins: Normal
- Line spacing: 1.5, with space after paragraph
- Text alignment: Justified
- Equation: Right aligned

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:49:40 -08'00'

**Annexure – I (Outer and Inner cover)**

# THE TITLE OF THE REPORT IN THE OUTER AND INNER COVER SHALL LOOK EXACTLY LIKE THIS TITLE

*(Font: Times New Roman, Size:16, Bold, Line Spacing: 1 ½, Centered )*

{Here put a gap of 4 lines}

**Project Report submitted to**
*(Font: Times New Roman, Size: 12, Bold, centered)*
*{Here put a gap of one line}*
**Chhattisgarh Swami Vivekanand Technical University Bhilai (India)**
*(Font: Times New Roman, Size: 14, Bold, centered)*
*{Here put a gap of two lines}*

**In partial fulfillment for award of the degree of**
*(Font: Times New Roman, Size: 12, Bold, centered)*
*{Here put a gap of one line}*
**BACHELOR OF ENGINEERING**
*(Font: Times New Roman, Size: 14, Bold, centered)*
*{Here put a gap of one line}*
**In**
*(Font: Times New Roman, Size: 14, Bold, centered)*
*{Here put a gap of one line}*
**Electrical Engineering**
*(Font: Times New Roman, Size: 14, Bold, centered)*
*{Here put a gap of two lines}*

***by***
*(Font: Times New Roman, Size: 12, Bold, centered)*
*{Here put a gap of two lines}*

**< Name of the Student>** **< Name of the Student>**
*(Font: Times New Roman, Size: 14, Bold, centered)*
*{Here put a gap of one line}*
**< Name of the Student>** **< Name of the Student>**
*(Font: Times New Roman, Size: 14, Bold, centered)*
*{Here put a gap of two lines}*

**Under the Guidance of**
*(Font: Times New Roman, Size: 12, Bold, centered)*
**<Name of the Supervisor/s>**
*(Font: Times New Roman, Size: 14, Bold, centered)*

*Institution logo*

**Department of Electrical Engineering**
**<Institute name>**
*(Font: Times New Roman, Size: 14, Bold, centered)*
*{Here put a gap of one line}*
**Session <Year>**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:49:54 -08'00'

*(Font: Times New Roman, Size: 12, Bold, centered)*

**Annexure – II**

## DECLARATION BY THESTUDENTS

We the undersigned solemnly declare that the project report titled <**Title of the Report**> is based on our own work carried out during the course of our study under the supervision of <**Name of the supervisor/s**>.

We assert that the statements made and conclusions drawn are an outcome of our work. We further certify that

i. The work contained in the report is original and has been done by us under the general supervision of our supervisor(s).
ii. The work has not been submitted to any other Institute for any other degree/diploma/certificate in this university or any other University of India or abroad.
iii. We have followed the guidelines provided by the University in writing the report.
iv. Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them by citing them in the text of the report and giving their details in the references.

_____ (Signature of the Student) Name of the Student Enrollment No.:

_____ (Signature of the Student) Name of the Student Enrollment No.:

_____ (Signature of the Student) Name of the Student Enrollment No.:

_____ (Signature of the Student) Name of the Student Enrollment No.:

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:50:07 -08'00'

**Annexure - III**

## CERTIFICATE FROM THE SUPERVISOR/S

This is to certify that the work incorporated in the project report entitled <**Title of the Report**> is a record of work carried out by <Name of the student> bearing Enrollment No.: ……. , <Name of the student> bearing Enrollment No.: ……. , <Name of the student> bearing Enrollment No.: ……. and <Name of the student> bearing Enrollment No.: ……. under my/our guidance and supervision for the award of Degree of Bachelor of Engineering in the faculty of Department of Electrical Engineering of Chhattisgarh Swami Vivekanand Technical University, Bhilai, Chhattisgarh, India.

To the best of my/our knowledge and belief the project report

*i)* Embodies the work of the candidates themselves,

*ii)* Has duly been completed,

*iii)* Fulfils the requirement BE degree of the University and

*iv)* Is up to the desired standard both in respect of contents and language for being referred to the examiners.

(Signature of the Supervisor) (Signature of the Supervisor)

(Name of the Supervisor) (Name of the Supervisor)

Forwarded to Chhattisgarh Swami Vivekanand Technical University, Bhilai

(Signature of the Head of the Department)

(Seal of the Department Electrical Engineering)

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:50:20 -08'00'

**Annexure - IV**

## CERTIFICATE BY THE EXAMINERS

This is to certify that the project report entitled <**Title of the Report**> which is submitted by

1. <Name of the student>, Roll No.: <Roll no. of the student>, Enrollment No.:< Enrollment No.>
2. <Name of the student>, Roll No.: <Roll no. of the student>, Enrollment No.:< Enrollment No.>
3. <Name of the student>, Roll No.: <Roll no. of the student>, Enrollment No.:< Enrollment No.>
4. <Name of the student>, Roll No.: <Roll no. of the student>, Enrollment No.:< Enrollment No.>

has been examined by the undersigned as a part of the examination for the award of the degree of Bachelor of Engineering in Electrical Engineering from Chhattisgarh Swami Vivekanand Technical University, Bhilai.

| | |
|---|---|
| (Signature of the External Examiner) | (Signature of the Internal Examiner) |
| (Name of the External Examiner) | (Name of the Internal Examiner) |
| Date: | Date: |
| Designation: | Designation: |
| Institute: | Institute: |

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:50:33 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: B.E.VIII** **Branch: Electrical Engg.**
**Subject: EHV AC and DC Transmission** **Code: 324841(24)**
**Total Theory Periods: 48** **Total Tutorial Periods:12**
**Total Marks in End Semester Exam: 80**

**Course Objectives:**

1. To study basic concepts of EHV AC and DC Transmission system.
2. To study concepts and operation of FACTS devices and gain knowledge about Series/ Shunt compensation of Lines.
3. To understand various components of EHV dc system, converter circuits, rectifier and inverter valves, their operation and control.

**Course Outcomes:** The end of the course, the students should be able to:

1. Describe fundamentals of EHV AC and DC Transmission system.
2. Describe the series / shunt Compensation of line by applying FACTS devices
3. Explain the components of EHV dc system, converter circuits, rectifier and inverter valves, their operation and control.

**UNIT – I: Fundamentals of EHV AC & DC transmission and Converter**

Constitution of EHV AC and DC Links, Kind of DC Links, Limitations and advantages of AC and DC Transmission, Principal application of AC and DC Transmission, trends EHV AC and DC Transmission, Power-handling capacity, Converter analysis Graetz circuit, Firing control, overlapping.

**UNIT – II: Line Compensation and FACTS Devices**

Extra long distance lines, Voltage profile of loaded and unloaded line along the line, Compensation of lines, series and shunt compensation, Shunt reactors, Tuned power lines, Problems of extra long compensated lines, FACTS concept and application.

**UNIT – III: Traveling waves and Over voltages in transmission system**

Traveling waves on transmission systems, Their shape, attenuation and distortion, effect of junction and termination on propagation of traveling waves, Over voltages in transmission system, Lightning, switching and temporary over voltage: Control of lighting and switching over voltages.

**UNIT – IV: Components and working of EHV dc system**

Components of EHV dc system, converter circuits, rectifier and inverter valves, Reactive power requirements, harmonics generation, adverse effects, Classification, Remedial measures to suppress, filters, Ground return, Converter faults & protection harmonics mis-operation, Commutation failure, Multi-terminal D.C. lines.

**UNIT – V: Control of EHV DC system**

Control of EHV dc system desired features of control, control characteristics, constants current control, Constant extinction angle control, Ignition angle control, parallel operation of HVAC & DC system, Problems and advantages.

**Textbooks:**

1. EHV AC Transmission, Begamudre, New Age International.
2. EHV AC & DC Transmission, Manoj Nair, Balaji publication
3. HVDC Transmission, Padiyar, New Age Pbs.

**Reference Books:**

1. EHV-AC and HVDC Transmission Engineering and Practice: Theory, Practice and Solved Problems, Sunil S. Rao, Khanna Publisher.
2. Direct current transmission, Edward Wilson Kimbark, Wiley-Interscience.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:50:47 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: B.E.VIII** | **Branch: Electrical Engg.**
**Subject: Flexible A C transmission System** | **Code: 324842(24)**
**Total Theory Periods: 48** | **Total Tutorial Periods:12**
**Total Marks in End Semester Exam: 80**

**Course Objectives:**

1. To study different types of FACTs controllers.
2. To study concepts and operation of voltage source converter and current source converter and current source converter.
3. To study the different methods of series compensation.

**Course Outcomes:** The end of the course, the students should be able to:

1. Make transformer connections for 12 pulse, 24 pulse and 48 pulse operation of voltage source converter.
2. Apply static var compensators in power systems for performance improvement.
3. Apply different methods of series compensation in power systems for performance improvement

**UNIT – I: Introduction**

Flow of power in AC system, loading capability, controllable parameters, basic types of FACTS controllers, review of semi-conductor devices (diodes, SCR's, MOSFET's, IGBT's etc.)

**UNIT II: Voltage Source Converters (VSCs)**

Basic concepts of VSC, single-phase full wave bridge converter operation, single phase-leg operation, three-phase full wave bridge converter and its operation, transformer connections for 12-pulse, 24-pulse and 48-pulse operation.

**UNIT III: Current source converters (CSCs)**

Basic concepts, three-phase CSCs, three-phase full wave rectifier, comparison of VSC and CSC.

Static shunt compensators: basic concepts, method of controllable VAR generation, Static VAR compensator (SVC), application of SVC in power systems.

**UNIT IV: Static Synchronous Series Compensator (STATCOM)**

Introduction, mathematical model, working of STATCOM, V-I and V-Q characteristics, transient stability enhancement and exchange of real power using STATCOM, comparison of SVC and STATCOM, Merits of hybrid compensators.

**UNIT V: Static Series Compensators**

Objectives of series compensation, variable impedance type series compensation, GTO thyristor controlled series capacitors (GCSC), thyristor controlled series capacitor (TCSC), basic concepts of GCSC and TCSC. Introduction to Unified Power Flow Controller (UPFC)

**Text Books:**

1. Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems, Narain G. Hingorani, Laszlo Gyugyi, Wiley-IEEE Press.
2. Thyristor-Based FACTS Controllers for Electrical Transmission Systems, R. Mohan Mathur, Rajiv K. Varma, John Wiley & Sons

**Reference Books:**

1. Flexible a c transmission system (FACTS), Edited by Yong Hue Song and Allan T Johns, Institution of Electrical Engineers, London.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:51:01 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: B.E.VIII** **Branch: Electrical Engg.**
**Subject: Bio-Medical Instrumentation** **Code: 324843(24)**
**Total Theory Periods: 48** **Total Tutorial Periods:12**
**Total Marks in End Semester Exam: 80**

**Course Objectives:**

The course is designed to make the student acquire an adequate knowledge of the physiological systems of the human body and relate them to the parameters that have clinical importance. The fundamental principles of equipment that are actually in use at the present day are introduced.

**Course Outcomes:**

1. To provide an acquaintance of the physiology of the heart, lung, blood circulation and circulation respiration.
2. To make the students understand the various sensing and measurement devices of electrical origin.
3. To provide the latest ideas on devices of non-electrical devices.
4. To bring out the important and modern methods of imaging techniques.
5. To provide latest knowledge of medical assistance / techniques and therapeutic equipments.

**UNIT-I Human Physiology And Basics:**

Brief introduction to human physiology, Basic components of bio-medical instruments, bioelectric signals, action potentials, Bio-electrodes.

**UNIT-II Transducers**

Biomedical Transducers: displacement, velocity, force, acceleration, flow, temperature, potential, dissolved ions and gases

**UNIT-III Electro-Physiological Measurements**

Analysis of EEG, ECG, EMG, EOG, & Bio-Potential Amplifiers for ECG, EMG, EEG, etc.

**UNIT-IV Electrical Parameter Measurements**

Cardiovascular measurement-blood pressure, blood flow, stroke volume, Impedance Plethysmography, Cardiac output, heart sound etc. Instrumentation for respiratory & nervous systems.

**UNIT-V Monitoring, Assisting, Therapeutic Equipments And Safety**

Patient care & monitoring system, Remote monitoring through telephone, Internet, Satellite link,

Safety aspects associated with Biomedical Instrumentation. Recent advances in Bio-Medical Instrumentation, Microprocessor based systems, Laser & optical Fiber systems.

**Text books:**

1. Biomedical Instrumentation and Measurements, Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, Prentice-Hall,
2. Handbook Of Biomedical Instrumentation, R. S. Khandpur, McGraw Hill

**Reference books:**

1. Biomedical Instrumentation, M. Arumugam, Anuradha Agencies.
2. Introduction to Biomedical Engineering, Domach, Pearson Education.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:51:18 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: B.E.VIII** **Branch: Electrical Engg.**
**Subject: VLSI Design** **Code: 324844(24)**
**Total Theory Periods: 48** **Total Tutorial Periods:12**
**Total Marks in End Semester Exam: 80**

**Course Objective**

1. To make student familiar with basic design techniques for IC fabrication.
2. Students will understand the significance of various design rule and its implementation for IC design.

**Course Outcome**

After successful completion of the course the student will be able to:

1. Apply his/ her knowledge in basic design techniques for IC fabrication
2. Understand layout design rules and logic design.
3. Help in VLSI Fabrication Industries

**Unit-I: Overview of VLSI Design Methodology**

VLSI design process-Architectural design-Logical design-Physical design-Layout styles-Full custom-semi custom approaches. Basic Electrical properties of MOS & CMOS circuits: NMOS enhancement transistor-PMOS enhancement transistor-threshold voltage-threshold voltage equations-MOS devices equations-Basic DC equations-Second order effects-MOS modules-small signal AC characteristics –NMOS inverter-Steered input to an NMOS modules-Depletion mode & enhancement mode pull ups-CMOS inverter-DC characteristics-Inverter delay-pass transistor-transmission gate

**Unit-II: VLSI Fabrication Techniques**

An overview of wafer fabrication –wafer Processing-Oxidation-Patterning- Diffusion –Ion implantation-Deposition-Silicon gate NMOS process-CMOS processes-Nwell-Pwell-Wintub-Silicon on insulator- CMOS process enhancement-Interconnect-Circuit elements.

**Unit-III: Layout Design Rules**

Need for design rules-Mead Conway design rule for the silicon gate NMOS process-CMOS Nwell/Pwell design rules-Simple layout examples-sheet resistance-area Capacitance-Wiring Capacitance-drive large capacitive loads

**Unit-IV: Logic Design**

Switch logic-pass transistor & transmission gate-Gate logic-Inverter-two point, NAND gate-NOR gate-other forms of CMOS logic-Dynamic CMOS logic-clocked CMOS logic-Precharged domino CMOS logic-structured design-simple combinational logic design examples-Parity generator-Multiplexes-clocked sequential circuits-two phase clocking-charge storage-dynamic register element-NMOS &CMOS- dynamic shift register-semi static register-JK flip flop circuit.

**Unit-V: Subsystem Design Process**

Design of a 4 bit shifter-General arrangement of a 4 bit arithmetic processor-Design of a ALU subsystem-Implementing ALU functions with an adder-Carry look ahead adders-Multipliers-serial parallel multipliers-Pipelined multiplier array-Modified Booth's Algorithm

**Text Books:**

1. Basic VLSI Design, Douglas A.Pucknell & Kamran Eshranghian, Prentice Hall of India, New Delhi, 3rd edition 1994.
2. CMOS VLSI Design : A Circuits and Systems Perspective, Neil H. E. Weste, David Harris and Ayan Banerjee, Pearson, 3rd Edition
3. Introduction to NMOS & CMOS VLSI system design, Amar Mukherjee, Prentice Hall, USA, 1986

**Reference books:**

1. Introduction to VLSI system, Caver Mead & Lynn Conway, Addison Wesley.
2. Introduction to VLSI design, Eugene D.Fabricus, McGraw Hill International edition, 1990.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:51:36 -08'00'

*Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: VIII** **Branch: Electrical Engg.**
**Subject: Robotics and Automation** **Code : 324845(24)**
**Total Theory Periods: 48** **Total Tut Periods: 12**
**Total Marks in End Semester Exam: 80**

**Course Objectives:**

1. To acquire the knowledge on advanced algebraic tools for the description of motion.
2. To develop the ability to analyze and design the motion for articulated systems.
3. To develop an ability to use software tools for analysis and design of robotic systems.

**Course Outcomes:**

1 Be able to use matrix algebra and Lie algebra for computing the kinematics of robots
2. Be able to calculate the forward kinematics and inverse kinematics of serial and parallel robots.
3 Be able to calculate the Jacobian for serial and parallel robot.
4 Be able to do the path planning for a robotic system.
5 Be proficient in the use of Maple or Matlab for the simulation of robots.

**UNIT-I: Fundamental Concepts of robotics**

History, present status & future trends-Robotics & automation-Laws of Robotics-Robot definitions-Robotics systems & robot anatomy-Specification of Robots-resolution, Repeatability & accuracy of a manipulator. Robot Drives & Power Transmission Systems & Control: Robot drive mechanisms, hydraulic-electric-pneumatic drives, mechanical transmission method-Rotary-to /Rotary motion conversion, Rotary –to linear motion conversion-End effectors-Types- in piping problem-Remote centered compliance devices-control of actuators in robotics mechanisms.

**Unit-II: Sensors & Intelligent Robots**

Sensory devices-Non optical-position sensors-optical position sensors-Velocity sensors-Proximity sensors-contact & non-contact type-touch &slip sensors-Force & torque sensors-Al & Robotics.

**Unit-III: Computer Vision for Robotics Systems**

Robot vision systems-Imaging components-image representation-Hardware aspects-Picture coding-Object recognition & categorization-Visual inspection-Software Considerations-Application-Commercial robotics vision systems

**Unit-IV: Transformations & Kinematics**

Homogenous coordinates-coordinates references frames-Homogenous transformation for the manipulator-The forward & inverse problem of manipulator kinematics-Motion generation-Manipulator dynamics-Jacobian in terms of D-H matrices-Controller architecture.

**Unit-V: Robot Cell Design & Control**

Specification of commercial robots-Robots design & process specification-Motor selection in the design of a robotic joint-Robot cell layouts-Economic & social aspect of robotics. Application of Robots: Capabilities of Robots-Robotics applications-Obstacle avoidance-Robotics in India-The future of robotics Factor Automation-Hierarchical computer control.

**Text books:**

1. Robotics Engg-An Integrated Approach, Richard D.Klafter, Thomas A.Chmielewski Michael Negin, Eastern Economy Edition, Prentice Hall of India P.Ltd.1989.
2. Robotics Technology & Flexible Automation, S. R. Deb and S. Deb, McGraw Hill 2nd edition.

**Reference Book:**

1. Robotics: Control, Sensing, Vision& Intelligence, K.S.Fu, R.C. Gomalez, C.S.G. Lee,tat McGraw Hill.
2. Industrial Robots-Technology, Programming & application, Mikell P.Groover et.al, McGraw Hill ,2nd edition.
3. Handbook of Industrial Robotics, Shiman Y.Nof, John Willey & Sons, New York, 1985

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:51:49 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: B.E.VIII** **Branch: Electrical Engg.**
**Subject: Artificial Neural Network & Fuzzy Logic** **Code: 324846(24)**
**Total Theory Periods: 48** **Total Tutorial Periods:12**
**Total Marks in End Semester Exam: 80**

**Course Objectives**

This subject aims to give an idea of evolution of artificial neural network as well as fuzzy logic. It introduces the architecture of a neural network. It gives the knowledge of network formation and various training algorithms. It also gives an introduction to fuzzy set theory its concepts and applications.

**Course Outcomes**

By the end of this course student will be able to

1. Explain basic artificial neural network architecture and functioning.
2. Describe the training schemes of various models.
3. Differentiate Fuzzy and Crisp systems with their applications.
4. Design ANN model for elementary engineering applications.

**Unit 1 : Basics of Artificial Neural Networks**

Histroical development of Neural Network Principles, Biological Neural Network (BNN), Basic building blocks of ANN, ANN: Terminologies (Weights, Activation function, Sigmoidal functions, Bias, Threshold), Topologies.

**Unit 2 : Models and Learning laws of ANN**

Models: McCulloch-Pitts Model, Perceptron model, Adaline model, Learning laws : Hebb's law, Perceptron law, Delta learning law, Competitive law, Boltzmann learning, Memory based learning.

**Unit 3 : Perceptron Networks**

Single layer perceptron: Architecture, Algorithm, Application procedure, Perceptron Algorithm for several Output Classes, Brief introduction to Multi Layer Perceptron Networks.

**Unit 4: Back Propagation Network (BPN)**

Generalized BPN rule, Architecture, Training Algorithm, Selection of parameters, Learning in Back Propagation, Local minima and Global Minima, Merits and Demerits of BPN, Applications.

**Unit 5: Fuzzy Sytems**

History of Development, Operation of Fuzzy logic, Fuzzy sets and Traditional sets, Membership Functions, Fuzzy techniques, Applications.

**Text Books:**

1. Introduction to Neural Networks using Matlab , S.N. Sivanandam, S. Sumathi, S.N.Deepa, Tata Mc Graw Hill Education Private limited, New Delhi, 2006.
2. Introduction to Artificial Neural Systems , Jacek M. Zurada, JAICO Publishing House, 2006.
3. Fuzzy Set Theory & its Applications, Zimmerman, H.J, Allied Publishers, New Delhi, 1996.

**Reference Books:**

1. Artificial Neural Network-Theory & Application Dan W Patterson, Prentice Hall of India, 1996
2. Fuzzy Logic with Engineering Applications, Timothy J Ross, McGraw Hill International Edition, USA, 1997
3. Artificial Intelligence: A Modern Approach Paperback, Stuart Russell, Peter Norvig, Pearson
4. Neural Networks in Computer Intelligence, Li Min Fu, McGraw Hill, USA, 1994.
5. Neural Networks, A Comprehensive foundation, 2nd Edition, Simon Haykin, Pearson Education.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:52:04 -08'00'

## *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: VIII** **Branch: Electrical Engg.**
**Subject: Radar & Television** **Code: - 324847(24)**
**Total Theory Periods: 48** **Total Tut Periods: 12**
**Total Marks in End Semester Exam: 80**
**Minimum number of Class tests to be conducted: 2**

**Course Objectives**

1. Understanding the basic concepts of radar
2. Understanding of the components of a radar system and their relationship to overall system performance, the radar operating environment and techniques
3. Analyzing different antenna system
4. Understanding the basic concepts of Television engineering, Transmitter and Receiver system

**Course Outcomes**

By the end of this course student will be able to

1. Know the concepts of radar
2. Analyze different antenna system
3. Understand the concepts of Television engineering.
4. Design TV Transmitter.

**Unit 1 Principal & Application:**
Basic Radar, radar block diagram, radar frequencies, application of radar, radar range equation, probabilities of false alarm, integration of radar pulses, radar cross-section of targets

**Unit II: Types of radar system operation with Application:**
Pulse, CW, MTI radar stacking radars, basics of radar Navigational aids

**Unit III: Types of Antennas Display:**
Parabolic, cosecant square antenna, Radomes, A scope display, B scope, E&F scope displays, Plain position indicator

**Unit IV: Fundamental of TV & TV standard:**
Sound and picture transmission, the scanning process, camera pick-up device, video signal, principle and working of colour television, colour fundamental mixing of colors and colours and colour perception, colour TV Camera.
Horizontal and vertical sync and Blanking standards, standard channels characteristics, consolidated CCIR system –B standard, various television broadcast systems.

**Unit V: TV Transmission and receiver:**
Requirements of TV broad –cast transmission, design principle of transmission, design principle of TV transmitters, Visual and aurual exciter, transmitting antennas.
Receivers: - Block schematic and functional for mono chromatics and colour TV receiver in India

**Textbooks:**

1. Radar system & Radio aids to Navigations. A K Sen Khanna pub
2. Television and video Engg . by A.M Dhake, TMH publication
3. Microwave & Radar Engineering, Kulkarni, Umesh pub

**Reference Books:**

1. Introduction to Radars, Skolnik, TMH
2. Radar Principles, Peebles, Wiley Pbs.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:52:17 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: VIII** **Branch: Electrical Engg.**
**Subject: Satellite Communication** **Code : 324848(24)**
**Total Theory Periods: 48** **Total Tut Periods: 12**
**Total Marks in End Semester Exam: 80**
**Minimum number of Class tests to be conducted: 2**

**Course Objectives**

1. Understand the basic concepts of satellite communication
2. Understand the basics of orbital mechanics, the types of satellite orbits, the location of ground stations, and the look angles from ground stations to the satellite
3. Learn the fundamentals and the techniques for the design and analysis of satellite communication systems
4. Design multiple-access satellite communications networks and understand the various trade-offs involved

**Course Outcomes**

By the end of this course student will be able to

1. Understand the characteristics of mobile/wireless communication channels.
2. Understand the multiple radio access techniques. Understand the multiple division and modulation techniques.
3. Analyze the performance of satellite communications systems
4. Specify systems design for satellite communications

**Unit –I Introduction:**
Synchronous satellite; Synchronous orbit, orbital parameter, satellite location with respect to earth; Look angles; Earth coverage and slant range; Eclipse effect; satellite frequency allocation and band spectrum; General And technical characteristic of satellite communication system; Advantage of satellite communication; Active and Passive satellite systems; current trends in satellite communication.

**Unit –II Communication satellite link design:**
Link design equation; system noise temperature; C/N, G/T ratio; Atmosphere and ionosphere effect on link design; Uplink design; complete link design interferences effect of complete link design Earth Station parameter, satellite communication link Analog base band Signals; FDM Techniques; SNR and CNR in FM in satellites link SNR in FM with multiplexed telephone signals; SCPC system CSSB system;
Analog FM/FDM TV satellites link; inter modulation effects in FM/FDM system; Energy dispersal in FM/FDM signals; Design base band signals; K digital satellite design.

**Unit III Multiple Access Techniques:**
TDMA Frame and burst structure; Frame Efficiency; Superfarme: TDMA Frame acquisition and synchronization; FDMA compared to TDMA: TDMA burst TME plan multiple beam TDMA satellite system; beam hopping TDMA; CDMA and hybrid access techniques; CSMA

**Unit IV Communication Satellite Subsystem:**
Power supply; Attitude and orbit control; Propulsion subsystem; Repeaters; Antenna subsystem; TTC subsystem; Thermal sub system structure subsystem: Reliability of satellites subsystem.

**Unit –V Satellite Earth stations:**
Earth stations design requirements; Earth stations subsystem; Monitoring and control; Frequency coordination; small earth station VSAT; Mobile and transport station; TVRO system.

**Textbooks:**

1. Satellite communication, Timothy Pratt, John Wiley & sons.
2. Satellite communication, Roddy, McGraw Hill Pbs.
3. Satellite Communications Systems Engineering, Wilbur L Pritchard, Henri G Suyderhoud, Robert A Nelson, Pearson

**Reference Books:**

1. Satellite communication, Dr.D.C. Agrawal, Khanna Publishers.
2. Satellite communication, Robert M. Gagliardi, CSB Publishers & Distributors.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:52:31 -08'00'

## *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)*

**Semester: B.E.VIII** **Branch: Electrical Engg.**
**Subject: Electrical Estimation and costing** **Code: 300816(24)**
**Total Theory Periods: 40** **Total Tutorial Periods:12**
**Total Marks in End Semester Exam: 80**

**Course Objectives:**

1. To give exposure to basic concepts estimating and costing.
2. To impart knowledge about material requirements for various Electrical installations.
3. To provide guidelines for preparation of Electrical drawings for residential and commercial buildings, , distribution substation, grid substation, overhead Lines

**Course Outcomes:**

At the end of the course the student should be able to :

1. Explain general principles of estimation & residential building electrification
2. Preparation of detailed estimates and costing of residential and commercial installation.
3. Design and estimate of overhead transmission & distribution lines, Substations.

**UNIT I: Principles of Estimation and Residential Building Electrification**

Introduction to estimation and costing, Electrical Schedule. Determination of cost material and labor Contingencies. Overhead charges.
General Rules guidelines for wiring of residential installation and positioning of equipments, Principles of circuit design in lighting and power circuits. Procedures for designing the circuits and deciding the number of circuits, Method of drawing single line diagram. Selection of type of wiring and rating of wires and cables Load calculations and selection of size of conductor, Selection of rating of main switch Distribution board, protective switchgear and wiring accessories, Preparation of detailed estimates and costing of residential installation.

**UNIT II: Electrification of Commercial Installation**

Design considerations of electrical installation system for commercial building, Load calculation and selection of size of service connection and nature of supply, Deciding the size of the cables, bus bar and bus bar chambers, Mounting arrangements and positioning of switchboards, distribution boards main switch etc, Earthing of the electrical installation, Selection of type wire, wiring system and layout, Preparation of detailed estimate and costing of commercial installation.

**UNIT III: Service Connection, Power Circuits, Inspection and Testing of Installation**

Concept of service connection, Types of service connection and their features, Method of installation of service connection, Estimates of underground and overhead service connections, Inspection of internal wiring installations, Inspection of new installations, testing of installations, testing of wiring installations,
Important considerations regarding motor installation wiring, Determination of rating of cables Determination of rating of fuse, Determination of size of Conduit, distribution Board main switch and starter.

**UNIT IV: Design of Overhead Transmission and Distribution Lines**

Introduction, Typical AC electrical LT system, Main components of overhead lines, Line supports. Factors governing height of pole, Conductor materials, Cross arms, Pole brackets and clamps, Guys and Stays, Conductors configuration spacing and clearances, Conductors configuration spacing and clearances, Span lengths, Overhead line insulators, Insulator materials, Types of insulators, Lightning Arrestors, accessories, Erection of supports, setting of stays, Fixing of cross arms, Fixing of insulators, Conductor erection, Repairing and jointing of conductor, Dead end clamps, Positioning of conductors and attachment to insulators Jumpers, Tee-offs, Earthing of transmission lines. Guarding of overhead lines, Clearances of conductor from ground Spacing between conductors.

**UNIT V: Design and Estimation of Substation**

Introduction, Classification of substation, Indoor substations, Outdoor substations, Selection and location of site for substation, Main Electrical Connections, Graphical symbols for various types of apparatus and circuit elements on substation main connection diagram. Key diagram of typical substations. Equipment for substation and switchgear installations, Substation auxiliaries supply, Substation Earthing.

**Note : For estimation and costing calculations refer attached sheets**

**Textbooks:**

Electrical Installation Estimating & Costing, J.B.Gupta,VIII Edition S.K.Katria & Sons New Delhi
Electrical Design Estimating and Costing, K.B.Raina S.K.Bhattacharya, New Age

**Reference Books:**

Electrical Wiring Estimating and Costing, S.L.Uppal, G.C Garg, Khanna Publishers

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:52:46 -08'00'

# CHHATTISGARH SWAMI VIVEKANAD TECHNICALUNIVERSITY, BHILAI

## Scheme of Teaching & Examination

## BE (Electronics &Telecommunication Engineering) III Semester

| Sl. No. | Boardof Study | CodeNo. | Subjects | PeriodPer Week | | | Schemeof Exam | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory/Practical | | | | |
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Appl. Mathematics | 328351(14) | Mathematics-III | 4 | 1 | - | 80 | 20 | 20 | **120** | 5 |
| 2 | Electronics &Telecom. | 328352(28) | Probability and Random Variables | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 3 | Electronics& Telecom. | 328353(28) | Electronic Devices and Circuits | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 4 | Electronics &Telecom. | 328354(28) | Network Analysis& Synthesis | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 5 | Electronics &Telecom. | 328355(28) | Industrial Instrumentation | 2 | 1 | - | 80 | 20 | 20 | **120** | 3 |
| 6 | Electronics &Telecom. | 328356(28) | Digital Logic Design | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 7 | Electronics &Telecom. | 328361(28) | Electronic Devices and Circuits Lab | - | - | 3 | 40 | - | 20 | **60** | 2 |
| 8 | Electronics &Telecom. | 328362(28) | Industrial Instrumentation Lab | - | - | 3 | 40 | - | 20 | **60** | 2 |
| 9 | Electronics &Telecom. | 328363(28) | Digital Logic Design Lab | - | - | 4 | 40 | - | 20 | **60** | 2 |
| 10 | Electronics &Telecom. | 328364(28) | Electronics Workshop | - | - | 3 | 40 | - | 20 | **60** | 1 |
| 11 | Humanities | 328365(46) | Value Education | - | - | 2 | - | - | 40 | **40** | 1 |
| 12 | | | Library | - | - | 1 | - | - | - | - | - |
| **TOTAL** | | | | **18** | **6** | **16** | **640** | **120** | **240** | **1000** | **32** |

***L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment***
***Note: Duration of all theory papers will be of Three Hours.***

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:53:01 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Mathematics – III** | Code: | **328351(14)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To provide tools for studying electromagnetic waves, signal processing etc.
2. To use partial differential equations and study its considerable importance in engineering systems
3. To describe initial and boundary value problems involving wave motions, transmission of signals along a cable.
4. To provide knowledge of Laplace transform of elementary functions including its properties and applications to solve ordinary differentials equations.
5. To provide a sound background of complex analysis to perform a thorough investigation of major theorems of complex analysis and to apply these ideas to a wide range of problems that include the evaluation of both complex line integrals and real integrals.
6. To provide tools to investigate the strength and direction of a relationship between two variables by collecting measurements and using suitable statistical analysis.

**UNIT- I** **Laplace Transform:** Definition, Linearity, shifting & scaling properties, Transform of elementary functions, Transform of derivatives and integrals, Multiplication by t & division by t. Inverse Laplace transform, Convolution theorem, Transform of periodic functions, Unit step function & Dirac delta function, Initial value & final value theorems, Application to solution of ordinary differential equations.

**UNIT-II** **Complex Variables:** Limit, Derivative, Analytic function, Cauchy-Riemann equations, Harmonic functions, Application to flow problems. Complex integration, Cauchy's integral theorem and integral formula, Taylor's & Laurent's series, Singular point, Poles & residues, Residue theorem & its application to contour integration.

**UNIT- III** **Correlation and Regression:** Linear correlation, Measures of correlation, Karl Pearson's coefficient of correlation, Spearman's rank correlation coefficient, Bivariate frequency distribution, Regression, lines of regression & coefficients of regression, Standard error estimate.

**UNIT-IV** **Series Solution of Differential Equations and Special Functions:** Series solution of differential equations, The method of Frobenius, Bessel's differential equation, Bessel's function of the First Kind - recurrence relations, generating function, orthogonality, Legendre's differential equation, Legendre's polynomial - Rodrigue's formula, generating function, recurrence relations, orthogonality.

**UNIT-V** **Partial Differential Equations:** Formation, Solution of Lagrange's linear differential equation, homogeneous linear differential equation with constant coefficients, non-homogeneous linear differential equations, Method of separation of variables. **Applications of PDE:** Initial & boundary value problems, Transmission of signals along a cable - Telephone equation, Telegraph & radio equations.

**Text Books:**

1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons.

**Reference Books:**

1. Advanced Engg. Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N. Wartikar & J.N. Wartikar.Vol- II– Pune Vidyarthi Griha Prakashan, Pune.
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

**Course outcomes:** Students will be able to

1. Define (mathematically) Unit step, Unit impulse, Laplace transforms, its properties, Inverse and applications to solve ordinary differential equations.
2. Solve difficult problems using theorems of complex analysis and apply Residue theorem to evaluate real integrals
3. Able to evaluate and interpret Karl Pearson's correlation coefficient and Spearman's correlation coefficient and also find equation of regression line and use them where appropriate.
4. Use special functions in communication system, non linear wave propagation, electromagnetic theory, signal processing etc.
5. Know the importance of PDEs in modern communication technology and many numerical simulations.
6. Solve wave equation, telephone equation, telegraph equation, radio equation and vibrations of membranes.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:53:15 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Probability and Random Variables** | Code: | **328352(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To study basics of probability theory.
- To understand the basic concepts of random variables & processes.

**UNIT- I** **SPECTRAL ANALYSIS OF SIGNALS:** Fourier series, Exponential form of the fourier series, Examples of fourier series, The sampling function, Response of a linear system, Normalized power, Normalized power in a fourier expansion, Power spectral density, Effect of transfer function on power spectral density, The fourier transform, Examples of fourier transforms, Convolution, Parseval's theorem, Power and energy transfer through a network, Band limiting of waveforms, Correlation between waveforms, Power and cross correlation, Autocorrelation, Autocorrelation of a periodic waveform, Autocorrelation of a nonperiodic waveform of finite energy.

**UNIT-II** **PROBABILITY:** Probability introduced through Sets and Relative Frequency, Joint and conditional probability, Independent events, Combined experiments, Bernoulli Trials.

**UNIT- III** **RANDOM VARIABLES:** Random variable concepts, Cumulative distribution function, Probability density function, Relation between probability and probability density, Joint cumulative distribution and probability density, Gaussian random variable, Poisson random variable, Rayleigh density and distribution function, Uniform density and distribution function, Exponential density and distribution function, Average value of a random variable, Variance of a random variable, Tchebycheff's inequality, Error function, Mean and variance of the sum of random variables, Probability density of $Z = X + Y$, Correlation between random variables, Central-limit theorem.

**UNIT-IV** **RANDOM PROCESSES - TEMPORAL CHARACTERISTICS:** The random process concept, Stationarity and independence, Correlation functions, Measurement of correlation functions, Gaussian random processes, Poisson random process.

**UNIT-V** **SPECTRAL CHARACTERISTICS OF RANDOM PROCESSES:** Power density spectrum and its properties, Relationship between power spectrum and autocorrelation function, Cross-Power density spectrum and its properties, Relationship between Cross-power spectrum and Cross-correlation function.

**Text Books:**

1. Principles of Communication Systems by Taub and Schilling, Tata McGraw Hill. (Unit – I & III)
2. Probability, Random Variables and Random Signal Principles, P. Z. Peebles, Tata McGraw Hill. (Unit – II , III, IV & V)

**Reference Books:**

1. Random Processes (Filtering, Estimation and Detection), Lonnie C. Ludeman, Wiley-IEEE Press.
2. Theory & problems of probability, Random variables and Random processes, Schaum Series, Hwei P. Hsu.
3. Probability and Random Processes with Application to Signal Processing, Henry Stark, John. W.Woods, 3rd Edition, Pearson Education.
4. Introduction to Random Signals and Noise, Wim C. van Ettn,, Wiley India.
5. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, S Chand and Sons.

**Course outcomes:**

1. Students should be able to define probability and interpret probability by modeling sample spaces.
2. To identify and formulate fundamental probability distribution and density functions, as well as functions of random variables.
3. Students are able to understand and analyze temporal and spectral characteristics of random processes.
4. Get the overview how various types of noise can be represented mathematically.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:53:28 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Electronic Devices and Circuits** | Code: | **328353(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To study semiconductor charge carriers transport phenomena.
- To understand practical applications of PN junction diode.
- To understand the basic working physics of BJT and study transistor biasing arrangements.
- To study basic principle of JFET, MOSFET their characteristics and amplifiers.

**UNIT- I** **CONDUCTION IN SEMICONDUCTOR:** Transport phenomena in semiconductors: Mobility and conductivity, Electrons and holes in an intrinsic semiconductor, Donor and acceptor impurities, Charge densities in a semiconductor, Law of mass action, Charge neutrality equation, Generation and recombination of charge carriers, Diffusion, Continuity equation, Injected minority carrier, Potential variation in a graded junction. Formation of p-n junction and its characteristics.

**UNIT-II** **DIODE AND ITS APPLICATION:** Semiconductor Diode: Construction, current components, V-I Characteristics, Effect of Temperature on V-I Characteristics, Ideal Diode, Diode equation, Diode Resistance, Diode Capacitance: Transition and Diffusion Capacitance. Load line analysis of diode circuit, DC analysis of diode circuits: Piecewise linear model of p-n junction diode. **Rectifiers:** Half wave, Full wave and Bridge rectifier: Voltage regulation, Ripple factor, Ratio of rectification, PIV, Transformer Utilization factor. Filter circuits for power supply: Inductor filter, Capacitor filter, LC filter, Multiple LC filter, CLC or $\pi$ filter. **Zener diode:** Break down mechanism, Characteristics, Specifications, Voltage regulator circuit using zener diode.

**UNIT- III** **BIPOLAR JUNCTION TRANSISTOR & ITS CONFIGURATIONS:** Introduction, Construction, Types: npn and pnp, Current components. Transistor as an amplifier, Transistor Characteristics (input, output and transfer), Transistor Circuit Configuration: CB, CC, CE Configuration, Early Effect. Ebers-Moll Model. Transistor as a Switch. **TRANSISTOR BIASING & THERMAL STABILIZATION:** Concept of operating point, Thermal runway, Bias stability, Stability factors, Fixed bias, Collector to base bias, Voltage divider bias. Bias compensation. (Thermistor , Sensistor and Diode)

**UNIT-IV** **JFET & ITS SMALL SIGNAL MODEL:** JFET Construction, Symbol, Basic Operation, V-I Characteristics, Cut-off and pinch-off voltages, Transconductance, CS, CG and CD Configuration, FET as switch, FET as VVR.
**Biasing arrangements for JFET:** Fixed bias, Self bias and Voltage divider bias, **Small-Signal Model Analysis** of Single stage JFET amplifiers: Mathematical definition of . Effect of $I_D$ on . AC input impedance, Output impedance and Voltage gain calculation for Fixed bias, Self bias and Voltage divider bias configuration of JFET.

**UNIT-V** **METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET):** Introduction, Construction, Symbol, Basic Operation, V-I Characteristics. MOSFET Types: Depletion MOSFET, Enhancement MOSFET, their characteristics and parameters, Body effect, Sub threshold conduction, The MOS Switch, CMOS devices. **MOSFET Biasing:** Fixed bias, Self bias and Voltage divider bias, Feedback bias in E-MOSFET.

**Text Books:**

1. Principles of Electronics by V. K. Mehta, Khanna Publication.
2. Electronic Devices and Circuit Theory – Robert L. Boylestad & L. Nashelsky, K.. L. Kishore, 9th Edition, PHI. (Unit- IV, V)
3. Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman & Halkias, Tata McGraw Hill. (Unit- I, II & III)
4. Electronic Devices & Circuits – Donald A Neaman, Tata McGraw Hill,

**Reference Books:**

1. Electronic Devices & Circuit – A.K. Maini & Varsha Agrawal, 1st Edition, Wiley Publication.
2. Electronic Devices & Circuits – Allen Mottershead, PHI.
3. Microelectronic Circuits - Sedra and Smith, 5th Edition, Oxford University Press.

**Course outcomes:**

1. The student is able to gain complete knowledge of transport phenomena in semiconductor.
2. Students are able to design practical circuit using diodes.
3. Students understand the concepts of DC analysis of BJT.
4. Students get complete knowledge on JFET and MOSFET.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:53:45 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Network Analysis & Synthesis** | Code: | **328354(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To understand the basic concepts and analysis of electric circuits.
- T o make the students learn how to synthesize an electrical network from a given impedance / admittance function.

**UNIT- I** **METHODS OF ANALYSING CIRCUITS:** Introduction, Tree and Co-Tree, Twigs and Links, Incidence Matrix (A), Properties of Incidence Matrix A, Incidence Matrix and KCL, Link Currents: Tie-Set Matrix, Cut-Set and Tree Branch Voltages, Mesh Analysis, Nodal Analysis.
**TWO-PORT PARAMETERS:** Relationship of Two-Port Variables, Short-Circuit Admittance Parameters, The Open Circuit Impedance Parameters, Transmission Parameters, The Hybrid Parameters, Relationships between Parameters Sets, Parallel Connection of Two-Port Networks.

**UNIT-II** **INITIAL CONDITIONS IN NETWORKS:** Initial Conditions in Elements, Geometrical Interpretation of Derivatives, A Procedure for Evaluating Initial Conditions, Initial State of a Network.
**THE LAPLACE TRANSFORMATION:** Introduction, The Laplace Transformation, Basic Theorems for the Laplace Transformation, Application of Laplace Transformation Technique in Electric Circuit Analysis.

**UNIT- III** **TRANSFORMS OF SIGNAL WAVEFORMS:** The Shifted Unit Step Function, The Ramp and Impulse Functions, Waveform Synthesis, The Initial and Final Value of f(t) from F(s), The Convolution Integral, Graphical Convolution.
**SINUSOIDAL STEADY-STATE ANALYSIS:** The Sinusoidal Steady State, The Sinusoid and $e^{\pm j\omega t}$; Solution Using $e^{\pm j\omega t}$; Solution Using $Re^{j\omega t}$ or $Ime^{j\omega t}$; Phasors and Phasor Diagrams.

**UNIT-IV** **IMPEDANCE FUNCTIONS AND NETWORK THEOREMS:** The Concept of Complex Frequency, Transform Impedance and Transform Circuits, Series and Parallel Combinations of Elements, Network Functions for the One Port and Two Port, Calculation of Network Functions for Ladder and General Networks. Network Theorems: Thevenin's Theorem, Norton's Theorem, Superposition Theorem.
**INPUT POWER AND POWER TRANSFER:** Energy and Power, Effective or Root- Mean Square Values, Average Power and Complex Power, Problems in Optimizing Power Transfer.

**UNIT-V** **ELEMENTS OF REALIZABILITY AND SYNTHESIS OF ONE-PORT NETWORKS:** Hurwitz Polynomial, Positive Real Functions, Frequency Response of Reactive One-ports, Synthesis of Reactive One-ports by Foster's Method, Synthesis of Reactive One-ports by the Cauer Method, Synthesis of R-L Network by Foster's Method, Synthesis of R-L Network by Cauer Method, Synthesis of R-C Network by Foster's Method, Synthesis of R-C Network by Cauer Method.

**Text Books:**

1. Network Analysis–M.E. Van Valkenburg, Pearson Education. (Unit- I, II, III & IV)
2. Circuits and Networks: Analysis and Synthesis–A. Sudhakar & Shyammohan S. Palli, Tata McGraw Hill.(Unit- I, & V)
3. Network Analysis and Synthesis – Franklin Kuo, Wiley International.

**Reference Books:**

1. Engineering circuit analysis- Hayt and Kimberley, TMH.
2. Electronic circuit analysis-Alexender and Sadique, TMH.
3. Network Synthesis–T. Lapatra,TMH.

**Course outcomes:**

1. Students are able to apply laplace transform in analyzing the circuits.
2. To evaluate properties & apply network theorems on various networks.
3. To evaluate two-port parameters of a given network.
4. Synthesize given network using foster and cauer forms.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:53:57 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Industrial Instrumentation** | Code: | **328355(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To studyBasic Measurement System.
- To understand Basics of Transducers and Primary Sensing Elements.
- To understand different types of Transducers relating with Non Electrical Parameter.
- To study Temperature and Pressure measurement.
- To study different phenomena of Flow measurement and Photo Electricity.

**UNIT- I** **MEASUREMENT SYSTEMS:** Introduction to Measurement Systems: Elements of Generalized Measurement System, Cathode Ray Oscilloscope: Block Diagram of General purpose CRO, Measurement of Phase and Frequency using Lissajous Patterns, Dual Trace Oscilloscopes, Sampling Oscilloscopes, Digital Storage Oscilloscopes. Display Devices: LED, LCD.

**UNIT-II** **PRIMARY SENSING ELEMENTS AND TRANSDUCERS:** Basics of Transducers: Transducer Performance, Transducers Classification. Static and Dynamic Characteristics.
Potentiometer: Loading effect, Power rating of Potentiometers, Linearity and sensitivity, Constructiom of Potentiometer. Theroy of Strain Gauges and its types. Variable Inductance type Transducer: LVDT and RVDT. Capacitive Transducer:Change in area of plates, Change in distance between plates, Change in dielectric constant, Frequency response of Capacitive transducers.

**UNIT- III** **MEASUREMENT OF NONELECTRICAL QUANTITIES:** (Velocity,Liquid Level and Humidity)
Measurement of Linear Velocity: Moving Coil, Moving Magnet and Seismic type, Measurement of Angular Velocity: Stroboscope. Measurement of Liquid Level: Resistive, Inductive and Capacitive methods. Measurement of Humidity: Resistive and Capacitive Hygrometers.

**UNIT-IV** **TEMPERATURE & PRESSURE MEASUREMENT:** Temperature Measurement: Bimetallic Thermometer, Platinum Resistance Thermometer, Thermistor, Thermocouple: Laws, Construction and its Types. Optical Pyrometers.
Pressure Measurement: U-Tube Double Column and Single Column Manometer, U-Tube Differential Manometer, Mechanical gauges: Elastic Pressure Transducers: Bourdan Gauge, Dead Weight Piston Gauge.

**UNIT-V** **FLOW MEASUREMENT & PHOTOELECTRIC TRANSDUCERS:** Flow Measurement: Classification of fluid flow measurement techniques, Theory of Variable head meters: Theory for incompressible fluids, Constructional details of variable head meters: Flow Nozzle, Orifice flow meter, Venturimeter. Pitot Tube. Special flow meter: Electromagnetic Flow Meter.
Photoelectric Transducers: Photoelectric Phenomenon, Photoconductive, Photovoltaic and Photo-emissive cell.

**Text Books:**

1. Electrical and Electronic Measurements & Measuring Instrumentation, A.K. Sawhney, Khanna Publication. (Unit- I, II & III)
2. Mechanical Measurements & Control, D.S. Kumar, Metropolitan Book Company Pvt. Ltd. (Unit- II, IV & V)
3. Transducers and Instrumentation; D.V.S. Murty, PHI.

**Reference Books:**

1. Mechanical and Industrial Measurements; R.K. Jain, 10th Edition, Khanna Publication.
2. Sensors and Transducers; D. Patranabis, 2nd Edition.,PHI.

**Course outcomes:**

1. Students will be acquainted with basics of measurement system and functioning of CRO.
2. Students are able to acquire knowledge and overview of Transducers.
3. Students are familiar with industrial applications of Transducers.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:54:11 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Digital Logic Design** | Code: | **328356(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To Design, Analyze and Interpret Combinational Circuits
2. To Design, Analyze and Interpret Sequential Circuits

**UNIT- I** **NUMBER SYSTEMS, CODES AND BOOLEAN ALGEBRA:** Representation of Signed Numbers and Binary Arithmetic in Computers. **Codes**: Weighted and Non-Weighted Codes, Sequential Codes, Self-Complementing Codes, Cyclic Codes; The 8421 BCD Code: BCD Addition; Excess-3 Code; The Gray Code: Binary to Gray and Gray to Binary Code Conversion; Error Detecting Codes: Parity, Check Sums, Block Parity, Five-bit Codes, The Biquinary Code, The Ring Counter Code; Error Correcting Code:7-bit Hamming code; Alphanumeric Codes: The ASCII Code, The EBCDIC Code. **Boolean Algebra:** Logic Operations; Axioms and Laws of Boolean Algebra: Complementation Laws, AND Laws, OR Laws, Commutative Laws, Associative Laws, Distributive Laws, Redundant Literal Rule, Idempotence Laws, Absorption Laws, Transposition Theorem, Demorgan's Theorem; Duality; Reducing Boolean Expressions; Functionally Complete Sets of Operations; Boolean Functions and Their Representation.

**UNIT-II** **MINIMIZATIONTECHNIQUES:** Expansion of a Boolean expression to SOP form; Expansion of a Boolean expression to POS form; Two, Three & Four variable K-Map: Mapping and minimization of SOP and POS expressions; Completely and Incompletely Specified Functions- Concept of Don't Care Terms; Quine – McClusky Method (Up to 5 variable); Synthesis using AND-OR, NAND-NOR and XOR forms; Design Examples; Programmable Logic Devices: PAL, PLA's & PROMS.

**UNIT- III** **COMBINATIONAL CIRCUITS:** Adder & Subtractor: Half adder, Full adder, Half subtractor, Full subtractor; Binary Parallel Adder; The Look Ahead Carry Adder; Serial Adder; BCD Adder; Code Converters; Parity Bit Generators/ Checkers; Comparators; Decoders: 3-Line to 8-Line Decoder, 8-4-2-1 BCD to Decimal Decoder, BCD to Seven Segment Decoder; Encoders: Octal to Binary and Decimal to BCD Encoder; Multiplexers: 2- Input Multiplexer,4-Input Multiplexer, 16-Input Multiplexer; Demultiplexers: 1-Line to 4-Line & 1-Line to 8- Line Demultiplexer; Applications of Multiplexers.

**UNIT-IV** **SEQUENTIAL CIRCUITS:** Flip-Flops: S-R Latch; Gated S-R Latch; D Latch; Edge Triggered Flip-Flops: S-R,D,J-K and T Flips-Flops; Master-Slave J-K Flip-Flop; Asynchronous Inputs; Shift Registers: SISO, SIPO, PISO,PIPO, Bi-Directional Shift Registers, Universal Shift register; Counters: Asynchronous Counters: Design of Asynchronous Counters; Effects of Propagation Delay in Ripple Counters; Synchronous Counters: Design of Synchronous Counters, 3-bit Synchronous Up counter, 3-bit Synchronous Down Counter,3-bit Synchronous Up-down Counter, Design of Modulo-9 Synchronous Counter, Design Of Synchronous BCD Counter, Design of Synchronous Mod-6 Counter; Shift Register Counters; Pulse Train Generators, Design of Sequence Generators; Design of Finite State Machine: Mealy and Moore Model.

**UNIT-V** **DIGITAL LOGIC FAMILIES:** Introduction; Simple Diode Gating and Transistor Inverter; Digital IC Specification Terminology; Logic Families: TTL: Open collector gates, TTL subfamilies; IIL; ECL; MOS Logic; CMOS Logic; Dynamic MOS Logic; Interfacing: TTL to ECL, ECL to TTL, TTL to CMOS, CMOS to TTL; Comparison Among Various Logic Families, Manufacturer's Specification.

**Text Books:**

1. Fundamentals of Digital Circuits: A. Anand Kumar, PHI.(Unit – I to V)
2. Digital Electronics-Principles and Integrated Circuits, A.K. Maini, 1st Edition, Wiley India.

**Reference Books:**

1. Digital Fundamentals: Floyd & Jain: Pearson Education.
2. Digital Electronics: A. P. Malvino: Tata McGraw Hill.
3. Digital Circuits & Logic Design–LEE, PHI.

**Course outcomes:**

1. Students will be able to gain knowledge about various codes, employ Boolean algebra and circuit minimization techniques.
2. Students gain knowledge to interpret the operation of logic circuit such as adders, subtractors, multiplexers, flip-flops, shift registers and counters.
3. Students will be able to design asynchronous, synchronous sequential circuits and finite state machines.
4. Gain knowledge about various logic families and select a suitable one for a specific application.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:54:26 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Electronic Devices and Circuits Laboratory** | Code: | **328361(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. To draw the characteristics of a semiconductor p-n junction diode and to find cut-in voltage, reverse resistance, static resistance and dynamic resistance.
2. To simulate characteristics of pn junction using SPICE model.
3. To draw the characteristics of a zener diode and to find cut-in voltage, reverse resistance, static resistance and dynamic resistance.
4. To design a half wave rectifier and to determine its efficiency and ripple factor.
5. To design a centre tap full wave rectifier and determine the ripple factor and efficiency with and without filter.
6. To design a bridge full wave rectifier and determine the ripple factor and efficiency with and without filter.
7. To draw the characteristics of CE configuration of a transistor amplifier.
8. To draw the characteristics of CB configuration of a transistor amplifier.
9. To draw the characteristics of CC configuration of a transistor amplifier.
10. To simulate characteristics of BJT using SPICE model.
11. To design a Zener regulator circuit and to find the regulation characteristics.
12. To draw the load line and find Q-point of a transistor amplifier under CE configuration.
13. To design and verify the self bias circuit operation.
14. To design and verify the voltage divider biasing circuit.
15. To draw the characteristics of FET.
16. To simulate characteristics of FET using SPICE model.
17. To draw the characteristics of MOSFET.

**Equipment/Machines/Instruments/Tools/Software Required:**

Circuit components, Breadboard, Hook-up wire, Power supply, CRO, Function generator, Any simulation software – Package like SPICE or MATLAB.

**Recommended Books:**

1. Laboratory Manual for Electronic Devices and Circuits, 4th Ed., David A. Bell, PHI
2. Lab Manual of Electronic Devices by Paul B Zbar.
3. Microelectronics' An integrated approach' by Roger T. howe and Charles G. Sodini.
4. Electronic Devices Systems and Applications by Robert Diffenderfer, Cengage learning.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:54:39 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Industrial Instrumentation Laboratory** | Code: | **328362(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. To study method of displacement measurement using Linear Potentiometer.
2. To study Strain gauge working as displacement sensor.
3. Measurement of linear displacement using Linear Variable Differential Transformer (LVDT).
4. To study LVDT as displacement transducer and observe displacement versus output voltage characteristics.
5. To calibrate variation in capacitance to measure displacement using Capacitive Displacement Transducer.
6. To study measurement of humidity using Humidity Transmitter set up.
7. To study the characteristics of IC temperature sensor (LM 335).
8. To study the characteristics of NTC bridge circuit.
9. To study the characteristics of NTC Thermistor.
10. To study the characteristics of Temperature Sensor Setup (Thermocouple, RTD, Thermistor Setup).
11. To study working of Pressure sensor (Piezo resistive/strain) and to observe characteristics of air pressure versus output voltage.
12. To study Dead Weight Pressure Gauge Tester.
13. To study calibration of flow meters setup with Electromagnetic Flow Meter.
14. To measure liquid flow using Orifice, Ventury, Rotameter and Turbine type flow sensor.
15. To study the characteristics of Filament Lamp.
16. To study the characteristics of Photovoltaic Cell.
17. To study the characteristics of Photoconductive Cell.
18. To study the characteristics of Photo-Transistor.
19. To study the characteristics of Optically Controlled Switching System.
20. Measurement of displacement using Light Dependent Resistor (LDR).
21. To study Rotary Encoder for speed and angular measurement.
22. Study of Transducer and Measurement system based upon a particular Application.

**Equipment/Machines/Instruments/Tools/Software Required:**

Transducers Trainer Kit, Sensors, Power supply, Digital Multimeter.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:54:54 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Digital Logic Design Laboratory** | Code: | **328363(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. To Verify The Properties of NOR & NAND Gates As Universal Building Block.
2. Realization of Boolean Expression Using NAND Or NOR Gates.
3. To design and implement an X- OR Gate Using Only NAND Or NOR Gates Only.
4. To design and implement a Half Adder Circuit using Logic Gates And Verify its Truth table.
5. To design and implement a Full Adder Circuit And Verify its truth table (Using Two X-OR And 3 NAND Gates).
6. To design and implement a Half Subtractor Circuit by Using Basic Gates And Verify its truth table.
7. To design and implement a Full Subtractor Circuit by Using Basic Gates And Verify its truth table.
8. To design and implement a Circuit of 4 -Bit Parity Generator and Checker & Verify its truth table.
9. To design and implement a 4x1 Multiplexer using Logic Gates And Verify its truth table.
10. To design and implement a 1x4 De-Multiplexer using Logic Gates And Verify its truth table.
11. To design and implement a Programmable Inverter Using X-OR Gates & Verify its truth table.
12. To design Octal to Binary Encoder using Logic Gates and Verify its truth table.
13. To design BCD to Excess-3 Decoder using Logic Gates And Verify its truth table.
14. To design Binary to Gray Code Converter and Verify its truth table.
15. To Design A Comparator Circuit & Verify its truth table.
16. To Construct A RS Flip Flop Using Basic & Universal Gates (NOT, NOR & NAND)
17. To Construct A J.K. Master Slave Flip Flop & Verify its truth table
18. To Verify The Operation of A Clocked S-R Flip Flop And J. K. Flip Flop
19. To Construct A T & D Flip Flop Using J. K. Flip Flop And Verify Its Operations & truth table.
20. To Construct and study the operation of a 4-bit Shift Register in following modes:
    a. Serial In Serial Out
    b. Serial In Parallel Out
    c. Parallel In Serial Out
    d. Parallel In Parallel Out
21. To Verify the Operation of 4-bit Binary Asynchronous Counter.
22. To Verify The Operation of a Synchronous Decade Counter.
23. To perform the operation of BCD Counter Using 7490.

**Equipment/Machines/Instruments/Tools/Software Required:**

Various ICs , Power Supply, Hook-Up Wires.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:55:15 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Electronic Workshop** | Code: | **328364(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At leastTen experiments are to be performed by each student)*

1. To understand the operational features of Analog and Digital Multimeter.
2. To understand the operational features of Cathode Ray Oscilloscope.( Calibration, Time/div, Volt/div, X-Y, single channel, Dual channel)
3. To understand the operational features of Function Generator ( Measurement of volt and frequency, attenuation).
4. Measurement of capacitors (mica, ceramic, paper, electrolytic and variable) using CRO and LCR Meter and verify with color coding.
5. Measurement of resistors- Fixed (carbon, wire wound, metal film and variable) using CRO and Multimeter and verify with color coding and identification of special resistors like Thermistor, LDR and VDR (FET)
6. Measurement of inductors (fixed ) using CRO and LCR meter.
7. Study of Diodes (Ge and Si ), Zener diodes and LEDs.( terminals, resistance and capacitance in forward biased and reversed biased conditions).
8. Study of Transistors ( npn, pnp) using multimeter and CRO. (terminals, forward biased and reversed biased junction conditions.)
9. To understand the types of PCB.
10. To understand PCB designing rules ( Art Work and layout) using EDA tools.
11. To design and fabricate a DC power supply using bridge rectifier on PCB.
12. To learn the use of SMD rework station.
13. Mini project ( compulsory)

**Equipment/Machines/Instruments/Tools/Software Required:**

- Film Making unit
- Deep coating machine
- UV exposure unit
- PCB curing machine
- PCB etching machine
- PCB drilling machine
- PCB tining machine
- Magnifying lamp
- Soldering &desoldering iron
- LCRQ meter
- Digital & analog multimeter
- PCB making software (ULTIBOARD, PROTEL, EXPRESS LAB, EDWin XP)
- Resistance color code chart
- Capacitor color code chart
- Transistor chart
- CRO.
- SMD work station

**Recommended books:**

1. A Monograph on Electronic design Principles – by N.C. Goyal& R.K. Khetan
2. Electronic Measurement and Instrumentation – by A.K. Shawney.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:56:09 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **III** |
| Subject: | **Value Education** | Code: | **328365(46)** |
| No. Of Periods: | **2 Periods/Week** | Total Tutorial Periods: | **NIL** |
| **Maximum Marks:** | **40** | **Minimum Marks:** | **24** |

**Course Objectives:**

1. This course is designed to provide the importance of education with why, what & how.
2. To impart students with an understanding of fundamental humanitarian viewpoint and its outcomes.
3. To provide the knowledge about whole existence and its impact on values.
4. To bring the awareness about life long exercise so that they can fulfill their responsibility towards themselves, the family, the society, the planet.

**UNIT- I** **Aim of Education and Necessity for Value Education:** Education in values/wisdom/etc and education in traits/technologies/etc as the two fundamental strands of education; Answer to the frequently asked questions such as "Why to do studies", "What studies to do in overall", "How to do studies in a proper way", "How to think systematically and talk systematically"

**UNIT-II** **Humanitarian Viewpoint and Basic Human Objective:** Meaning and concept of happiness, Need for a fundamental viewpoint to judge things in all cases of human concerns, Proposal of the natural path of humanitarian coexistentialism; Consciousness development and its expression; Fundamental want of sustainable happiness in human being; Understanding the distinct activities and needs of self (I) and body in human being; Fundamental goal of human being; Sustainable-solution in individual (At the place of delusion); Sustainable-prosperity in family (At the place of poverty); Sustainable-cooperation in society (At the place of competition); Sustainable-coexistence in planet (At the place of struggle)

**UNIT- III** **Elements of Holistic and Systematic Perspective:** Need for study of fundamental information categories to develop holistic perspective; Particular-time actions and general-time laws; Need for fundamental information sequence to develop systematic perspective, Some examples for systematic study sequence

**UNIT-IV** **Elements of Society-friendly and Environment-friendly Goals:** Elements of Knowledge of whole existence; Elements of Knowledge of human being; Elements of fundamental Values and Wisdom; Value spectrum with reference to general relationships and particular relationships of the objects in nature; Elements of History and Contemporarity used to set current goals; Elements of Sciences and Techniques to formulate methods to achieve goals; Elements of Motoricity and Mattericity to make actions to execute the methods

**UNIT-V** **Lifelong Exercise for All-round Sustainability:** Collecting information for sustainability issues; Motivating people towards sustainable life-style; Ability to identify and develop appropriate technologies and management patterns for society-friendly and environment-friendly systems for production/protection/utilization/experimentation; Ability to establish and execute the fundamental five-fold system in order to ensure sustainable peace-and-prosperity worldwide.

**Text Books:**

Value Education for Consciousness Development by Dr P B Deshmukh, Radha K Iyer, and Deepak K Kaushik (2nd Edition, 2012, ISBN: 978-81-924034-0-3)

**Reference Books:**

1. International Research Handbook on Values Education and Student Wellbeing by Terence Lovat, Ron Toomey, Neville Clement (Eds.), Springer 2010, ISBN: 978-90481-86747
2. Values Education and Lifelong Learning: Principles, Policies, Programmes by David N Aspin and Judith D Chapman (Eds.); Springer 2007, ISBN: 978-1-4020-6183-7
3. Fundamentals of Ethics for Scientists and Engineers by E G Seebaur and Robert L Berry, 2000, Oxford University Press

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:56:55 -08'00'

# CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY, BHILAI

## SCHEME OF TEACHING AND EXAMINATION

## BE (Electronics &Telecommunication Engineering) IV Semester

| Sl. No. | Board of Study | Code No. | Subjects | Period Per Week | | | Scheme of Exam | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory/Practical | | | | |
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Electronics & Telecom. | 328451(28) | Numerical Analysis Using C | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 2 | Electronics & Telecom. | 328452(28) | Analog Communication | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Electronics & Telecom. | 328453(28) | Analog Electronics | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Electronics & Telecom. | 328454(28) | Microprocessor and Interfaces | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | Electronics & Telecom. | 328455(28) | Signals and Systems | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | Electronics & Telecom. | 328456(28) | Electromagnetic Fields & Transmission Lines | 3 | - | - | 80 | 20 | 20 | 120 | 3 |
| 7 | Electronics & Telecom. | 328461(28) | Numerical Analysis Using C Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 8 | Electronics & Telecom. | 328462(28) | Analog Communication Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 9 | Electronics & Telecom. | 328463(28) | Analog Electronics Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 10 | Electronics & Telecom. | 328464(28) | Microprocessor and Interfaces Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 11 | Humanities | 328465(46) | Health, Hygiene & Yoga | - | - | 2 | - | - | 40 | 40 | 1 |
| 12 | | | Library | - | - | 1 | - | - | - | - | - |
| TOTAL | | | | 18 | 5 | 17 | 640 | 120 | 240 | 1000 | 31 |

*L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment*
*Note (1): Duration of all theory papers will be of Three Hours.*
*Note (2): Industrial Training of six weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV semester after which students have to submit a training report which will be evaluated by the college teachers during B.E. V semester.*

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:57:11 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Numerical Analysis Using C** | Code: | **328451(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**
The basic objective of this course is to give the students an opportunity to hone their skills in problem solving using numerical methods and to acquaint the students with the potentials of numerical methods for solving various problems arising in engineering using C.

**UNIT- I** **INTRODUCTION TO C LANGUAGE :** History of C, Data types , Managing input and output, Arithmetic, Logical, Bitwise and shift operators in C, Precedence of operators, Type casting, Developing simple programs, Compilation, Executing a C program , Importance of C language, If statement, If-Else statements, Nested if-else, Else-If ladder, Conditional operator, Switch case construct.

**UNIT-II** **LOOP CONSTRUCTS AND FUNCTIONS:** Loop control structures, Nested loops, Break and continue statements, Arrays: Syntax and definition, One and multidimensional arrays, Reading and writing an array
**FUNCTIONS:** Declaring and defining functions, Scope and visibility of variables, Call by value.

**UNIT- III** **POINTERS, STRINGS & STRUCTURES:** Introduction to pointer data type, Pointers and arrays, Call by reference, Using library functions in programs, Preprocessor directives - #define, Recursion.
**STRINGS:** Reading and writing strings, Using library functions to manipulate strings, Array of strings.
**STRUCTURES:** Declaring and defining structure variables, Array of structures.

**UNIT-IV** **NUMERICAL SOLUTIONS OF ALGEBRAIC, TRANSCENDENTAL AND SIMULTANEOUS LINEAR EQUATIONS:** Bisection method, Regula-Falsi Method, Newton-Raphson Method, Secant Method, Birge-Vieta Method; Iterative Methods: Jacobi's, Guass-Siedal & Relaxation Method.

**UNIT-V** **NUMERICAL INTEGRATION:** Newton Cote's Quadrature Formula, Trapezoidal Rule, Simpson's Rule, Weddle's Rule.
**NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**: Picard's Method, Taylor's Series Method, Euler's Method, Euler's Modified Method, Runge-Kutta Method, Predictor-Corrector method, Milne's Method.

**Text Books:**

1. Numerical Methods, B.S. Grewal, Khanna Publishers.
2. Numerical Methods, S.S. Shastri, PHI
3. Programming in ANSI C – E. Balaguruswamy Tata McGraw Hill
4. The C Programming Language, Brian W. Kernighan, Dennis M. Ritchie, PHI

**Reference Books:**

1. Numerical Methods For Scientific And Engineering Computation by M.K. Jain and S.R.K. Iyengar, New Age International
2. Let us C – Yashwant Kanetkar, BPB Publication

**Course outcomes:**

1. Student will learn the basic concepts of C programming language
   - Implement conditional statements
   - Declaring and defining functions, strings and structures.
2. The student should be able to find out the numerical solutions of algebraic, transcendental and simultaneous linear equations.
3. Use the numerical differentiation and integration and solve engineering problems which are characterized in the form of ordinary differential equations.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:57:25 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Analog Communication** | Code: | **328452(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**
To obtain familiarity and gain knowledge about various analog communication techniques including different modulation schemes, time-domain and frequency domain multiplexing, noise analysis.

**UNIT- I** **AMPLITUDE MODULATION:** Frequency translation, A method of frequency translation, Recovery of the baseband signal, Amplitude modulation, Maximum allowable modulation, The square law demodulator, Spectrum of a amplitude-modulated signal, Modulators and balanced modulators, Single-sideband modulation, Methods of generating an SSB signal, Vestigial-sideband modulation, Compatible single sideband, Multiplexing.
**Radio Receivers:** Receiver types: TRF receivers, Superhetrodyne receivers, Sensitivity and selectivity, Image frequency and its rejection.

**UNIT-II** **ANGLE MODULATION: PHASE & FREQUENCY MODULATION:** Angle modulation, Phase & frequency modulation, Relationship between phase and frequency modulation, Phase and frequency deviation, Spectrum of an FM signal: Sinusoidal modulation, Some features of the Bessel coefficients, Bandwidth of a sinusoidally modulated FM signal, Effect of the modulation index β on bandwidth, Spectrum of "constant bandwidth" FM, Phasor diagram for FM signals, Spectrum of Narrowband angle modulation: Arbitrary modulation, Spectrum of wideband FM (WBFM): Arbitrary modulation, Bandwidth required for a Gaussian modulated WBFM signal, FM generation: Parameter-variation method, An indirect method of frequency modulation (Armstrong system), Frequency multiplication, Frequency multiplication applied to FM signals, FM demodulators, Approximately compatible SSB systems, Stereophonic FM broadcasting. **FM receiver Block Diagram**.

**UNIT- III** **MATHEMATICAL REPRESENTATION OF NOISE:** Sources of noise, Frequency-domain representation of noise, Effect of filtering on the probability density of gaussian noise, Spectral components of noise, Response of a narrowband filter to noise, Effect of a filter on the power spectral density of noise, Superposition of noises, Mixing involving noise, Linear filtering, Noise bandwidth, Quadrature components of noise, Power spectral density of $n_c(t)$ and $n_s(t)$, Probability density of $n_c(t)$, $n_s(t)$ and their time derivatives.

**UNIT-IV** **NOISE IN AM SYSTEMS:** Amplitude modulation receiver, Advantage of super heterodyne principle: Single channel, Single sideband suppressed carrier (SSB-SC), Double sideband suppressed carrier (DSB-SC), Double sideband with carrier, Square law demodulator, The envelope demodulator.

**UNIT-V** **NOISE IN ANGLE MODULATED SYSTEMS:** An FM demodulator, Calculation of output signal and noise powers, Comparison of FM and AM, Pre-emphasis and de-emphasis, Single channel, Pre-emphasis and de-emphasis in commercial FM broadcasting, Phase modulation in multiplexing, Comparison between FM and PM in multiplexing, Effect of transmitter noise.

**Text Books:**

1. Principles of Communication Systems, Taub and Schilling, 2nd Edition., Tata McGraw Hill.(Unit-I,II,III,IV,V)
2. Electronic Communication Systems, George F Kennedy, Tata McGraw Hill. (Unit-I, II)
3. Communication Systems, Simon Haykins, Wiley India.

**Reference Books:**

1. Communication Systems Engineering, Proakis, 2nd Edition, Pearson Education.
2. Modern Digital and Analog Communication, B.P. Lathi, Oxford University Press.

**Course outcomes:**

1. The student will be able to draw spectral plots and visualize signals in frequency domain.
2. Understand the amplitude modulation process and effect of noise in AM systems.
3. Understand the angle modulation process and effect of noise in FM/PM systems.
4. Get the overview of transmitters and receivers for both AM and FM systems.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 00:57:38 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Analog Electronics** | Code: | **328453(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**
At the end of this course the students will learn and apply
- To understand Operating point calculations and working of BJTs at low and high frequencies.
- To study Frequency response of BJT.
- To study the design of power amplifiers.
- To understand the working of different types of feedback amplifiers.
- To understand the working of different types of oscillators.

**UNIT- I** **BJT AT LOW FREQUENCY**: Transistor as a two port device and its Hybrid Model: Models for CB, CE, CC configurations and their Interrelationship, Analysis and Comparison of the three Configurations. Classification of Amplifiers, Amplitude and Frequency, Linear analysis of Transistor Circuits. Miller's Theorem and its dual. Cascading transistor Amplifiers. Simplified Models and Calculation of CE and CC Amplifiers. The Common Emitter Amplifier with an Emitter Resistance. Cascode Amplifiers. High Input resistance Transistor Circuits.

**UNIT-II** **BJT AT HIGH FREQUENCY:** CE hybrid- model, Hybrid –π Conductances and Capacitances. Validity and parameter Variation, CE Short Circuit Current Gain, Current Gain with Resistive load. Frequency response of a single stage CE Amplifier, Gain-Bandwidth product, CC stage High frequencies.

**UNIT- III** **MULTISTAGE AMPLIFIERS**: Introduction, Distortion in Amplifiers, Frequency Response, Step Response of an amplifier, Band Pass of Cascaded Stages. Coupling Types: Direct, RC and Transformer. RC Coupled Amplifier, Low Frequency response of an RC-coupled Stage, Effect of an Emitter bypass capacitor, High Frequency response of two cascaded CE Transistor stages.
**Power Amplifiers**: Class A Large signal amplifiers and Class B Amplifier: Conversion Efficiency and Distortion. Class AB Operation, Push pull amplifiers.

**UNIT-IV** **FEEDBACK AMPLIFIERS:** Classification, Feedback concept, Transfer gain with Feedback, Characteristics of Negative Feedback Amplifiers, Analysis of Input and output Resistance. Topologies: Method of Analysis of Feedback amplifiers, Voltage series Feedback, Voltage series Feedback pair, Current series, Current shunt and Voltage shunt feedback. Concept of positive Feedback.

**UNIT-V** **OSCILLATOR (BJT):** Barkhausen criterion for oscillation, Mechanism for start of oscillation and Stabilization of amplitude, Analysis of RC and LC oscillators. Sinusoidal oscillator: Phase shift oscillators, Wien Bridge oscillator, Resonant circuit oscillators, Colpittsand Hartley oscillator. Amplitude Frequency and Phase stability analysis of all Oscillators, General form of Oscillator Configuration. Crystal oscillator.

**Text Books:**
1. Integrated Electronics – Millman & Halkias, Tata McGraw Hill. (Unit I to V)
2. Microelectronics – Millman and Grabel, Tata McGraw Hill.
3. Electronic Devices & Circuits – Donald A Neaman, Tata McGraw Hill.

**Reference Books:**
1. Electronic devices and circuits- A.K. Maini & Varsha Agrawal, 1st Edition ,Wiley Publication.
2. Electronic Devices & Circuits – David A. Bell, PHI.
3. Microelectronic Circuits- Sedra and Smith, 5th Edition, Oxford University Press.

**Course outcomes:**
1. Student is able to understand ac analysis of BJT amplifier at Low and High frequencies.
2. Student gets knowledge of multistage amplifier and power amplifier.
3. The concepts of feedback used in amplifier is understood.
4. Student is able to understand the concepts of Oscillator.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:00:44 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Microprocessor & Interfaces** | Code: | **328454(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**
To introduce the architecture, interfacing and programming of 8085 microprocessor and various peripheral interfacing devices.

**UNIT- I** **MICROPROCESSOR ARCHITECTURE:** Introduction to Microprocessors, Architecture of 8085, Pin Configuration and Function, internal register & flag register, Generation of Control Signals: Bus Timings: Demultiplexing of address/ data bus; Fetch Cycle, Execute Cycle, Instruction Cycle, Instruction Timings and Operation Status, Timing Diagram.

**UNIT-II** **INSTRUCTION SET AND PROGRAMMING WITH 8085:** Instruction for Data Transfer, Arithmetic and Logical Operations, Branching Operation, Machine Cycle Concept, Addressing Modes, Instructions Format, Stacks, Subroutine and Related Instructions, Elementary Concepts of Assemblers, Assembler Directives, Looping and Counting, Software Counters with Time Delays, Simple Programs using Instruction Set of 8085, Debugging, Programs Involving Subroutines, Programs for Code Conversion e.g. BCD to Binary, Binary to BCD, Binary to Seven-Segment LED Display. Binary to ASCII, ASCII to Binary, Program for Addition Subtraction, Programs for Multiplication and Division of Unsigned Binary Numbers.

**UNIT- III** **DATA TRANSFER & DEVICE SELECTION:** Format of Data Transfer: Modes of Data Transfer: Type of I/O Addressing: Condition of Data Transfer: Microprocessor Controlled Data Transfer: Peripheral Controlled Data Transfer: Absolute and Linear Select Decoding.
**Semiconductor Memories**: Static & Dynamic RAM Cell, ROM, PROM, EPROM, EEPROM, UVPROM, Flash Memory and I/O Interfacing: Use of Decoders Selection, Memory organization and Mapping.

**UNIT-IV** **INTERRUPTS:** Restart Instruction, Hardware Implementation, Interrupt Processing, Multiple Interrupts and Priority Concepts, Interrupt Structure of 8085, Instructions related to interrupts, Pending Interrupts, Use of Interrupt and Handshaking Signals in Interfacing, Application of Interrupts and Illustrative Programs.

**UNIT-V** **ARCHITECTURE OF PERIPHERAL INTERFACING DEVICES:** Architecture, Pin Diagram and functioning of 8155/ 8156 (RAM), 8355/ 8755(ROM), 8255(PPI),Simple programs like Initialization and I/O operations of the ports, Timer operation of 8155, Programmable Internal Timer 8253/8254: Block Diagram, Pin Configuration, Modes, Initialization Instruction, Interfacing and Simple Programs to generate various types of signals. Architecture, Pin diagram, description and initialization of Keyboard and display interface (8279), USART (8251), 8259A Programmable interrupt Controller, Direct Memory Access (DMA), 8237 DMA Controller.

**Text Books:**

1. Microprocessor Architecture, Programming and Application - R.S. Gaonkar, Wiley Eastern
2. Digital Systems–From Gates to Microprocessors-Sanjay K. Bose, New Age International Publishers.
3. Digital Integrated Electronics – Taub and Schilling, Tata McGraw Hill.

**Reference Books:**

1. 8085Microprocessor Programming & Interfacing – N.K. Srinath, PHI.
2. Digital Computer Electronics–Malvino, Tata McGraw Hill.
3. Microprocessors: Theory and Applications–Intel and Motorolla, Rafiquuzzaman, PHI.
4. 0000 to 8085: Introduction to Microprocessor for Engineers and Scientists, Ghosh & Sridhar, PHI.

**Course outcomes:**
1. Gain knowledge about architecture of general purpose microprocessor.
2. Students will be able to describe physical and logical configuration of memory.
3. Demonstrate the ability to program the 8085 microprocessor.
4. Interface the 8085 microprocessor to the outside world.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:01:09 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Signals and Systems** | Code: | **328455(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To describe continuous time and discrete-time signals and systems.
2. Proficiently use various methods and approaches to solve problems with signals and systems prepared for upper-level courses in communication systems, control systems, and digital signal processing.

**UNIT I** **CLASSIFICATION OF SIGNALS AND SYSTEMS:** Representation of signals, Elementary signals, Basic Operation on Signals, Classification of Signals: Deterministic and random, periodic and non-periodic, Energy and power, Causal and non-causal, Even and odd Signals, Classification of Systems: lumped and distributed parameter, static and dynamic, causal and non-causal, linear and non-linear, time variant and time invariant, stable and unstable, invertible and non-invertible .

**UNIT II** **FOURIER REPRESENTATION OF SIGNALS:** Representation of Continuous time Fourier series(CTFS), Existence of fourier series, Trigonometric form of fourier series, Cosine representation, Wave symmetry, Exponential Fourier series, Fourier spectrum, Power representation using Fourier series, Gibbs phenomenon, Properties of CTFS.
**Fourier Transform:** Fourier transform of non-periodic functions, Magnitude and phase representation of Fourier transform, Existence of Fourier transform, Fourier transform of standard signals, Properties of continuous time Fourier transform, Fourier transform of periodic signals, Introduction to Hilbert transform.

**UNIT III** **Z TRANSFORM:** Introduction, Z transform of some common sequences, Z transform and region of convergence of finite duration sequences, Properties of region of convergence, Properties of Z transform, Inverse Z transform, Transform analysis of LTI systems, Stability and causality, Solution of difference equations using Z transform.

**UNIT IV** **LINEAR TIME INVARIANT SYSTEMS:** Response of a continuous time LTI System and Convolution integral using graphical method, Properties of continuous time LTI systems, Eigenfunctions of continuous time LTI systems, System described by Differential Equation, Response of a Discrete time LTI System and Convolution sum, Properties of discrete time LTI system, Eigenfunctions of Discrete Time LTI Systems, Systems described by difference equations.
**Time and Frequency Characterization of Signals and Systems:** The magnitude- Phase representation of Fourier transform, The magnitude – Phase representation of the frequency response of LTI systems: Linear and nonlinear phase, Group delay.

**UNIT V** **STATE SPACE ANALYSIS:** The Concept of state, State space representation of discrete time LTI Systems, State space representation of continuous time LTI Systems, Solution of state equations for discrete time LTI Systems,, Solution of state equations for continuous time LTI Systems.

**Name of Text Books:**

1. Signals & Systems: A. Anand Kumar, 2nd Edition, PHI. (Unit – I,II and III)
2. Signals & Systems: H. P. Hsu, McGraw-Hill Publication. (Unit- IV and V)
3. Signals & Systems: Alan Oppenheim & Alan Wilsky, S Nawab, PHI.(Unit-IV)
4.

**Name of Reference Books:**

1. Simon Haykin, Signals and Systems, 2nd Edition, Wiley India.
2. Signals, Systems and Communications: B.P. Lathi, BS Publications.

**Course outcomes:**

1. The student will be able to understand the classification of signals and systems.
2. Gain knowledge about the frequency domain analysis of continuous time and discrete time signals.
3. Use the Z-transform techniques to solve the system equations.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:01:22 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Electromagnetic fields and Transmission lines** | Code: | **328456(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To impart the knowledge of electric, magnetic fields and the equations governing them.
- To show the existence of Electromagnetic waves under time varying case.
- To develop understanding of transmission lines.

**UNIT- I** **INTRODUCTION:** Orthogonal co-ordinate systems: Cartesian, Cylindrical and Spherical, Transformations between co-ordinate systems, Differential length, area and volume in different co-ordinate systems, Del Operator, Divergence, Curl- their physical interpretations, Laplacian operator, Coulomb's law, Electric field intensity, Field due to several charges.

**UNIT-II** **ELECTROSTATICS:** Gauss's law, Application of Gauss's law for some symmetrical charge distribution, Gauss's Divergence theorem; Electric potential, potential at any point due to discrete and distributed charge, Potential gradient, Relationship between E and V and Maxwell's equation, Dipole and flux lines; Energy density in electrostatic fields; Boundary conditions: dielectric-dielectric, Conductor-free space, Poisson's and Laplace's equations, Examples of the solutions of Laplace and Poisson's equations; Uniqueness theorem.

**UNIT- III** **MAGNETOSTATICS:** Biot-Savart's law and Magnetic fields and its calculation for different current distributions, Ampere's circuital law, Curl, Stokes' theorem; Magnetic flux and flux density, Scalar and Vector magnetic potentials.

**Magnetic Force and Induction:** Force on a moving charge, force on a differential current element, Force between differential current element, Force and torque on a closed circuit, Magnetic materials, magentization and permeability, Magnetic boundary conditions; Energy stored in magnetic field.

**UNIT-IV** **FIELD AND WAVES:** Faraday's law, Maxwell's modification of Ampere's law; Displacement current, Maxwell's equations in point form, Maxwell's equations in integral form, Source free wave equation, Uniform plane wave, Complex propagation constant, Wave propagation in air, Loss-less dielectric and lossy dielectric, Poynting theorem and flow of power; Wave polarization, Reflection and transmission of uniform plane wave at normal and oblique incidence.

**UNIT-V** **TRANSMISSION LINES:** Uniform transmission lines; transmission line equations and parameters; Solutions of transmission line equations, Lossless and distortion less transmission lines, Characteristic and input impedance of a transmission line, Shorted and open circuited transmission lines, Reflection coefficient, Standing wave ratio, Smith's chart and its application, Impedance matching: by Quarter wave line and by use of single stub.

**Text Books:**

1. Engineering Electromagnetics, William H. Hayt, Jr. John A. Buck, 7th Edition.,Tata McGraw Hill.
2. Antenna and Wave Propagation, K. D. Prasad, 3rd Edition. 1996, Satya Prakashan.

**Reference Books:**

1. Electromagnetic Fields, Jordan & Ballman, PHI.
2. Electromagnetic Field Theory and Transmission Lines, G. S. N. Raju, Pearson.

**Course outcomes:**

1. Students will be able to learn and apply concepts of orthogonal co-ordinate system and vector calculus to solve electric and magnetic field problems.
2. Know concepts about electric and magnetic fields; electromagnetic wave existence and its propagation in different medium.
3. Gain knowledge about signal transmission, parameters associated with transmission line; measure of various losses and techniques to reduce those losses.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:01:38 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Numerical Analysis Using Laboratory** | Code: | **328461(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. Write a program to take the radius of a sphere as input and print the volume and surface and surface area of that sphere.
2. Write a program to take a 5-digit number as input and calculate the sum of its digits.
3. Write a program to take three sides of a triangle as input and verify whether the triangle is an isosceles, scalene or an equilateral triangle.
4. Write a program that will take 3 positive integers as input and verify whether or not they form a Pythagorean triplet or not.
5. Write a program to print all the Prime numbers between a given range.
6. Writeaprogramtodefineafunctionthatwilltakeanintegerasargumentandreturnthesumof digitsofthatinteger.
7. Writea programto definea recursivefunctionthat willprintthereverseofitsintegerargument.
8. Writeaprogramthatwilltaketheelementsoftwointegerarraysof5elementeach,andinsertthe commonelementsofboththearrayintoa thirdarray(Setintersection).
9. Writea programto take5namesasinputandprintthelongest name.
10. Write a program to define a structure Student that will contain the roll number, name and total marks of a student. The program will ask the user to input the details of the students and print the details of all the students whose total marks is greater than a given value.
11. Write a program for solution of simultaneous linear algebraic equations by Gauss Seidal Method.
12. Write a program for numerical solution of ordinary differential equations by Runge-Kutta method.
13. Write a program for numerical solution of ordinary differential equations by Predictor-Corrector method.
14. Write a program to find roots of an equation using Newton Raphson Method.
15. Write a program for the computation of area of any section by Trapezoidal rule.
16. Write a program for the computation of area of any section by Simpson's rule.
17. Write a program to find the solution of Differential Equation by Euler's Method.
18. Write a program to find the solution of Differential Equation by Modified Euler's Equation

**List of Equipments/Machine Required:**
PCs, C-Compiler.

***Reference Books:***

1. Programming in ANSI C – E. Balaguruswamy Tata Mc-Gcraw Hill.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:03:21 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Analog Communication Laboratory** | Code: | **328462(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To study Amplitude Modulation on trainer kit.
2. To study Amplitude Demodulation on trainer kit.
3. To study Frequency Modulation and to trace the frequency modulated waveform on CRO using trainer kits.
4. To study Frequency Demodulation using trainer kits.
5. Design of a Frequency Demodulator Using PLL
6. To study a radio receiver having medium frequency reception.
7. To plot amplitude modulated signal and to calculate modulation index
8. To design and obtain characteristics of a mixer Circuit.
9. To generate SSB-SC signal and to study its characteristics.
10. To generate DSB-SC signal using Balanced Modulator and to study its characteristics.
11. To design a Ring Modulator and to study its characteristics.
12. To design a Square Law Detector using diode and to study its V-I characteristics.
13. To design and study an Envelope Detector.
14. To study the Time division multiplexing and de-multiplexing.
15. To study the Frequency division multiplexing and de-multiplexing.
16. To observe the effect of pre-emphasis and de-emphasis on a given input signal.

(Along with the above experiments, Simulators may be used to give idea about various communication techniques.)

**List of Equipments/Machine Required:**

Discrete Components, Function Generator, Power Supply, CRO, Communication trainer kits, Modulated Signal Generator, Transmission Line.COMMSIM software.

***Reference Books:***

1. Radio Communication by G.K Mithal, Khanna Publishers.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:03:40 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Analog Electronics Laboratory** | Code: | **328463(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To draw Static input characteristics curves of CE transistor and determine its h-parameter values.
2. To draw Static output characteristic curve CE transistor and determine its h-parameter values.
3. To draw Static input characteristic curve of CB transistor and determine its h-parameter values.
4. To draw Static output characteristic curve of CB transistor and determine its h-parameter values.
5. To design and study the frequency response of single stage CE transistor amplifier and determine its Bandwidth.( with and without bypass capacitor).
6. To find input and Output impedances of single stage CE amplifier.
7. To study the frequency response of RC coupled double stage CE transistor amplifier and determine its Bandwidth.
8. To study the frequency response of RC coupled double stage CE transistor amplifier with voltage feedback and determine its Bandwidth.
9. To study the frequency response of RC coupled double stage CE transistor amplifier with current feedback and determine its Bandwidth.
10. To Design Wein Bridge Oscillator and determine the frequency of Oscillation.
11. General study of pushpull audio power amplifier.
12. To Design RC phase shift oscillator and determine the frequency of Oscillation.
13. Study of various topologies of feedback amplifier.
14. Experiment with Darlington pair amplifier.

**List of Equipments/Machine Required:**
Circuit components, Power supply, CRO, Function generator, Multimeter, Breadboard.

***Reference Books:***

1. Lab Manual Of Electronic Devices by Paul B Zbar.
2. Lab Manual of Basic Electronics by David Bell.
3. Electronic Devices Systems and Applications by Robert Diffenderfer, Cengage learning.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:03:54 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **IV** |
| Subject: | **Microprocessor & Interfaces Laboratory** | Code: | **328464(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. **Reversing an Array:** A Block of 16 bytes are residing at locations starting from BLOCK : WAP to transfer the block in reverse order at locations starting from BLOCK 2.
2. **Sorting in Ascending Order:** A block ( 16 bytes are residing at locations starting from DATA : Write a program to arrange the word in the same location in ascending order.
3. **Binary Addition:** 16 bytes are residing at location starting from DATA WAP : to add all bytes and store the result location SUM and SUM + 1.
4. **BCD Addition:** 16 BCD NUMBER are residing at location starting from DATA WAP to add all bytes and store the result location SUM and SUM + 1.
5. **Multiplication:** Two bytes are residing at location DATA 1 and DATA 2 Write a program to multiply the two bytes and store the result at location PROD 1 and PROD 2.
6. **Binary to BCD:** A binary number is residing at location BIN > WAP to convert the binary number in to its equivalent BCD and store the result at BCD and BCD + 1.
7. **BCD to Binary:** A BCD number is residing at location BCD; Write a program to convert the BCD number into its equivalent binary and store the result at BIN.
8. **Multibyte Addition:** Two 10 bytes are residing at location starting from DATA 1 and DATA 2 respectively ,Write a program two add them up and store the result at location starting from RESULT ( result space 11 bytes).
9. **Multibyte BCD Addtion:** Two 6 digits BCD numbers are residing at location starting from DATA 1 and DATA 2 respectively. Write a program to add them up and store the result at locations starting from RESULT (Result space 7 bytes).
10. **RST 6.5:** A block of 16 bytes is residing at location starting from ; DATA Reverse the block and store the bytes at REVERSE whenever the RST 6.5 key is pressed.
11. **Editing of ASCII String:** A string of ASCII characters is residing at locations starting from READ which contain "I $ WILL $ BE $ AN $ ENGINEER ". Edit string in such a way that it should contain "I $ will $ be $ Engineer ". Keep the edited string in the same locations. Product the string from further editing. ($ stands for a blank).
12. **Signed Binary Addition:** A block of 16 signed binary numbers is residing at locations NUMBERS. Add them up and store the result (in signed binary) at locations from RESULT.
13. **ASCII Code Conversion:** A string of 16 ASCII characters are residing at locations starting from DATA .The string consists of codes for capital letters, small letters and BCD digits (0-9). Convert the ASCII characters. In such a way that the codes for capital letters be converted into corresponding codes for small letters, codes for small letters into that of capital letters and codes for BCD digits into that of BCD numbers and store them at the same locations.
14. **Parity Check:** A block of 32 bytes is residing at DATA count the number (BCD) of times even and odd parity bytes are appearing consecutive memory locations. Keep the count at MATCH.
15. **Series Generation:** Two BCD numbers a and b are residing at locations DATA 1 and DATA 2 respectively. Write a program to form a series in BCD with the elements of a. a + 2b, a + 4b, a + 6b ..... Stop the generation of the series whenever any element of the series in BCD with the elements of the series exceeds (99). Store the result at locations starting from RESULT. Count the number (BCD) of elements in the series and store it at NUMBER.

**List of Equipments/Machine Required:**
8085 based microprocessor kit, MASM assembler, 8085 simulator, PCs.

**Recommended Books:**
8085 Microprocessor Programming & Interfacing – N.K. Srinath, PHI

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:04:07 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **IV** |
| Subject: | **Health, Hygiene & Yoga** | Code: | **328465(46)** |
| No. Of Periods: | **2 Periods/Week** | Total Tutorial Periods: | **NIL** |
| **Maximum Marks:** | **40** | **Minimum Marks:** | **24** |

**Course Objectives:**

1. To provide understanding the importance of health.
2. To provide insight into the hygiene aspect & quality of life.
3. To study the concepts of various medical therapy.
4. To practice the various yogasans.
5. To provide knowledge about common diseases and its cure through yagasans and pranayam.
6. To develop concentration through various methods.

**UNIT- I** **HEALTH & HYGIENE:** Concept of health, Physical health and mentall health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and underrating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs nutritious food; fruits, vegetables cereals and qualities of each of these.

**UNIT-II** **INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE:** History, development, basic concepts, modes of operation of Alopathy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accurpressure, Accupunture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

**UNIT- III** **YOGASANS:** Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshep Mudra.

**UNIT-IV** **YOGASANS FOR COMMON DISEASES:** From Yogic MateriaMedica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomache disorders, such as, indigestion, acidity, dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:**Shavasan, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain:**Shirshpadasan, Shashankasan.
- **Asans for eye sight:**Tratak, NetiKriya .
- **Pranayam:** Definition and types: NadiShodhan, Bhastrik, Shitakari, Bhramari useful for students.

**UNIT-V** **CONCENTRATION:** Concentration of mind and how to achieve it. Tratak (त्राटक). Concentration on breath, Japa (जप), Ajapajap (अजपाजप), internal silence (अन्तर्मौन), visualization in mental sky (चिदाकाश धारणा), Concentration on point of light (ज्योति ध्यान). Concentration on feeling (भाव ध्यान). Concentration on figure (मूर्त ध्यान).

**Text Books:**

Health, Hygiene & Yoga,Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

**Reference Books:**

(1) Yogic MateriaMedica
(2) Asan, Pranayam and Bandh.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:05:34 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

**Scheme of Teaching and Examination**
**B.E. V SEMESTER**
**ELECTRONICS AND TELECOMMUNICATION ENGINEERING**

| Sl. No. | Board of Study | Code No. | Subjects | Period Per Week | | | Scheme of Examination | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | Theory/ Practical ESE | CT | TA | | |
| 1 | Electronics & Telecommunication | 328551(28) | Linear Integrated Circuits &Applications | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 2 | Electronics & Telecommunication | 328552(28) | Data Structures and Programming with C++ | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Electronics & Telecommunication | 328553(28) | Antennas and Wave Propagation | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Electronics & Telecommunication | 328554(28) | Digital Communication | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | Electronics & Telecommunication | 328555(28) | Advanced Microprocessor and Interfacing | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | Electronics & Telecommunication | 328556(28) | Automatic Control System | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 7 | Electronics & Telecommunication | 328561(28) | Linear Integrated Circuits &Applications Lab | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 8 | Electronics & Telecommunication | 328562(28) | Data Structures and Programming with C++ Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 9 | Electronics & Telecommunication | 328563(28) | Digital Communication Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 10 | Electronics & Telecommunication | 328564(28) | Advanced Microprocessor and Interfacing Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 11 | Humanities | 300565(46) | Personality Development | - | - | 2 | - | - | 20 | 20 | 1 |
| 12 | Electronics & Telecommunication | 328566(28) | *Practical Training Evaluation and Library | - | - | 1 | - | - | 20 | 20 | 1 |
| **TOTAL** | | | | **18** | **6** | **16** | **640** | **120** | **240** | **1000** | **33** |

**L:** Lecture **T:** Tutorial **P:** Practical
**ESE:** End Semester Examination **CT:** Class Test **TA:** Teacher's Assessment

**** Industrial Training of eight weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV sem. after which students have to submit a training report which will be evaluated by the college teachers during B.E. V sem.***

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:05:50 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **V** |
| Subject: | **Linear Integrated Circuits & Application** | Code: | **328551(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**

1. To design simple circuits like amplifiers using op-amps.
2. To design linear and non-linear applications of operational amplifiers.
3. To Gain knowledge about A/D and D/A converters
4. To gain knowledge in designing a stable voltage regulators
5. To introduce the theory and applications of analog multipliers and PLL.

**Course Outcomes:**

1. Gain knowledge about Differential amplifier and operational amplifier.
2. Designing circuits for op-amp applications.
3. Gain knowledge about A/D and D/A converters.
4. Get knowledge about various types of voltage regulator.
5. Understand PLL circuits and multiplier circuits.

**UNIT I** **Fundamentals of differential amplifiers and operational amplifiers:** Current mirror, BJT differential amplifier analysis using r-parameters. Introduction to operational amplifier : op-amp Symbol and terminal characteristics, Block schematic of op-amp, Ideal op-amp characteristics, Open loop configuration of op-amp, Closed loop configuration of op-amp: Voltage series feedback amplifier, Voltage shunt feedback amplifier, Differential amplifier. The practical op-amp: Input offset voltage, Input bias current, Input offset current, Total output offset voltage, Thermal drift. Frequency response of an op-amp: Frequency response, Compensating networks, Slew rate.

**UNIT II** Operational amplifier applications:**Basic op-amp circuits:** Summing, Scaling and Averaging amplifiers. Comparator: Inverting and Non-inverting comparator, Schmitt trigger, Zero crossing detector, Peak detector, Level detector, Window detector, Rectifier: Precision half wave rectifier, Precision full wave rectifier, Current to voltage and Voltage to current converter, Bridge amplifier; Instrumentation amplifier. Differentiator, Integrator, Logarithmic amplifier, Norton amplifier.

**UNIT III** **Analog to digital and digital to analog converters:** Sample and hold circuits and sample and hold IC (LF 398), Types of D/A converter : The binary weighted resistor network, The R-2R ladder network, The inverted ladder, D/A specification. A/D converter : Parallel-comparator type, Dual slope, Successive approximation, Voltage to time and Voltage to frequency converters, A/D specification.

**UNIT IV** **Voltage Regulators:** Voltage regulator characteristics, Regulator performance parameters, Types of voltage regulator: Series and Shunt regulator using op-amp. Safe operating Area, Protection circuit: Short circuit protection, Current limiting circuit, Foldback current limiting, Three terminal IC regulator: Three terminal IC regulator(LM 317, LM 337, 78XX, 79XX) [Description, Schematic diagram and Pin diagram], General purpose IC regulator (723): Important features and Internal structure.

**UNIT V** **PLL and multiplier:Phase Locked Loops:** Introduction, Basic principle. Phase detector: Analog and Digital, Voltage controlled oscillator, PLL IC 565: Functional diagram and Principle of operation, Derivation of lock-in and capture Range. Application of PLL (AM detection, FM detection, FSK demodulation and frequency synthesizer).
**Analog Multipliers and Dividers: Analog Multiplier:** Introduction,Characteristics. Multiplication techniques: Logarithmic summing, PWM, Variable transconductance. Monolithic multiplier circuit realization: Logarithmic - Exponential multiplier circuit (RC-4200). Multiplier application: Divider circuit, Square rooting circuit, RMS detector.

***Name of Text Book:***

1. Integrated Circuits by K. R. Botkar, 9th Ed., Khanna Publications (Unit- I,II,III,IV,V)
2. Operational Amplifiers by R. Gayekwad, 4th Ed., Pearson Education(Unit-I, II.IV)
3. Linear Integrated Circuits by D.Roy Choudhary and Shail B Jain,3rd Ed., New Age International (Unit-IV,V)
4. Digital integrated Electronics by Herbert Taub and Donald Schilling, McGraw Hill(Unit- III)

***Name of Reference Books:***

1. Integrated Electronics by Millman& Halkias,6th Ed., TMH Publishing Co.
2. Operational Amplifiers and Linear Integrated Circuits, Lal Kishore,2nd Ed., PHI
3. Operational Amplifiers and Linear Integrated Circuits, Coughlin and Driscoll, 6th Ed., PHI

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:06:04 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **V** |
| Subject: | **Data Structure &Programming with C ++** | Code: | **328552(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**CourseObjectives:**

1. To gain a better understanding of object-oriented design and program implementation by using object-oriented features of C++.
2. Identify the major elements in an object-oriented programming language.
3. Understand some advanced features of C++ including templates, exceptions, and multiple inheritances.

**Course Outcomes:**

1. Understand algorithmic thinking and apply it to programming.
2. Understand problem-solving techniques.
3. Understand object-oriented concepts and how they are supported by C++.
4. Gain some practical experience of C++.

**UNIT I** **Principles of Object Oriented Programming:** Basic Concepts of Object Oriented Programming, Benefits of OOPs, Classes and Objects: C Structures Revisited, Specifying a Class, Defining Member Functions, Making an Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays Within a Class, Memory Allocation for Objects, Static Data M embers, Static Member Functions, Arrays of Objects, Objects as Function Arguments, Friendly Functions, Returning Objects. Constructors and Destructors: Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Destructors.

**UNIT II** **Operator Overloading and Inheritance:** Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Overloading Binary Operators Using Friends, Manipulation of Strings Using Operators, Rules for Overloading Operators, Function Overloading, Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical inheritance, Virtual Base Classes, Abstract Classes.

**UNIT III** **Pointers and Runtime Binding:** Pointers and their Binding, Address Operator &, Pointer Variables, Void Pointers, Pointer Arithmetic, Runtime Memory Management, Pointers to Pointers, This Pointer, Introduction to Virtual Functions, Need for Virtual Functions, Pointer to Derived Class Objects, Definition of Virtual Functions, Array of Pointers to Base Class Objects, Pure Virtual Functions, Abstract Classes

**UNIT IV** **Introduction to Data Structures:** Searching: Linear Search, Binary Search, Sorting: Insertion Sort, Bubble Sort and Selection Sort, Introduction to Linked Lists, Stacks and Queues.

**UNIT V** **Files and Streams:** Classes for File Stream Operations, Opening and Closing a File, Detecting end-of-file, More about Open:File Modes, File Pointers and Their Manipulations, sequential Input and Output Operations, Updating a File: Random Access, Error Handling During File Operations, Command-line Arguments, Introduction to Templates and Exception Handling.

**Text Books:**

1. Object oriented Programming with C++, E Balaguruswamy, 3rd Edition, Mcgraw-Hill .(Unit I, II & V)
2. Mastering C++, K.R.Venugopal, Raj Kumar and T.Ravi Shankar , Mcgraw-Hill. (Unit III)
3. Theory and Problems of Data Structures, Seymour Lipschutz, Schaum's Outline Series. (Unit IV)

**Reference Books:**

1. C++ Complete Reference, H. Schildt , Mcgraw-Hill.
2. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia Pub.
3. C++ Primer plus, Stephen Prata, Galgotia Pub
4. The C++ Programming Language, Bjarne Stroustrup, Pearson

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:06:21 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **V** |
| Subject: | **Antennas and Wave Propagation** | Code: | **328553(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course outcome**:

1. Students will be able to understand the guided and unguided wave propagation.
2. Students will acquire knowledge of Basic antennas, their radiation and characteristics.
3. Students will knowledge of antenna arrays and their design.
4. Students will able to understand some different practical antennas.

**Course Objectives:**

1. To study uniform plane wave propagation in different media and wave polarization
2. To study guided wave propagation in metallic wave guides
3. To study radio wave propagation
4. To study the concept of radiation and analyze radiation characteristics of a current element and dipole
5. To study antenna fundamentals and antenna arrays: uniform and tapered and their design
6. To study some practical antennas like Rhombic, Loop, Yagi and microstrip antenna.

**UNIT – I** **Waveguides:** Wave propagation between two infinite parallel conducting plane: TE and TM modes; Properties of TE and TM modes, TEM waves; Rectangular and Circular waveguides: TE and TM modes, dominant modes, characteristics: attenuation and phase constants, phase and group velocities, cut-off wavelengths and frequencies, guide wavelength, field pattern and wave impedance.

**UNIT – II** **Wave Propagation:** Sky wave, surface wave and space wave; Ionospheric propagation- refractive index at high frequencies; Mechanism of radio wave bending, critical frequency; effect of earth's magnetic field; Effective dielectric constants and conductivity, MUF, skip distance, optimum working frequency; Multihop propagation; Ionoshperic abnormalities; Troposhperic propagation, field strength of troposhperic wave; Effect of earth's curvature and dielectric constant; Troposhperic scatter and Duct propagation.

**UNIT – III** **Antennas and Radiation:** Electromagnetic radiation; Retarded potentials; Short electric dipole, radiation from a small current element, radiated power and radiation resistance; Radiation from a half wave dipole and its radiation resistance; Isotropic radiator; radiation pattern; Radiation Intensity; Antenna Gain: directive gain and power gain; Antenna directivity; Effective length and effective aperture of antennas; Beamwidth; Bandwidth; Beam area; FBR, Self impedance of antennas, Antenna efficiency; Reciprocity theorem and its application.

**UNIT – IV** **Antenna Arrays and their design:** Various form of array: broadside, end fire, collinear and parasitic arrays; Arrays of two isotropic point sources; Principle of pattern multiplication; Linear arrays with 'n' isotropic point sources of equal amplitude and spacing: broadside and end fire case; Tapering of arrays: Binomial and Dolph Tchebysceff array.

**UNIT – V** **Practical Antennas:** Effect of earth on antenna performance; Grounded and ungrounded antennas; Antenna top loading and tuning; Resonant and non-resonant antennas; Beverage antenna;Tower radiator; Long-wire antenna; V-antenna; Rhombic antenna; Loop antenna and Adcock antenna; Yagi antenna; Log periodic antenna; Horn and Microstrip antenna.

***Name of Text Books:***

1. Engineering Electromagnetic, William H. Hyat, Jr. John A. Buck 7th Ed. TMH, 2006. (Unit: I)
2. Antennas and Wave Propagation, K. D. Prasad, Satya Prakashan, 3rd Ed., 2001.(Unit: I, II, III,IV &V)

***Name of Reference Books:***

1. Antenna Theory, Balanis, 2nd Edition, John Wiley & Sons, 2003.
2. Antenna and Wave Propagation, R.L. Yadava, PHI, 2011.
3. Antenna and Wave Propagation, G. S. N. Raju, , 5th Impression, Pearson, 2011.
4. Antennas and Radio Propagation, R.E.Collins, McGraw-Hill, 1987.
5. "Antennas", John D.Kraus and Ronalatory Marhefka, Tata McGraw-Hill Book, 2002.

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 01:06:38 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **V** |
| Subject: | **Digital Communication** | Code: | **328554 (28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**

1. To study signal space representation of signals and discuss the process of sampling, quantization that are fundamental to the digital transmission of analog signals.
2. To study baseband and band pass signal transmission and reception techniques.
3. To study digital modulation methods and optimum receiver.
4. To study the noise in digital communication, correlator, optimum filter, matched filter.

**Course outcome**:

1. Design digital communication systems, given constraints on data rate, bandwidth, power, fidelity, and complexity.
2. Analyze the performance of a digital communication when additive noise is present in terms of the signal-to-noise ratio and bit error rate.

**UNIT I** **Pulse modulation system and quantization:** Sampling theorem: Low pass signal, Band-pass signal, TDM-PAM, Channel bandwidth for PAM signal, Natural sampling, Flat-top sampling, Signal recovery through holding, PWM, PPM. **Quantization:** Quantization of signals, Quantization error, PCM, TDM-PCM system, Companding, Multiplexing: T1 Digital Systems, Multiplexing T1 Lines-The T2, T3, T4 Lines.

**UNIT II** **Digital transmission of analog data:** DPCM, Delta modulation, Adaptive delta modulation, Continuously variable slope delta modulator (CVSD).
**Noise in PCM and DM:** PCM transmission: Calculation of quantization noise power, Output signal power, Output SNR in PCM. Delta modulation transmission: Quantization noise in delta modulation, Output signal power, DM signals to quantization noise ratio.

**UNIT III** **Principle of digital data transmission:** Digital communication system, Line coding: PSD of various line codes, Polar signalling, On-Off signalling, Bipolar signalling, Pulse shaping: Nyquist criterion for zero ISI, Scrambling, Regenerative repeater: Eye diagram, Detection error probability for polar signal, ON-Off and bipolar signals.

**UNIT IV** **Digital modulation techniques:** Fundamentals of BASK, BPSK and BFSK, Generation, detection, spectrum and geometrical representation of BPSK and BFSK, Fundamentals of DPSK, DEPSK and QPSK, Generation and detection of DPSK, DEPSK and QPSK, Signal space representation of QPSK.
M-ary PSK.

**UNIT V** **Optimum reception of digital data:** Baseband signal receiver, Probability of Error, Optimum receiver for both baseband and passband: Optimum filter transfer function, Optimum filter realization using matched filter, probability of error of the matched filter. Optimal of coherent reception: Calculation of probability of error for BPSK, BFSK and QPSK.

***Name of Text Book:***

1. Principles of communication system by Taub& Schilling, 3rd Ed., McGraw-Hill Education (unit I, unit II, unit IV, unit V)
2. Modern Digital and Analog Communication Systems by B.P. Lathi,3rd Ed., Oxford university press (unit III)

***Reference books***

1. Fundamentals of communication systems by John.G. Proakis, Pearson education, 2006.
2. Communication system by A. Bruce Carlson, Paul Crilly, Paul B. Crilly, McGraw-Hill Education
3. Digital communications by Simon Haykin, Wiley India Private Limited,2006.

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:06:52 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication/Electronics & Instrumentation/Applied Electronics & Instrumentation** | Semester: | **V** |
| Subject: | **Advanced Microprocessors & Interfacing** | Code: | **328555 (28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**
1. To learn the functional and technological characteristics of 8086 microprocessor.
2. Understand about memory components, peripherals and their interface.
3. Enable the students to understand the general and advanced features of 16/32 bit microprocessors

**Course Outcomes:**
1. Gain knowledge about architecture of advance microprocessors.
2. Demonstrate the ability to program the 8086 microprocessor.
3. Interface the 8086 microprocessor to the outside world.
4. Understand multiprocessor systems and learn about co-processors.

**UNIT I** **Architecture of 8086:** Differences Between 8085 and 8086, Overview of 8086 Microprocessor Family, Architecture and Pin Configuration of 8086, System Bus Structure: Basic 8086/8088 system bus architecture, Minimum Mode Configuration, Maximum Mode configuration; System Bus Timings, Bus Standards. 8087 Numeric Data Processor& 8089 I/O Processor: Architecture only (no Programming)

**UNIT II** **Instruction Set and Assembly Language Programming of 8086:** Instruction Format; Addressing modes, Data Transfer Instruction, Arithmetic Instructions, Branching and Looping Instructions, NOP and Halt, Flag Manipulation Instructions, Logical, Shift and Rotate Instruction. Byte and String Manipulation: String Instructions; REP Prefix, Table Translation, Number Format conversions. Assembler Directives and Operators, Translation of Assembler Instructions. Programming of Microprocessor8086, Interrupts of Microprocessor 8086.

**UNIT III** **Interfacing – I (With 8086 only):** Memory interfacing, Interrupt Priority Management System based on 8259A, Interfacing of 8254 (Programmable Interval Timer), Interfacing of 8257and 8251 with 8086.

**UNIT IV** **Interfacing – II (with 8086 only):** Architecture and Interfacing of 8-bit ADC (0808/0809) and DAC (0800) with 8086 using PPI 8255. Interfacing of Stepper motor, 8279 (Keyboard & Display Driver) and LCD interface with 8086.

**UNIT V** **Architecture of 32 Bit Microprocessors**: Intel 80386Architecture, Special 80386 Registers, Memory Management, Interrupts and Exceptions, Management of Tasks–Real, Protected and Virtual 8086 mode, Architectural Differences Between 80486 and 80386 Microprocessor.

***Text Books:***

1. Microcomputer Systems: The 8086/8088 Family - Architecture, Programming, and Design; Y. Liu and G. A. Gibson, 2nd Ed., PHI. (Unit I, II, III & IV)
2. Microprocessors& Interfacing–Douglas V Hall, The McGraw-Hill Companies. (Unit I, II & V)

***Reference Books:***

1. The 8086 Microprocessor: Programming &Interfacing the PC, Kenneth J. Ayala, Penram International Publishing (India).
2. The Intel Microprocessor 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium & Pentium Pro Processor: Architecture, Programming & Interfacing –Barry B Brey, Pearson Education.
3. Advanced Microprocessors and Peripherals, K M Bhurchandi and A K Ray, 3rd Edition, McGraw-Hill.
4. Advanced Microprocessor, Rajasree, New Age International Publishers.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:07:11 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication** | Semester: | **V** |
| Subject: | **Automatic Control System** | Code: | **328556 (28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**
1. To study the applicationof automatic linear control system.
2. To study the time response analysis of control system.
3. To study the frequency response analysis of control system.

**Course outcome**:
1. Student is able to do the mathematical modeling of control system.
2. Student is able to analyse the performance of control system.
3. Student is able to improve the performance of control system.

**UNIT –I** **Mathematical Models of Physical Systems:** Introduction, Differential Equation of Physical systems(Mechanical and Electrical Systems), Transfer functions, Block Diagram Algebra, Signal Flow Graphs.

**UNIT-II** **Feedback Characteristics of Control Systems:** Feedback &Non feedback systems, Reduction of parameter variation by use of feedback, Control over system dynamics by use of feedback, Control of the effects of disturbance signals by use of feedback, Regenerative feedback.

**Time Response Analysis:** Standard Test signals, Time response of first and second order system, steady state error and error constants, Effect of adding a zero to a system. Design specifications of second order systems, Response with P, PI, PD and PID Controllers.

**UNIT-III** **Stability Analysis & The Root Locus Technique:**The concept of Stability, Routh- Hurwitz stability criterion , Relative stability analysis, Introduction to The Root locus concept, Construction for Root loci, Root contours, System with Transportation Lag.

**UNIT-IV** **Frequency Response Analysis:** Introduction, Correlation between Time and Frequency Response, Polar Plots, Bode Plots, All-Pass and Minimum-phase Systems.

**Stability in Frequency Domain:** Nyquist stability criteria, Assessment of relative stability using Nyquist Criterion.

**UNIT-V** **State Variable Analysis and Design:**Concepts of state, state variables and state model, State models for linear continuous time systems, Diagonalization, Solution of state equations, Concepts of controllability and observability, Pole placement by state feedback.

***Name of Text Books:***

1.Control System Engineering, L.Nagrath and Gopal, New Age International Publications
2.Automatic Control System, B.C.Kuo,PHI

***Name ofReference Books:***

1.Modern Control Engineering, Ogata, Pearson Education
2.Modern Control Engineering ,Roy Choudhury,PHI
3.Introduction to Control Engineering, Ajit K. Mandal, New Age International Publications.
4. Control Systems, A. Anand Kumar, PHI



DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 01:07:27 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics &Telecommunication Engineering** | Semester: | **V** |
| Subject: | **Linear Integrated Circuits & Application Laboratory** | Code: | **328561 (28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To design an inverting amplifier using OPAMP (741) and study its frequency response.
2. To design a non-inverting amplifier using OPAMP (741) and study its frequency response.
3. To design a summing amplifier using op-amp (741).
4. To design a differential amplifier using op-amp (741) and find its CMRR.
5. To determine SVRR and slew rate of an op-amp (741).
6. To measure the input impedance of an voltage follower using op-amp (741)
7. To measure input offset voltage, input bias current and input offset current for op-amp 741.
8. To design and study comparator circuit using op-amp (741).
9. To design a DAC using Weighted Resistor method.
10. To design a ADC using parallel comparator method.
11. To study the voltage regulation of 78XX and 79XX series of voltage regulators.
12. To design the voltage regulator using IC 723.
13. To design a Sample & Hold circuit and to study its output response.
14. To design a multiplier circuit using variable Trans-conductance method.
15. To design one quadrant divider using RC – 4200.
16. To design a square rooting circuit using multiplier.

***List of Equipments/Machine Required:***

Discrete components, Power Supply, Function Generator, CRO

***Recommended Books:***

Laboratory Manual for Operational Amplifiers and Linear ICs, David Bell, PHI

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:07:54 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics &Telecommunication Engineering** | Semester: | **V** |
| Subject: | **Data Structures & Programming with C++ Laboratory** | Code: | **328562 (28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. A book shop maintains the inventory of books that one being sold at the shop. He list includes details such as authors, title, price, publisher and stock position. Whenever a customer wants a book, the sales person input the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed. If it is then the system displays the book details and requests for the number of copies required.
2. Write a program which will show the order of execution of constructor, destructor, static data member, static function and member functions.
3. Create class Distance having private data feet(type integer), inches(type float) and function getdist() and showdist() . Overload + operator to add two distance values and > operator to compare them.
4. Create a class called employee containing protected data name(20 characters), employee number(long integer). Also write its constructor and destructor functions. Create two derived classes called hourly _employee containing private data rate and hours and salary_ employee containing basic salary and allowances as data members. The class employee is inherited as public by these derived classes. Write appropriate functions in each class to calculate total salary of each employee and to display name, number and total salary.
5. Create a class dimension containing three float type data and a constructor to accept values, also declare a pure virtual function area() in it. Now create three derived classes rectangle, square and triangle, each inheriting dimension as public. Define corresponding constructors and redefine virtual function area() in each to give area of respective figure. A main() program should create suitable objects to implement this inheritance.
6. Create a class STRING that contains a character array as a data member. Overload + and = operators respectively to concatenate and compare strings.
7. Create two classes DM and DB respectively represent the distance in meters, centimeters and distance in feet, inches. Write a program that can read values for the class objects and add one object DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results may be a DM object or DB object depending on the units in which the results are required. The display should be in the format of feet and inches or meters and centimeters depending on the object on display.
8. Write a program to read the contents of a text file and count the number of words present in the file.
9. Write a program that reads a text file and creates another file that is identical except that every sequence of consecutive blank spaces is replaced by single space.
10. Write a program that will ask the users to enter the details of 5 students and transfer those details into a binary file Stud.dat. Write another file that will read the details of the students and print the names of all those students who have total marks greater that a particular given value.
11. Write a program that will take the details of 10 employees as input and transfer those details into a binary file. Write another program that will provide a menu to the user for the following purpose.
    a. To sort the file on the basis of their employment number.
    b. To sort the file on the basis of their name.
    c. To search the record for a particular employee on the basis of their employee number or name.
12. Write a program that will take two strings from the command line as argument and print the appropriate message if both the strings are same.
13. Write a program to implement a stack and it's operations.
14. Write a program to implement a linear queue, circular queue using an array.
15. Write a program to convert an infix expression into its equivalent postfix expression using a stack.
16. Write a program to evaluate a postfix expression using a stack.
17. Write a program to create and display a linked list of integers.
18. Write a program to create a linked list and define functions to add a node (at the beginning, end and middle), delete a node, search a node and display all the nodes.
19. Write a program to create two linked list and append one list at the end of another using function.

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:09:34 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics &Telecommunication Engineering** | Semester: | **V** |
| Subject: | **Digital Communication Laboratory** | Code: | **328563 (28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To study Signal sampling and reconstruction techniques.
2. To study the effect on reconstructed waveform of the use of sample / hold circuit.
3. To study the TDM Pulse Amplitude Modulation / Demodulation & to draw their waveforms.
4. To study Time Division Multiplexing of Pulse Code Modulation /Demodulation
5. To study A-Law and μ-Law Companding.
6. To perform experiment with delta modulation techniques and to study the waveforms.
7. To perform experiment with adaptive delta modulation techniques and to study the waveforms.
8. To study the Equalizers Circuits.
9. To study ASK Modulation.
10. To study FSK Modulation.
11. To study PSK Modulation.
12. To study ASK Demodulation.
13. To study FSK Demodulation.
14. To study PSK Demodulation.
15. To study DPSK generation and detection.
16. To study QPSK generation and detection.
17. To study the effect of Noise in digital modulation techniques.

**List of Equipments/Machine Required:**
Communication Trainer Kits, Function Generator, Power Supply, CRO, Discrete Components.

Experiments can be implemented in hardware circuits or Simulated using C, C++, Simulation Software.

**Recommended Books:**
1. Principles of Communication Systems –Taub and Shilling, Tata McGraw Hill.
2. Handbook of Experiments in Electronics and Communication Engineering, Rao, Vikas Publishing House Pvt. Ltd.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:09:49 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics &Telecommunication Engineering** | Semester: | **V** |
| Subject: | **Advanced Microprocessor & Interfacing Laboratory** | Code: | **328564 (28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To write a program to perform subtraction X-Y where X and Y are 48 bit numbers.
2. To write a program to multiply 4 and 5 in ASCII and store the result.
3. To find the largest number from a block of 15 bytes
4. To find the smallest number from a block of 15 bytes
5. To write a program to add series of 20 bytes.
6. A block of 200-signed bytes is present in memory from address BA: EA add all the positive bytes and store 8 bit signed result in memory after this block.
7. To write a program to compare two data blocks.
8. To write a program to scan for a specific word in the block and to store the location of the word at a suitable memory location.
9. To write an assembly language program to solve following arithmetic equation: 3AX+5DX+BP.
10. To write a program to arrange a data block in ascending/descending order.
11. To write a program to arrange a data block in descending order.
12. To write a program to insert a specific data byte in an array under certain given conditions.
13. To write program to input a 4 bit BCD number, look up the seven segment code for this number and output to the display.
14. Interface 8279 and Write a program to display a message.
15. Interface 8254 with 8086 and write a program to generate a given delay.
16. Interface 8255 with 8086 and write a program to input a given set of data through Port A and output the complement of the set of data through Port B.
17. Study the Traffic Light Interface.
18. Interface a stepper motor with 8086 and write a program to rotate the motor in a given step in a given direction.
19. Interface 8251 with 8086 and write a program to generate a train of Sync pulses of given duration.

**List of Equipments/Machine Required:**

8086 Microprocessor kit, Keyboard, Assembler, PCs.

**Recommended Books:**

The Intel 8086/8088 Microprocessor Architecture, Programming, Design and Interfacing – Bhupinder Singh Chhabra, Dhanpat Rai Publications.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:10:02 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of Program: | **Bachelor of Engineering** | | |
| Branch: | **Common to All Branches** | Semester: | **V** |
| Subject: | **Personality Development** | Code: | **300565 (28)** |
| No. of Lectures: | **2/Week** | Tutorial Period: | **NIL** |
| Total Marks in ESE: | **NIL** | Marks in TA: | **20** |
| Minimum number of Class Tests to be conducted: | **Two** | | |

**Objective:** The course is introduced to develop one's outer and inner personality tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Personality Development is essential for overall development of an individual apart from gaining technical knowledge in the subject.

**Course Objectives**

Upon completion of this course, the student shall be able

- To understand the concept of personality and image;
- To develop leadership, listening and interacting skills;
- To develop attitudinal changes;
- To develop decision-making qualities; and
- To communication skill.

**UNIT I** **Personality concepts:** What is Personality – its physical and psychic aspects. How to develop a positive self-image. How to aim at Excellence. How to apply the cosmic laws that govern life and personality. How to improve Memory – How to develop successful learning skills. How to develop and effectively use one's creative power. How to apply the individual MOTIVATORS that make you a self-power personality.

**UNIT II** **Interpersonal Skills:** Leadership: Leaders who make a difference, Leadership: your idea, What do we know about leadership? If you are serious about Excellence. Concepts of leadership, Two important keys to effective leadership, Principles of leadership, Factors of leadership, Attributes. Listening: Listening skills, How to listen, Saying a lot- just by listening, The words and the music, How to talk to a disturbed person, Listening and sometimes challenging. How to win friends and influence people, How to get along with others. How to develop art of convincing others. How can one make the difference. How to deal with others particularly elders. Conflicts and cooperation.

**UNIT III** **Attitudinal Changes: Meaning of attitude,** benefits of positive attitudes, How to develop the habit of positive thinking.

**Negative attitude and wining:** What is FEAR and how to win it. How to win loneliness. How to win over FAILURE. How to win over PAIN. How to win over one's ANGER and others anger. What is stress and how to cope up with it? The art of self-motivation. How to acquire mental well-being. How to acquire physical well-being.

**UNIT IV** **Decision Making:** How to make your own LUCK. How to plan goals/objectives and action plan to achieve them. How to make RIGHT DECISION and overcome problems. How to make a Decision. Decision making: A question of style. Which style, when? People decisions: The key decisions. What do we know about group decision making? General aids towards improving group decision making.

**UNIT V** **Communication Skills: Public Speaking:** Importance of Public speaking for professionals. The art of Speaking - Forget the fear of presentation, Symptoms of stage fear, Main reason for speech failure, Stop failures by acquiring Information; Preparation & designing of speech, Skills to impress in public speaking & Conversation, Use of presentation aids & media.

**Study & Examination:** How to tackle examination, How to develop successful study skills.

**Group discussions:** Purpose of GD, What factors contribute to group worthiness, Roles to be played in GD.

**Course Outcomes:**

- The students will be able to develop inner and outer personality exposure;
- The students will be able to develop effective leadership qualities and interacting skills;
- The students will be able to develop positive attitude, motivating skills and develop winning philosophies;
- The students will be able to develop decision-making tools; and
- The students will be able to develop group presentation, public speaking and impressive conversation.

**Text Books:**

1. Basic Managerial Skills for all by E. H. McGrawth, prentice Hall India Pvt. Ltd., 2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

**Reference Books:**

1. How to Develop a Pleasing Personality by Atul John Rego, Better Yourself Books, Mumbai, 2000
2. How to Succeed by Brain Adams, Better Yourself Books, Mumbai, 1969
3. Personality: Classic Theories & Modern Research; Friedman ; Pearson Education, 2006
4. How to Win Friends and Influence People by Dale Carnigie, A. H. Wheeler 2006



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:10:16 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

## Scheme of Teaching and Examination

## B.E. VI Semester

## Electronics & Telecommunication Engineering

| Sl. No. | Board of Study | Code No. | Subjects | Period Per Week | | | Scheme of Exam | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | Theory/ Practical | | | | |
| | | | | | | | ESE | CT | TA | | |
| 1 | Electronics & Telecommunication | 328651(28) | Digital Signal Processing | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 2 | Electronics & Telecommunication | 328652(28) | Electronic Circuit Design | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Electronics & Telecommunication | 328653(28) | Microcontroller & Embedded | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Electronics & Telecommunication | 328654(28) | VLSI Design | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | Electronics & Telecommunication | 328655(28) | Information Theory & Coding | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | *Refer Table -1* | | Professional Elective -I | 3 | - | - | 80 | 20 | 20 | 120 | 3 |
| 7 | Electronics & Telecommunication | 328661(28) | Digital Signal Processing Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8 | Electronics & Telecommunication | 328662(28) | Electronic Circuit Design Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 9 | Electronics & Telecommunication | 328663(28) | Microcontroller & Embedded | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 10 | Electronics & Telecommunication | 328664(28) | VLSI Design Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 11 | Management | 300665(76) | Managerial Skills | - | - | 2 | - | - | 40 | 40 | 1 |
| 12 | | | Library | - | - | 1 | - | - | - | - | - |
| **TOTAL** | | | | **18** | **5** | **17** | **640** | **120** | **240** | **1000** | **31** |

**L:** Lecture **T:** Tutorial **P:** Practical
**ESE:** End Semester Examination **CT:** Class Test **TA:** Teachers' Assessment

**Note:** Industrial Training of eight weeks is mandatory for B.E. students. It is to be completed in two equal parts. The first part must have been completed in summer after IV semester. The second part to be completed during summer after VI semester after which students have to submit a training report which will be evaluated by college teachers during B.E. VII semester.

**Table 1**
**Professional Elective – I**

| Sl. No. | Board of Study | Code | Subject |
|---|---|---|---|
| 1 | Electronics & Telecom. | 328671(28) | Internet & Web Technology |
| 2 | Electronics & Telecom. | 328672(28) | Operating System |
| 3 | Electronics & Telecom. | 328673(28) | Biomedical Electronics |
| 4 | Electronics & Telecom. | 328674(28) | Electronic Engineering Materials & Components |
| 5 | Electronics & Telecom. | 328675(28) | Computer Organization & Architecture |
| 6 | Electronics & Telecom. | 328676(28) | Advanced Semiconductor Devices |

*Note:*

1. 1/4th of total strength of students to minimum of twenty students is required to offer an elective in the college in a particular academic session
2. Choice of elective course once made for an examination cannot be changed in future examinations.

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:10:35 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Digital Signal Processing** | Code: | **328651(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective:**

- To study the basic mathematical techniques needed for analysis of discrete time signals and systems
- To study the various digital filter design techniques.
- To study the multirate digital signal processing techniques

**Course Outcomes:**

At the end of this course students will demonstrate the ability to

1. Synthesize discrete time signals from analog signals.
2. Use time domain and frequency domain analysis tools.
3. Apply forward and reverse transformations.
4. Visualize various applications of DSP and explore further possibilities.
5. Design IIR and FIR filters.
6. Excel in H/W and S/W environment of Digital Signal Processing. .

**UNIT I Analysis of Discrete Time Signals and Systems:** Discrete Fourier analysis, Classification, Discrete Time Fourier Transform (DTFT) & its properties, Inverse DTFT. Discrete Fourier Transform (DFT) & its Properties, Inverse DFT. Fast Fourier Transform, Properties, Types of FFT, N-point Radix-2 FFT, Inverse FFT. Discrete Linear Convolution, Circular Convolution, Fast Convolution, Frequency Response of LTI system using Discrete Fourier Analysis. Discrete Cosine Transform.

**UNIT II Implementation of Discrete-time Systems**: Structures for the Realization of discrete-time systems, Structures for FIR systems: Direct, Cascade, Frequency Sampling & Lattice structures. Structures for IIR systems: Direct, Signal Flow Graphs & Transposed, Cascade, Parallel, Lattice & Lattice-Ladder structures. State space system analysis and structures.

**UNIT III FIR Filter Design:** Symmetric and Anti-symmetric FIR filters, FIR Filter design by window method (Rectangular, Bartlett, Hamming, Hanning, Blackman and Kaiser window), Frequency Sampling method, Optimum approximation of FIR filters, Design of FIR differentiators, Design of Hilbert transformers.

**UNIT IV IIR Filter Design**: Design of Discrete-time IIR filters from Continuous-time Filters: Filter design by Impulse invariant and bilinear transformation method: Butterworth, Chebyshev & Elliptic approximation Filter, Frequency transformation.

**UNIT V Multirate Digital Signal Processing**: Introduction, Decimation, Interpolation, Sampling rate conversion by rational factor, Filter design and implementation for sampling rate conversion: Direct form FIR digital filter structure, Polyphase filter structure, Time varying digital filter structure, Sampling rate conversion by an arbitrary factor.

**Name of Text Books:**

1. Discrete Time Signal Processing by A.V. Oppenheim, R. W. Schafer, & John R. Buck, , 2nd Edition, Prentice Hall, 1999. (Unit I, Unit II, Unit III, Unit IV)
2. Digital Signal Processing: Principles, Algorithms and Applications by John G. Proakis & D.G. Manolakis, Prentice Hall, 1997. (Unit II, Unit III, Unit IV, Unit V)
3. Digital Signal Processing by S. K. Mitra, 3rd edition, McGraw-Hill, 2007. (Unit V)

**Name of Reference Books:**

1. Signals and Systems by A. V. Oppenheim, A. S. Willsky & S. H. NAWAB, 2nd edition, Prentice Hall, 1996.
2. Digital Signal Processing by S. Salivahanan, A. Vallavaraj, C. Gnanapriya, Tata McGraw-Hill, 2000.
3. Digital Signal Processing by A. Anand Kumar, PHI Learning Pvt. Ltd, 2012.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:10:48 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Electronic Circuit Design** | Code: | **328652(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objectives:**

1. To become familiar with fundamental electronic circuits.
2. To learn to use common wave shaping Circuits.
3. To become familiar with Timer circuits designing for applications.
4. To be able to design active filter electronic circuits to perform realistic tasks.

**Course Outcome:**

1. To understand electronics waveshaping circuits.
2. The student will be able to understand timer IC and Its Applications and Design concepts
3. Student will be able to understand Designing concepts of Active filters.

**UNIT I** **Signal Generators & Conditioners: Signal generators(op-amp):** Square Wave Generator, Triangular Wave Generator, Sawtooth Wave generator. Voltage sweep generator: General features of Time base signal, Exponential sweep circuitCurrent Sweep generator: A simple current sweep, Linearity correction through adjustment of driving waveform.
**Signal conditioner:** Clipper Circuits (using diodes): Series Clipper, Parallel Clipper. Clamper Circuits (using Diodes): Negative Clamper, Positive Clamper. High Pass RC Circuit as Differentiator, Low Pass RC Circuit as Integrator.

**UNIT II** **Multivibrators:** Transistor as Switch, Types of Multivibrator (bistable, astable & monostable), Fixed and self biased binary , use of Commutating Capacitor, improving resolution, Schmitt trigger Emitter Coupled ,Monostable and Astable Multivibrator : Collector – Coupled and Emitter – Coupled Multivibrator.

**UNIT III** **Timer and its application:** 555 Timer, Functional Diagram, Monostable mode operation and its applications: missing pulse detector, Linear Ramp generator, Frequency Divider, Pulse Width modulation. Astable mode operation and its applications: FSK Generator, Pulse position modulator, Schmitt trigger.

**UNIT IV** **Principles of Active Filters:** Bilinear Transfer Function, Parts of T(jw), Classification of Magnitude and Phase Response, Bode plots and Design. Cascading: Inverting and Non-inverting OP –AMP Circuits, Cascade Design, All pass Circuits: Phase shaping, Design parameters: $\omega_o$ and Q, Biquad circuit and its frequency response.

**UNIT V** **Special Active Filters:** Design of Low –pass Butterworth Filters, Sallen and key Circuits, Resistive gain Enhancement, RC-CR Transformation, Design of Band – pass Butterworth Filters, Delyiannis-Friend Circuit, Stagger-Tuned Bandpass filter Design, Q Enhancement of the Friend circuit. Design of Low – pass and Band-pass Chebsyhev Filters, Sensitivity concepts and their Application to Sallen and key Circuits.

***Name of Text Books:***

1. Pulse, Digital and Switching Waveforms by Millman & Taub, TMH Publishing Co.(Unit-1,2)
2. Integrated Circuits: K. R. Botkar,9th Ed., Khanna Publications (Unit-3)
3. Analog Filter Design; Van –Valkenburg ; Holt –Standers International Edn. (Unit-4,5)

***Name of Reference Books:***

1. Operational Amplifiers and Linear Integrated Circuits, Coughlin and Driscoll, 6th Ed., PHI
2. Linear Integrated Circuits, Roy Choudhury and Jain, 2nd Ed., New Age International Publishers.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:11:02 -08'00'

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering/Electronics & Instrumentation/Applied Electronics & Instrumentation** | Semester: | **VI** |
| Subject: | **Microcontroller & Embedded System** | Code: | **328653(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objectives:**

- To make students familiar with the basic blocks of microcontroller device and Embedded system in general.
- To provide comprehensive knowledge of the architecture, features and interfacing with 8051 microcontroller.
- To use assembly and high level languages to interface the microcontrollers to various applications.

**Course Outcome:**

1. To understand Microcontroller 8051 its architecture and its instruction set.
2. Gain knowledge about Counter/timer and interrupts in 8051 Microcontroller and Programming concepts.
3. Students will be able to do serial communication programming and gain knowledge of serial communication.
4. Students will be able to understand interfacing Microcontroller 8051 with devices.

**UNIT I** **Introduction to Microcontroller:** A brief History of Microcontrollers, Harvard Vs Von-Neumann Architecture; RISC Vs CISC, Classification of MCS-51family based on their features ( 8051,8052, 8031, 8751, AT89C51 ), Pin configuration of 8051.
**8051 Processor Architecture and Instruction Set**: Registers of 8051, Inbuilt RAM, Register banks, stack, on-chip and external program code memory ROM, power reset and clocking circuits, I/O port structure, Addressing modes, Instruction set and programming.

**UNIT II** **Counter/Timer and Interrupts of 8051:** Introduction, Registers of timer/counter, Different modes of timer/counter, Timer/counter programming, Interrupt *Vs* Polling, Types of interrupts and vector addresses, register used for interrupts initialization, programming of external interrupts, Timer interrupts.

**UNIT III** **Asynchronous Serial Communication and Programming:** Introduction to serial communication, Data Programming, RS232 standard, RS422 Standard, 1488 and 1489 standard, GPIB, Max 232/233 Driver.

**UNIT IV** **Interfacing with 8051:** Interfacing and programming of: ADC (0804,0808/0809,0848) & DAC (0808), stepper motor , 4x4 keyboard matrix, Relays, LED and Seven segment display, LCD, Interfacing (only) of different types of Memory , Address decoding techniques

**UNIT V** **Embedded Systems**: Introduction to an Embedded Systems, Defining the Embedded System, Real Life Examples of Embedded Systems, Characteristics of Real-Time Embedded Systems, Basics Of Developing For Embedded Systems, Embedded design challenges and development issues.

***Names of Text Books:***

1. The 8051 Microcontroller and Embedded Systems using Assembly and C, Mazidi, Mazidi & McKinlay, 2nd Ed.,PHI.(Unit-I,II,III)
2. Embedded system, Frank Vahid.(Unit-IV)

***Names of Reference Books:***

1. 8051 Programming, Interfacing and Applications K. J. Ayala, Penram Pub.
2. 8 bit Microcontrollers & Embedded Systems Manual.
3. Programming and Customizing the 8051 Microcontroller, Predko; TMH
4. Microcontrollers: Architecture, Programming, Interfacing and System Design, Rajkamal, Pearson Education.

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:11:18 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **VLSI Design** | Code: | **328654(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**
1. To understand the IC design aspects, basic fabrication steps.
2. To study the design rules & representation of circuits at lower level of abstraction.
3. To understand the layout design of few combinational and sequential circuits.
4. To study one of the HDL (hardware description language) for front end design.
5. To study internal structure of programmable logic devices.

**Course Outcomes:**
1. Students are expected to understand CMOS fabrication details.
2. Students are expected to understand schematic, layout of combinational circuits.
3. Students are expected to understand schematic, layout of sequential circuits.
4. Students are expected to understand VHDL programming concepts.

**UNIT I** **An Overview & Analysis of CMOS Integrated Circuits:** Complexity and Design: Design Flow, VLSI Chip Types, Moore's Law; MOSFETs as Switch: FET Threshold Voltages, Pass Characteristics; Basic Logic Gates in CMOS: NOT Gate, NOR Gate, NAND Gate; Complex Logic Gates in CMOS: Structured Logic Design, XOR and XNOR Gates; Transmission Gate Circuits: Multiplexers, OR Gate, XOR/XNOR Gate. DC characteristics of the CMOS inverter, Switching Characteristics: Fall Time, Rise Time, Propagation Delay; Power Dissipation.

**UNIT II** **Fabrication & Physical Design of CMOS Integrated Circuits:** CMOS Layers; Designing FET Arrays; Basic Gate Designs; Complex Logic Gates; Euler Graph; Overview of Silicon Processing; Material Growth and Deposition; Lithography; CMOS Process Flow; CMOS Design Rules; Layout of Basic Structures: nWell, Active Areas, Doped Silicon Regions, MOSFETs, Active Contacts, Metal, Vias; Physical Design(Stick diagram &Layout Design) of Logic Gates: NOT, NAND & NOR.

**UNIT III** **CMOS Subsystem Design:** Schematic and Layout of CMOS Combinational Circuits: Full adder circuit, Multiplexer, Parity Generator, Schematic and Layout of CMOS Sequential Circuits: SR Flip-Flop, JK Flip-Flop, & D Flip-Flop, 4x4 NOR based ROM Array, 4x4 NAND based ROM Array; Schematic of SRAM Schematic and operation of DRAM: 3-T DRAM 6-T DRAM;

**UNIT IV** **Implementation Technology & Introduction to VHDL:** Implementation Technology: CPLD Architecture, FPGA Architecture, LUT Design; Brief history of VHDL, Entity Declaration, Architecture Declaration, Modeling styles: Data Flow, Structural, Behavioral and Mixed Style. Assignment Statements, Select Signal Assignment, Conditional Signal Assignment, Component Declaration, Generate Statements, Concurrent and Sequential Assignment Statement, Process Statement, Case Statement. VHDL operators. VHDL programming of Multiplexer, Decoder, Encoder, Half Adder, Full Adder, 4-bit Adder, ALU.

**UNIT V** **Sequential Logic Design using VHDL:** VHDL Programming for D-Latch, SR Flip-Flop, JK Flip-Flop, T Flip-Flop& D Flip-Flop, Shift Registers, Synchronous Counter: UP counter, Down counter, BCD counter; Moore Finite State Machine for Sequence Detector, MOD counter & Serial Adder. Mealy Finite State Machine for Sequence Detector, MOD counter & Serial Adder. Test Bench design for Half Adder, Full adder & D Flip-Flop.

**Textbooks:**
1. Introduction to VLSI Circuits and Systems: John P. Uyemura, John Wiley & Sons (Unit-I & II).
2. CMOS Digital Integrated Circuits: Analysis & Design; Sung-Mo Kang & Yusuf Leblebici, TMH, (Unit-III)
3. Fundamentals of Digital Logic with VHDL Design, Brown, TMH Pub. (Uni- IV & V)
4. VHDL Primer by J. Bhaskar, PHI(Unit-IV & V)

**Reference Books:**
1. CMOS VLSI Design: A Circuits and Systems Perspective by Weste, Pearson Education Pub.
2. Basic VLSI Design by Pucknell&Esharghian,3rd Ed., PHI Pub.
3. CMOS circuit design, layout and simulation by Jacob Baker, PHI

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:11:33 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Information Theory & Coding** | Code: | **328655(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objectives:**

- To learn about various source coding and channel coding techniques.
- To study various error control coding techniques.
- To Gain knowledge about BCH code and implementation of RS encoder and decoder.
- To learn convolutional coding, viterbi decoding and turbo codes.
- To gain knowledge about Trellis Coded Modulation

**Course Outcomes:**

1. Students will be able to understand the concept of various Source Coding Techniques and Channel Coding Techniques.
2. Students will be able to analysis various error control coding techniques.
3. Students will be able to understand BCH Code and RS Code.
4. Students will get the knowledge of convolutional Code.

**UNIT I** **Source Coding and Channel Capacity Coding :** Introduction to Information Theory, Uncertainty and Information, Average Mutual Information and entropy, Information Measures for continuous Random Variables, Source Coding Theorem, Huffman coding, The Lempel-Ziv algorithm, Run Length Encoding and the PCX Format. Introduction to JPEG Standard for Lossless and Lossy Compression.(refer to text book)
**Channel Capacity Coding:** Channel Models, Channel Capacity, Channel Coding, Information Capacity Theorem, The Shannon Limit.

**UNIT II** **Error Control Coding (Channel Coding) Linear Block Codes for Error Correction & Cyclic Codes:** Introduction to Error Correcting Codes, Basic Definitions, Matrix Description of Linear Block Codes, Equivalent Codes, Parity Check Matrix, Decoding of a Linear Block Code, Syndrome Decoding, Hamming Codes.
**Cyclic Codes:** Polynomials, The Division algorithm for Polynomials, A Method for Generating Cyclic codes, Matrix Description of cyclic codes, Burst Error Correction.

**UNIT III** **Bose-Chaudhuri Hocquenghem (BCH) Codes:** Introduction to BCH Codes, Primitive Elements, Minimal Polynomials, Generator Polynomials in Terms of Minimal Polynomials, some Examples of BCH Codes, Decoding of BCH Codes, Introduction to Reed-Solomon Codes,

**UNIT IV** **Convolutional Codes:** Introduction to Convolutional Codes, Tree codes and Trellis Codes, Polynomial Description of Convolutional Codes (analytical Representation), distance Notions for Convolutional Codes, The Generating Function, Matrix Description of Convolutional Codes, Viterbi Decoding, Distance Bounds for Convolutional Codes.

**UNIT V** **Trellis Coded Modulation:** Introduction to TCM, The Concept of Coded Modulation, Mapping by Set Partitioning, Ungerboeck's TCM Design Rules, TCM Decoder.

***Name of Text Books:***

1. Information Theory coding & Cryptography by Rajan Bose,(Unit- I,II,III,IV,V) Tata McGraw-Hill,

***Name of Reference Books:***

1. Principles of Digital Communication - Das Mullick Chatterjee, Willey Eastern Publications
2. Digital communication - Sklar, Pearson Publication
3. Digital communication - Prokais, Tata McGrawHill

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:11:47 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics &Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Digital Signal Processing Laboratory** | Code: | **328661 (28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To generate the basic Analog and Discrete Signals.
2. Implementation of Linear convolution, Circular convolution, Linear convolution using circular convolution.
3. DFT Implementation for a given signal.
4. To plot Fourier Transform amplitude spectrum and phase spectrum for a given function .
5. To plot frequency response in Z-domain for the given transfer function.
6. To plot frequency response in S-domain for a given transfer function.
7. To plot Fast Fourier Transform (amplitude & phase).
8. To sample a sinusoidal signal at Nyquist rate, above the Nyquist Rate and below the Nyquist Rate.
9. Design & implementation of IIR filters [LPF, HPF, BPF, BSF].
10. Design & implementation of FIR filters [LPF, HPF, BPF, BSF].
11. To design various filters using Simulink.
12. To design a Graphical User Interface to display various basic signals [ sine wave , sinc wave, etc].
13. To perform Interpolation and decimation [ Multirate DSP].
14. To design a digital notch filter and embed it on a digital signal processor block.
15. Experiments with application of DSP in Communication/Speech Processing/Image Processing .

*(Institutes may append more programmes /Experiments based on the infrastructure available)*

**List of Equipments/Machine Required:**

C++ Compiler, Simulation Software, DSP Processor kit, Digital Storage CRO, Spectrum Analyzer.

**Recommended Books:**

1. Digital Signal Processing, Vallavaraj, Salivahanan, Gnanapriya, TMH
2. Stein, J. Digital Signal Processing - a computer science perspective. Wiley

---

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:12:02 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **VI** |
| Subject: | **Electronic Circuit Design Laboratory** | Code: | **328662(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To design clipper circuits to clip positive , negative and also clipping at two independent levels.
2. To design Clamper circuits.
3. To design a Bistable multivibrator circuit and to draw its output waveform.
4. To design a Monostable multivibrator circuit and to draw its output waveform.
5. To design a Astable multivibrator circuit and to draw its output waveform.
6. To design an astable multivirator using 555 timer
7. To design a monostable multivibrator using 555 timer.
8. To design a LPF using R & C and to study its characteristics
9. To design a HPF using R & C and to study its characteristics
10. To design a BPF using R & C and to study its characteristics
11. To design chebsyhev filter using OPAMP and to plot its frequency response.
12. To design All Pass filter using OPAMP and to plot its frequency response.
13. To design Band-pass filter using OPAMP and to plot its frequency response.
14. To design HPF using OPAMP.
15. To design LPF using OPAMP.
16. To design HPF (Multistage) using OPAMP.

**List of Equipments/Machine Required:**

Discrete Components, Function Generator, Power Supply, CRO, AVO Meter, Multimeter, Voltmeter

**Recommended Books:**

. Integrated Circuits: K. R. Botkar, Khanna Publshers.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:12:15 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **VI** |
| Subject: | **Microcontroller & Embedded System Laboratory** | Code: | **328663(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. Write a microcontroller 8051 program to transfer the bytes into RAM locations starting at 50H,assuming that ROM space starting at 240H contains CHHATTISGARH by using – a) Counter, b) nullchar. for end of string .
2. Write a microcontroller 8051 program to get hex data on the range of 00-FFh from port 0 and convert itto decimal. Save the digits in R7, R6 and R5, where the least significant digit is in R7.
3. Write a microcontroller 8051 program to add two 16 Bit unsigned numbers. Operands are two RAMvariables. Results to be in R1-R0 pair.
4. Write a microcontroller 8051 program to subtract an unsigned 16 Bit number from another. Operandsare two RAM variables. Results to be in R1-R0 pair.
5. Write a microcontroller 8051 program to add two unsigned 32-bit numbers. Operands are two RAMvariables. Results to be in R1-R0 pair.
6. Write a microcontroller 8051 program to add two 16 Bit signed numbers.
7. Write a microcontroller 8051 program to convert a binary number to equivalent BCD
8. Write a microcontroller 8051 program to convert a packed BCD number to two ASCII numbers andplace them in R5 and R6.
9. Write a microcontroller 8051 program to calculate the square root of an 8-bit number using iterativemethod.
10. Write a microcontroller 8051 program that generates 2kHz square wave on pin P1.0, 2.5 kHz on pin P1.2and 25 Hz on pin P1.3.
11. Write a microcontroller 8051 program for counter 1 in mode 2 to count the pulses and display the stateo the TL1 count on P2. Assume that the clock pulses are fed to pin T1.
12. Write a microcontroller 8051 program to transfer letter "N" serially at 9600 baud, continuously. Assumecrystal frequency to be 11.0592 MHz.
13. Write a microcontroller 8051 program to transfer word "CSVTU" serially at 4800 baud and one stop bit,continuously. Assume crystal frequency to be 11.0592 MHz.
14. Write a microcontroller 8051 program to receive bytes of data serially, and put them in P1. Set thebaud rateat 2400 baud, 8-bit data, and 1 stop bit. Assume crystal frequency to be 11.0592 MHz.

**List of Equipments/Machine Required:**

Microcontroller kit, Interfacing kit, Keyboard, Monitor, SMPS for Microcontroller



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:12:28 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program | **Bachelor of Engineering** | | |
| Branch: | **Electronics &Telecommunication** | Semester: | **VI** |
| Subject: | **VLSI Design Laboratory** | Code: | **328664(28)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To Study Architecture of CPLD
2. To Study Architecture of FPGA
3. To Design Half Adder in Data Flow Style of Modeling and Implement it in the CPLD.
4. To Design Full Adder in Structural Style of Modeling and Implement it in the FPGA.
5. To Design 4:1 Multiplexer in Behavioral Modeling and Implementation in CPLD.
6. To Design 16:1 Multiplexer using Generate statement and Implementation in FPGA.
7. To Design 8bit adder using Generic statement and Implementation in CPLD.
8. To Design D Flip-Flop in Behavioral Modeling.
9. To Design Sequence Detector using Moore Machine in Behavioral Modeling.
10. To Design Serial Adder using Mealy Machine in Behavioral Modeling.
11. To Prepare and Verify the Layout for NOT Gate.
12. To Prepare and Verify the Layout for NAND Gate.
13. To Prepare and Verify the Layout for NOR Gate.
14. To Prepare the Layout for D-FF.
15. To Prepare the Layout for the logic equation (a * (b+c))'

**EDA Tools to be used:**

**Front End:** Modelsim, FPGA Advantage, Xilinx, EdWinXP, ActiveHDL.

**Back End:** Cadence, Zeni-EDA, Calibre, Tanner, Synopsis, II-Spice

**CPLD:** XC9572, XC95108.**FPGA:**XC3S400

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:12:40 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of Program: | **Bachelor of Engineering** | | |
| Branch: | **Common to All Branches** | Semester: | **VI** |
| Subject: | **Managerial Skills** | Code: | **300665 (76)** |
| No. of Lectures: | **2/Week** | Tutorial Period: | **NIL** |
| Total Marks in ESE: | **NIL** | Marks in TA: | **40** |
| Minimum number of Class Tests to be conducted: | **Two** | | |

**Objective:**
The course is introduced to develop managerial skills tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Managerial skills are essential for overall professional development of an individual apart from gaining technical knowledge in the subject.

**Course Objectives**
Upon completion of this course, the student shall be able
- To define and explain the concept of managerial, written and oral communication skill;
- To understand the leadership skill;
- To develop self-appraisal and understand distinction between leader and manager;
- To develop positive attitude and thinking; and
- To understand managerial functions and develop creativity.

**UNIT I** **Managerial Communication Skills:** Importance of Business Writing: writing business letters, memorandum, minutes, and reports- informal and formal, legal aspects of business communication, oral communication- presentation, conversation skills, negotiations, and listening skills, how to structure speech and presentation, body language.

**UNIT II** **Managerial skills - Leadership**: Characteristics of leader, how to develop leadership; ethics and values of leadership, leaders who make difference, conduct of meetings, small group communications and Brain storming, Decision making, How to make right decision, Conflicts and cooperation, Dissatisfaction: Making them productive.

**UNIT III** **Proactive Manager:** How to become the real you: The journey of self-discovery, the path of self-discovery, Assertiveness: A skill to develop, Hero or developer, Difference between manager and leader, Managerial skill check list, team development, How to teach and train, time management, Stress management, Self-assessment.

**UNIT IV** **Attitudinal Change:** Concept of attitude through example, benefits of right attitude, how to develop habit of positive thinking, what is fear? How to win it? How to win over failure? How to overcome criticism? How to become real you? How to Motivate? How to build up self confidence?

**UNIT V** **Creativity**: Creativity as a managerial skill, Trying to get a grip on creativity. Overview of Management Concepts: Function of Management: Planning, organizing, staffing, controlling.

**Course Outcome**
- The students will be able to develop formal and informal, negotiation, written and oral communication skill;
- The students will be able to develop manage groups, resolve conflicts and leadership skill and decision making qualities;
- The students will be able to develop self-appraisal, teaching, training and managing stress and time;
- The students will be able develop positive thinking, motivating team members and winning race; and
- The students will be able to develop creativity and fundamental management functions.

**Text Books:**
1. Basic Managerial Skills for all by E.H. Mc Grawth, Prentice Hall India Pvt Ltd,2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

**Reference Books:**
1. How to develop a pleasing personality by Atul John Rego, Better yourself bools, Mumbai,2006
2. The powerful Personality by Dr. Ujjawal Patni & Dr. Pratap Deshmukh, Fusion Books, 2006
3. How to Success by Brian Adams, Better Yourself books, Mumbai, 1969



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:12:54 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Internet & Web Technology (Professional Elective – I)** | Code: | **328671(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **NIL** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective:**

1. To provide the fundamental concepts of Internet and to make students recognize the difference between various Internet protocols.
2. To introduce the concept of e-mail, list server & file transfer protocols.
3. To introduce the concept of HTML, Javascript & XML.
4. To introduce the concept of Internet security, Firewalls, E-commerce & EDI.

**Course Outcome:**

1. Students will be familiar with various Internet protocols and the concepts of Internet.
2. Students will able to differentiate between various e-mail protocols and their working.
3. Students will be familiar with the concept of remote login with the understandability of hosting and maintaining of website.
4. Students will also get knowledge about Internet security and Firewalls.

**UNIT I** **INTRODUCTION TO INTERNET**: Introduction, Evolution of Internet, Internet Applications, Internet Protocol -TCP/IP, UDP, HTTP, Secure Http(Shttp), Internet Addressing – Addressing Scheme – Ipv4 &IPv6, Network Byte Order, Domain, Name Server and IP Addresses, Mapping. Internet Service Providers, Types Of Connectivity Such as Dial-Up Leaded Vsat. Web Technologies: Three Tier Web Based Architecture; Jsp, Asp, J2ee, Net Systems.

**UNIT II** **HTML CSS AND SCRIPTING**: HTML - Introduction, Sgml, Dtd(Document Type Definition, Basic Html Elements, Tags and usages, HTML Standards , Issues in HTML Dhtml: Introduction Cascading Style Sheets: Syntax ,Class Selector, Id Selector Dom (Document Object Model) & Dso (Data SourceObject) Approaches To Dynamic Pages: Cgi, Java Applets, Plug Ins, Active X, Java Script – Java Script Object Model, Variables-Constant – Expressions, Conditions-Relational Operators- Data Types – FlowControl – Functions & Objects-events and event handlers – Data type Conversion & Equality – Accessing HTML form elements.

**UNIT III** **XML**: What is XML – Basic Standards, Schema Standards, Linking & Presentation Standards, Standards that build on XML, Generating XML data, Writing a simple XML File, Creating a Document type definition, Documents & Data ,Defining Attributes & Entities in the DTD ,Defining Parameter Entities & conditional Sections, Resolving a naming conflict, Using Namespaces, Designing an XML data structure,Normalizing Data, Normalizing DTDS.

**UNIT IV** **INTERNET SECURITY & FIREWALLS**: Security Threats From Mobile Codes, Types Of Viruses, Client Server Security Threats,Data & Message Security, Various electronic payment systems,Introduction to EDI, Challenges–Response System, Encrypted Documents And Emails , Firewalls:Hardened Firewall Hosts, Ip- Packet Screening, Proxy Application Gateways, Aaa (Authentication ,Authorization and Accounting).

**UNIT V** **WEBSITE PLANNING & HOSTING:** Introduction, Web Page Lay-Outing, Where To Host Site, Maintenance Of Site, Registration Of Site On Search Engines And Indexes, Introduction To File Transfer Protocol, Public Domain Software, Types Of Ftp Servers (Including Anonymous), Ftp Clients Common Command. Telnet Protocol, Server Domain, Telnet Client, Terminal Emulation. Usenet And Internet Relay Chat

**Text Books:**

1. Internet & Intranet Engineering,- Daniel Minoli, TMH.
2. Alexis Leon and Mathews Leon – Internet for Every One, Tech World.

**Reference Books:**

1. Eric Ladd, Jim O'Donnel –"Using HTML 4, XML and JAVA"-Prentice Hall of India - 1999.
2. Beginning Java Script– Paul Wilton – SPD Publications –2001.
3. Frontiers of Electronics of Commerce, Ravi kalakota & Andrew B. Whinston, Addison Wesley.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:13:07 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Operating System (Professional Elective – I)** | Code: | **328672(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **NIL** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective:**

1. To provide an understanding of the functions of operating systems.
2. To provide an insight into internals and functional modules of operating systems.
3. To study the concepts underlying the design and implementation of memory management of operating systems.
4. To make student able to understand deadlocks and to recover them.
5. To make student understand the core structure, functions and design principles of distributed operating system will be introduced with this subject.

**Course Outcome:**

1. The student will be able to learn the various functionalities of OS.
2. The student will be able to use the various algorithms and techniques to perform the various jobs performed by operating systems
3. The student will be able to get the overview of how operating system is designed.
4. The student will be able to demonstrate how various resources are managed by operating system

**UNIT I** **`Introduction to operating system`**: Functions provided by operating system, Introduction to multi programming, Time sharing and real time systems, Introduction to file systems, Access and allocation methods of file systems, Directory structure of a file system on a disk and tape, File protection.

**UNIT II** **`Introduction to scheduling`**: Process concept, states of process, Process control block, CPU scheduling, various types of CPU scheduling algorithms and their evaluation. Meaning of disk and drum scheduling, Various types of disk and drum scheduling algorithms like FCFS, SCAN etc., CPU protection.

**UNIT III** **`Introduction to memory management`**: Various types of memory management schemes like paging, Segmentation etc. Concept of virtual memory, demand paging,Various page replacement algorithms, thrashing and methods to tackle it, Memory protection.

**UNIT IV** **`Concurrency and Deadlock:`** Meaning of deadlocks, Resource allocation graphs, Deadlock Characterization, Various methods to avoid deadlocks like deadlock avoidance, Deadlock detection, Deadlock prevention, Banker's algorithm for deadlock avoidance. Introduction to concurrent processing, Precedence graphs, Critical section problem, Semaphore concept, Study of classical process co-ordination problem.

**UNIT V** **`Introduction to distributed systems`**: I/O Subsystem Principles of I/O Hardware: I/O devices, device controllers, direct memory access. Principles of I/O Software: Goals, interrupt handlers, device drivers, device independent I/O Software. User space I/O software, I/O protection. Distributed file systems: Design, Implementation, and trends. Performance Measurement: Important trends affecting performance issues, performance measures, evaluation techniques, bottlenecks and saturation feedback loops. Case study of UNIX and DOS operating systems.

**Text Books:**

1. Operating System Concepts, James L. Peterson and Abraham Silberschatz (Addison-Wesley)
2. Modern Operating System, Andrew .S. Tanenbaum, PHI

**Reference Books:**

1. Operating System Concepts & Design, Milan Milenkovic (MGH)
2. An Introduction to Operating Systems, Harvey M. Dietel(Addison Wesley)

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:13:22 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Biomedical Electronics (Professional Elective – I)** | Code: | **328673(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **NIL** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective:**

1. To provide an understanding the function of Man Instrument System.
2. To provide an understanding of the heart and cardiovascular system and measurement of parameters involved.
3. To know the methods of measurements of various Biological parameters.
4. To make student understand the devices used and medical equipment used in patient-care and monitoring.
5. To know about Biotelemetry and its application in patient care.

**Course Outcome:**

1. Student will be able to understand problem found un measuring a living system.
2. Student will get an idea of Bio-electric potentials in cardio vascular system
3. Student will be able to understand measurement of Biological Parameters..
4. Student will be able to understand. Application of Telemetry and various equipment used in patient care.

**UNIT I** **Man Instrument System and Sources of Bio-potentials :** Introduction to Man-Instrument System, Components of Man-Instrument System, Physiological System of the Body, Problems Encountered in Measuring a Living System, Sources of Bio-electric Potentials: Action and Resting Potentials, ECG, EEG, EMG and their characteristics.

**UNIT II** **Bio Electric Potential Measurements:** Bio potential Electrodes: Electrode theory, Microelectrodes, surface electrodes and needle electrodes, Cardiovascular Measurements: The Heart and Cardiovascular System, Electrical activity of heart, Electrocardiography.

**UNIT III** **Measurements of Biological Parameters:** Measurement of Blood Pressure and Flow, Plethysmography, Measurement of Heart Sound, Measurement of Temperature, Ultrasonic Diagnosis.

**UNIT IV** **Patient Care and Monitoring:** The Elements of Intensive Care Monitoring, Pacemakers, Defibrillators, Heart Lung Machine, CT scan system, MRI scan system, Electrical Safety of Medical Equipment.

**UNIT V** **Biotelemetry:** Introduction, Physiological parameters Adaptable to Biotelemetry, The components of a Biotelemetry System, Implantable Units, Applications of Telemetry in Patient care, use of Lasers, Recent advances in Biomedical Instrumentation.

***Name of Text Books:***

1. Biomedical Instrumentation & Measurement by L. Cromwell, F.J. Weibell and E.A. Pfeiffer, 2nd Ed., PHI
2. Principles of Medical Electronics & Biomedical Instrumentation, C Raja Rao & S.K Guha, University Press

***Name of Reference Books:***

1. Electronics in Medicine and Biomedical Instrumentation – Nandini K. Jog, PHI
2. Biomedical Instrumentation – Dr. A. Arumugam, Anuradha Agencies, Chennai.
3. Handbook of Biomedical Instrumentation by R.S. Khandpur, TMH Pub. Co.
4. Introduction to Biomedical Engineering, Domach, Pearson Education



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:13:38 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Electronic Engineering Materials & Components (Professional Elective – I)** | Code: | **328674(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **NIL** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective:**
1. To study the fabrication process of monolithic ICs.
2. To study the dielectric and magnetic property of materials.
3. To understand the characteristics of various components.

**Course Outcome:**
1. Student will be able to understand the fabrication process of Diodes and Transistors.
2. Student will be able to understand the properties of materials used in semiconductor devices.

**UNIT I** **Monolithic Techniques:** The basic fabrication sequence; Growth and refining of silicon crystals; Epitaxial process; Diffusion; Diffusion system; Surface passivation; Photolithography; Metallization; Isolation; Crossovers. Monolithic Transistors and diodes; Monolithic junction FET and MOSFET; Integrated resistors; Junction Capacitors. MOS ICs; The silicon –gate and silicon-nitride MOS structure; Advantages and limitations of MOS devices; Charge coupled devices.

**UNIT II** **Dielectric Properties of Insulators**: Static Field; static Dielectric Constant; Polarization; Dielectric Constant of Monatomic gases; Dielectric constant of solids. Properties of Ferro electric materials; Spontaneous polarization Piezo Electricity, Alternating fields; Electronic and Ionic Polarizability-Frequency Dependence; Complex Dielectric Constant of Non-Dipolar Solids; Dipolar Relaxation and Dielectric Losses.

**UNIT III** **Magnetic Properties of Materials:** Summary of Concepts pertaining to Magnetic Fields; Magnetic Dipole moment of a Current Loop; Magnetization from a Macroscopic Point of View; Orbital Magnetic Dipole Moment and Angular Moment of Two Simple Atomic Models; Lenz's: Induced Dipole Moment Classification of Magnetic Materials: Diamagnetism: Origin of Permanent Magnetic Dipole in matter: Paramagnetic Spain System: Properties of Ferromagnetic Materials: Spontaneous Magnetization and Curie- Weiss Law; Ferromagnetic Domains and Coercive Forces; Anti Ferromagnetic and Ferrimagnetic Materials.

**UNIT IV** **Conduction in Metals:** Ohm's Law; Relaxation; Collision Time and Mean Free Path; Electron Scattering and Receptivity of Metals; Heat Developed in Current Carrying Conductors; Thermal Conductivity of Metals.

**UNIT V** **Components:** Resistances: Resistive Elements: Terminals and Protective Means: Characteristics of Resistor: Characteristics of Different Capacitors and Their Selection Factors: Variable Capacitors: Precision Variable Capacitors: General Purpose Variable Capacitors: Trimmers: Characteristics of Electronics power Transformers and Audio Transformers: Design Consideration: Low and High Frequency Equivalent Circuits of Audio Transformers; Hiigh Frequency Equivalent Circuits of Components.

***Name of Text Books:***

1. Electronic Engineering Materials and Devices – John Allison, TMH
2. Electrical Engineering Materials – A.J. Dekker, PHI.
3. A Monograph on Electronics Design Principals: N.C. Goyal and R.K. Khetan: Khanna Publishers: (For Unit - V).

***Name of Reference Books:***

1. Integrated Electronics – Millmann & Halkias, TMH
2. Structure and Properties of Materials Vol IV : Robert M Rose. Lawrence A Shepard and John Wulf: Wiley Eastern.
3. Electrical Engineering Materials – S.P. Seth & P.V. Gupta, Dhanpat Rai Publications.

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 01:13:55 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Computer Organization & Architecture (Professional Elective – I)** | Code: | **328675(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **NIL** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective:**

1. To know about Central processor organization.
2. To know about Control unit organization.
3. To provide an Insight into Arithmetic processor design.
4. To provide an insight into Input/Output organization & Memory organization.

**Course Outcome:**

1. Student will be able to understand Central processor organization.
2. Student will be able to understand Instruction set and micro programming.
3. Student will be able to understand Algorithm in arithmatic control unit.
4. Student will be able to understand Input/output and memory organization.

**UNIT I** **Central Processor organization:** Bus organized computer, Memory address structure, Memory data register, program counter, Accumulator, Instruction register, Program counter, Accumulator, Instruction register, Instruction field, Micro operations, Register transfer languages, Instruction field, Decoding and execution, Instruction formats and addressing modes.

**UNIT II** **Control unit organization:** Instruction sequencing, Instruction interpretation, Hardwired control, Micro-programmed control organization, Control memory, Address sequencing, Micro-instruction, Formats, Micro-program sequence, Microprogramming.

**UNIT III** **Arithmetic processor design:** Addition and subtractions algorithm, Multiplication algorithm, Division algorithm Processor configuration, Design of control unit and floating point arithmetic.

**UNIT IV** **Input Output organization:** Programmed I/O., I/O, addressing, I/O instruction, Synchronization, I/O interfacing, Interrupt mechanism, DMA, I/O processors and data communication, RISC, CISC, Loosely Coupled & Tights Coupled system.

**UNIT V** **Memory organization and multiprocessing:** Basic concepts and terminology, Memory hierarchy, Semiconductor memories (RAM, ROM), Multiple module, Memories and interleaving (Virtual memory, Cache memory, Associative memory), Memory management hardware requirements, RISC & CISE Processor.

***Name of Text Books:***

1. Computer System Architecture by M. Morris Mano, PHI
2. Computer Organization Architecture by J.P. Hayes, PHI

***Name of Reference Books:***

1. Digital Computer Logic Design By M. Morris Mano, PHI
2. Structured Computer Organization by Andrew S. Tanenbaum PHI
3. Computer Organisation and Design, Pal-Chauduri, PHI

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:14:08 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication Engineering** | Semester: | **VI** |
| Subject: | **Advanced Semiconductor Devices (Professional Elective – I)** | Code: | **328676(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **NIL** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective:**

1. To study the concepts of metal Semiconductor devices.
2. To understand concept of Tunnelling study tunnel devices.
3. To introduce concept of Transferred electron effect and Study various modes of such devices.
4. To study about advanced MOS Devices.

**Course Outcome:**

1. Student will be able to understand concepts of MESFET, CCDS.
2. Student will be able to understand concepts of funneling .
3. Student will be able to understand Transferred-Electron devices.
4. Student gets an idea of MOSFET devices.

**UNIT I** **Metal Semiconductor Devices:** Metal-vacuum boundary: Schottky effect, Metal-Semiconductor boundary: Ohmic contact, Current transport across a metal-semiconductor boundary, Metal-Insulator-Semiconductor (MIS) System, Metal-Semiconductor-Field -Effect-Transistor (MESFET), Charge Coupled Devices (CCDs)

**UNIT II** **Semiconductor Tunnel Devices:** Tunneling from the point of view of quantum measurement, Analysis of the Tunneling effect; Tunneling probability, Tunneling current density, Resonant tunneling. Tunnel Diodes; Qualitative and quantitative explanation of the Tunnel Diode I-V characteristics, Tunneling in a resonant tunneling diode, Indirect tunneling, Excess current, Thermal current in a tunnel diode, Dependence of tunnel diode characteristics on various parameters.

**UNIT III** **Transferred – Electron Devices:** Introduction, Transferred – Electron effect; Bulk Electron Negative Differential Resistivity, Modes of Operation; Ideal – Uniform Field mode, Accumulation Layer Mode, Transit Time Dipole Layer Mode, Quenched Dipole Layer Mode, Limited Space Charge Accumulated Mode. Device performances; Cathode Contacts, Power-Frequency Performance and Noise, Functional Devices.

**UNIT IV** **MOSFET:** Introduction, Basic Device Characteristics; Non-equilibrium condition, Linear and Saturation regions, Sub threshold region, Non-uniform Doping and Buried Channel Devices, Short-Channel Effects, MOSFET Structures; Scaled Down devices, HMOS, DMOS, Recessed-Channel MOSFET, Schottky-Barrier Source and Drain, Thin Film Transistor, SOI, VMOS, HEXFET.

**UNIT V** **Transistor Structures:** Electron Transport in short devices and Compound Semiconductor Technology, Permeable Base Transistors, Plannar Doped Barrier Devices, Real Space Transfer and Hot Electron Injection Transistors, Superlattice Devices.

***Name of Text Books:***

1. Physics of Semiconductor Devices, S.M Sze, Wiley Student Edition
2. Physics of Semiconductor Devices, Michael Shur, PHI

***Name of Reference Books:***

1. Physics of Semiconductor Devices, Dilip K. Roy, University Press
2. Semiconductor Devices-Modelling & Technology, Nandita Dasgupta & Amitava Dasgupta, PHI

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 01:14:23 -08'00'

# ChhattisgarhSwamiVivekanandTechnicalUniversity,Bhilai

## SchemeofTeachingandExamination

## B.E.VIISemesterElectronics&TelecommunicationEngineering

| Sl. No. | Boardof Study | CodeNo. | Subjects | PeriodPer Week | | | SchemeofExam | | | Total Marks | Credit L+(T+P) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory/Practical | | | | |
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Electronics&T elecom. | 328731(28) | MicrowaveCommunicationand Engineering | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2 | Electronics&T elecom. | 328732(28) | ComputerNetworks | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Electronics&T elecom. | 328733(28) | WirelessCommunications | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Electronics&T elecom. | 328734(28) | ManagementConcepts& Techniques | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | ReferTable-2 | | ProfessionalElective-II | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | Electronics&T elecom. | 328761(28) | MicrowaveCommunicationand EngineeringLab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 7 | Electronics&T elecom. | 328762(28) | ComputerNetworksLab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 8 | Electronics&T elecom. | 328763(28) | AdvanceCommunicationLab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 9 | Electronics&T elecom. | 328764(28) | MinorProject | - | - | 4 | 100 | - | 40 | 140 | 2 |
| 10 | Management | 328765(28) | Innovative&Entrepreneurial Skills | - | - | 2 | - | - | 40 | 40 | 1 |
| 11 | Electronics&T elecom. | 328766(28) | **PracticalTrainingEvaluation andLibrary | - | - | 1 | - | - | 40 | 40 | 1 |
| TOTAL | | | | 16 | 5 | 19 | 620 | 100 | 280 | 1000 | 31 |

L-Lecture,T-Tutorial,P-Practical,ESE-EndSemesterExamination,CT-ClassTest,TA-Teacher's Assessment

***To becompletedafterVISemesterandbeforethecommencementofVIISemester*

**Table-2**

**ProfessionalElective-II**

| Sl.No. | BoardofStudy | Code | Subject |
|---|---|---|---|
| 1 | Electronics& Telecom. | 328741(28) | DigitalCircuitDesignwithVerilogHDL |
| 2 | Electronics& Telecom. | 328742(28) | SystemDesignwithARM |
| 3 | Electronics& Telecom. | 328743(28) | Robotics&Controls |
| 4 | Electronics& Telecom. | 328744(28) | RadarandNavigationalAids |
| 5 | Electrical and Electronics | 325745(25) | IndustrialAutomation |
| 6 | Electronics& Telecom. | 328746(28) | NeuralNetwork&FuzzyLogic |
| 7 | Electronics& Telecom. | 328747(28) | RFCommunicationDesign |
| 8 | Electronics& Telecom. | 328748(28) | VLSISystemDesign |
| 9 | Electronics& Telecom. | 328749(28) | DigitalImageProcessing |

Note (1)- 1/4thoftotal strength ofstudents subjectto minimum oftwentystudents isrequired tooffer anelective in thecollegea particular academicsession.

Note(2)- Choice ofelective course once madefor anexamination cannotbechangedin future examinations.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:14:36 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **MicrowaveCommunication &Engineering** Code:**328731(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. Learnaboutwave propagationthroughwaveguide
2. Learnabouttransmissioninrectangularwaveguide
3. Learnaboutmicrowave tubes
4. Learnabouttransferredelectron device
5. Learnthe theoryofmicrowave cavityandthere various applications
6. Learn designingofmicrowavefilters

**UNIT – I** **Introduction to Microwaves and Linear Beam Tubes:** Need of Microwave Communications; Microwave Region and Bands; Advantages and Limitations of Microwave Systems; Failure of Conventional Tubes at High Frequencies; Klystron - Velocity Modulation Power Output and Efficiency; Reflex Klystron- Velocity Modulation Power Output and Efficiency; Helix TWT- Amplification Process and Working.

**UNIT – II** **Microwave Crossed-Field Tubes:** Differencebetween Linear Beam Tubes & Crossed Field Tubes, Magnetron- Cavity Magnetron: Principle and Operation, Mode of Oscillation, Strapping and Mode Jumping, Voltage Tunable Magnetron, Inverted Coaxial Magnetron. Forward wave and Backward wave Crossed Field Amplifier.

**UNIT – III** **Microwave Devices:** Microwave Bipolar Transistor: Structure, Operation, Characteristics and Power Frequency Limitations of Microwave Transistors, Microwave Field-Effect Transistor: JFET, MESFET, MOSFET, Microwave diode: Tunnel Diode, PIN diode, Crystal diode.

**UNIT – IV** **Avalanche Transit Time Devices:** Physical Structure, Principle of Operation, Characteristics, Power Output and Efficiency of IMPATT, TRAPATT and BARITT Diodes, Parametric Amplifiers: Parametric Up Converters and Parametric Down Converters.
**Transfer Electron Devices:** Gunn Diode, Gunn Effect: Principle and Mode of Operation.

**UNIT – V** **Microwave Components and Measurement:** Rectangular Cavity Resonators, Q of a Cavity Resonator, Reentrant Cavities, Slow-Wave Structure, Microwave Hybrid Circuits, S-parameters and their properties, Wave Guide Tees, Hybrid Ring, Waveguide Corners, Bends and Twists, Two Hole Directional Coupler, S-Matrix, Circulator and Isolator, Hybrid Coupler, Microwave Measurement, Microwave Bench, Precautions, Power Measurement, Bolometric Method, Attenuation, VSWR, Impedance, Frequency and Q of the Cavity.

***TextBooks:***
1. Microwave Devices andCircuitsbySamuelY.Liao, 3rdEd.,PearsonEducation
2. FoundationsofMicrowave EngineeringbyR .E.Collin,TMHPub.

***Reference Books:***
1. Microwave PrinciplesbyHerbertJ.Reich,PrincetonN.J.,VanNostrand.
2. Microwaves byGupta,New AgeInternationalPublishers
3. Microwave SemiconductorDevicesbyRoy&Mitra,PHI
4. Microwave Engineering byD. M.Pozar, 2nd Edition, JohnWiley.
5. Microwave CircuitDesignbyG.D.Vendelin,A. M.PavioandU.L.Rohde,JohnWiley.
6. Microwave TransistorAmplifiers:Analysis andDesignby GuillermoGonzalez,2nd Edition,PrenticeHall.

***Course outcomes:***
1. Understandthe reasonwhyTEMwave are impossible ina Waveguide.
2. Understandthe workingof Microwave Tubes.
3. Understandthedifferentmodes ofoperationofGunn Diodes.
4. Understandmicrowave components suchas Tee Junction and Directional Couplers.
5. Understanddesigning andtransformation ofMicrowave Filters.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:14:49 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **Computer Networks** Code:**328732(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. Tomakestudentsunderstandthebasicmodelofdatacommunication,OSIModel,TCP/IPsuiteandvariousconceptsof networking.
2. Tomake students acquaintedwithData LinkLayerandvarious flowcontrolanderrorcontrolprotocol.
3. Tofamiliarize students withdifferent LAN protocols like Ethernet,Tokenring andTokenBus andFDDI.
4. Toteachstudents aboutconnectingdevices,Network andtransportlayer protocols.
5. Togive knowledge oftheApplicationlayerfunctions, protocols,switchingandswitched networks likeATM.

**UNIT-I** **IntroductiontoDataCommunication,DatanetworkingandInternet:**CommunicationSystemModel, DataCommunication Networks,Protocol,NeedofProtocol,TCP/IPProtocolSuite,OSIModel, Transmission Modes,CategoriesofNetwork,TopologiesofNetwork.SignalEncodingTechniques:Digital toDigitalConversion-Unipolar,Polar:NRZ,RZ,Biphase,Bipolar,TransmissionofDigitalData:DTE-DCEInterface, EIA-232D,NullModem,Modems:TraditionalModem, 56KModem.

**UNIT-II** **DataLinkControlProtocol:**DataLinkLayer:DesignIssues,Framing,ErrorDetectionandCorrection: CRC,ElementaryProtocols-FlowControl: Stop and Wait,SlidingWindow,Error Control:Stop-and-Wait, Go-Back-N,SelectiveRepeat. HDLC:Modes,Frames,DataTransparency,BitStuffing.

**UNIT-III** **LocalAreaNetwork:** Project802,Basicof–IEEE802.1,LLC,MAC,PDU;ETHERNET:Access Method:CSMA/CD,Implementation: ThickEthernet,ThinEthernet,TwistedPairEthernet,Switched Ethernet,FastEthernet,GigabyteEthernet, TokenRing,FDDI,IntroductiontoWireless LAN-IEEE802.11 : Architecture,MAC: CSMA/CA.

**UNIT-IV** **InternetandTransportProtocol:** PrincipleofInternetworking,Connectingdevices:Repeaters,Hubs, Bridges,Routers.InternetProtocol: IPAddressing,IPV4Header,Comparison ofIPV4andIPV6, Subnetting,ARP,RARP,ICMP, IGMP.TransportLayerProtocols:UDP,TCP:TCPHeaderformat,ISDN services.

**UNIT-V** **ApplicationlayerandWideAreaNetwork**:Application Layer:TheWebandHTTP,FTP,SMTP,DNS, WAN:CircuitandPacketswitching,AsynchronousTransferMode-ATMarchitecture:VirtualConnection, Identifiers,Cells,ConnectionEstablishmentandRelease.Switching:VPCswitch; ATMLayers:AAL

***Text Books:***
1. DataCommunicationandComputerNetworkingbyB.A.Forouzan,3rdEd.,TataMcGrawHill.
2. DataandComputerCommunicationsbyWilliamStalling,7thEdition,PearsonEducation.

***Reference Books:***
1. ComputerNetworksbyAndrewSTanenbaum,4thEdition.PearsonEducation/PHI
2. AnEngineeringApproachto ComputerNetworks-S.Keshav,2ndEdition,PearsonEducation
3. UnderstandingcommunicationsandNetworks,3rdEdition,W.AShay,Thomson

***CourseOutcomes***:
1. Students will be able tounderstandthe workingofinternetbased onOSImodelandTCP/IPprotocolsuite.
2. Students will be able toanalyze practicalrequirements ofLAN onthe basis ofvarious topologies,signalling techniques and various interfaces.
3. Students will have deepunderstandingofvarious protocols usedatData LinkLayerandwill be able toanalyze the advantages and disadvantages ofvarious available protocols forflowanderrorcontrol.
4. Students will be able toanalyze various Ethernetstandards ,otherstandards andwill be able tochoose anappropriate standard accordingtorequirement ofLAN.
5. Students will be able toidentifyvarious internetworkingdevices andformation ofHeaders ofIPandTCP.
6. Students willgetidea about various Applicationlayerfunctions and some protocolsalongwithswitchingtechniques and ATM.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:15:04 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **WirelessCommunications** Code: **328733(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. Togive students briefhistoryofthe evolutionofmobile communications throughoutthe world.
2. Togive knowledge ofcellular concepts andits designing aspects.
3. Togive students a detailedoverviewofGSM,itsarchitecture,interfaces,frames etc.
4. Tofamiliarize students aboutadvancedmodulationtechniques usedinmobile communications.
5. Toteachstudents aboutthe practicallimitations ontheperformance ofwireless communicationsystems.

**UNIT–I** **Introductiontowirelesscommunications**:EvolutionofMobileRadioCommunication,DifferentWireless CommunicationSystems.ComparisonofVariousWirelessCommunicationSystem,IntroductiontoModern WirelessCommunicating System-SecondGeneration(2G), ThirdGeneration(3G)andFourthGeneration (4G).

**UNIT–II** **CellularConceptsandSystemDesignFundamentals**:CellularConceptsandFrequencyReuse, Channel AssignmentStrategies andHandoffStrategies,InterferenceandSystemCapacity Channel Planningfor WirelessSystems,TrunkingandGradeofservice,ImprovingcoverageandcapacityinCellularSystem.

**UNIT–III** **GlobalSystemsforMobile**:SystemArchitecture,GSMfrequencybands,GSMPLMN,GSMsubsystems, GSMinterface,MappingofGSMLayerontoOSILayers,GSMLogicalChannelandFrame,Structure, GSMBurst,DataencryptioninGSM,MobilityManagement.

**UNIT–IV** **ModulationTechniques**:ConstantEnvelopModulation,MSK,GMSK,CombinedLinearand Constant EnvelopeModulationTechnique ,MPSK,QAM,OFDM,IntroductiontoSpreadSpectrum, PNSequence, DS-SS,FH-SS,PerformanceofDS-SSandFH-SS.

**UNIT–V** **Transmission problems**:Introduction to Radio Wave Propagation:The basic Propagation Mechanisms:Reflection,Diffraction,Scattering.PathLoss, Shadowing, Time dispersion, Time Alignment, CombinedSignalLoss,HighBitErrorRate,SolutionToTransmissionProblems,ChannelCoding,Interleaving, Diversity,FundamentalofEqualizationFrequencyHopping.

***Textbooks:***
1. WirelessCommunications byT.S.Rappaport,PearsonEducation
2. Principles andApplicationofGSM byVijayK.Garg,PearsonEducation.

***Reference books:***
1. MobileCommunications–Schiller,Jochen;2ndIndianReprint,PearsonEducationAsia–AddisonWesleyLongmanPte. Ltd.
2. Mobile CommunicationEngineeringby W.C.Lee,TMH Pub.

***Course Outcomes***
1. Students will have idea aboutthegrowthinmobile communications thatgives risetotechnologicalimprovements.
2. Studentswillbeabletovisualizetheuseoffrequencyreusetoincreasethesystemscapacityandalsootherdesigning aspects.
3. Students will be able tounderstandthe architecture ofthe GSMandmechanismtosupportmobilityofthe GSMterminals.
4. Studentswillsechowmodulationtechniquesareusedtotransportthemessagesignalviaaradiochannelwith best possiblequality withminimumradiospectrum.
5. Studentswill be ableto understand various transmission problems andtheircounter measures.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:15:21 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **ManagementConcepts and Techniques** Code: **328734(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. Toenable the studentstoacquireknowledge aboutheprinciples ofmanagement
2. Togetanidea ofhumanresource management
3. Togetanidea aboutmarketingmanagement
4. Togive aninsightto theproduction/operationmanagement
5. Togive aninsightto theorganizationofa business andpublic sectorcompanies.

**UNIT-I:** **Basic Managementand Techniques:**Planning: Nature PurposeandObjectivesofPlanning,Organizing: Natureand Purposeof Organizing, Authority and Responsibility, Staffing, PerformanceAppraisal, Controlling: Processof Controlling, Control Techniques.

**UNIT-II:** **HumanResource Management:**NatureandScopeof Human Resource Planning,TrainingandDevelopment, Recruitment and Selection, Career Growth, Absenteeism, Grievances, Motivationanditstypes, Needof Motivation, Modelsof Motivation, Leaders, TypesofLeaders, Leadership Styles, RolesandFunctions of Leaders, Conflict Management:Typesandcausesof Conflict, Groupand TeamWorking,Organizational Designand Development.

**UNIT-III:** **MarketingManagement:**Marketing Environment,Industrial Markets (B2B Marketing)andBuyerBehaviour, MarketingMix, Overviewof Advertisingand Sales Promotion, ChannelsofDistribution.
Financial Managementand AccountingConcepts: Concept of Book Keeping, Overviewof Financial Statements and Breakeven Analysis.

**UNIT-IV:** **Production/Operations Management:** ProductionSystems, Facilities, Planning, Location, Layout and Movementof Materials, Materials Management, Maintenance Management,PERTandCPM.

**UNIT-V:** **OrganizingaBusiness:**FormsofOwnershipOrganization:SoleProprietor,Partnership, Private andPublic Ltd.Companies,Choiceof suitableformofBusinessOrganization.
PublicSector:CentralGovernment,PublicCorporation, LocalGovernment,Organizationneither Publicnor PrivateSector,Clubs&Society,CooperativeSocieties.

***TextBooks:***
1. Industrial Managementand Engineering Economics,K.C.Arora,KhannaPbs.
2. Industrial Engineering and ProductionManagement, MartandTelsang, S.Chand
3. Industrial Managementand Organization,Ahuja,KhannaPbs.
4. Industrial Engineering andManagement,O.P.Khanna,DRD.

***Reference Books:***
1. Industrial Organizationand Management,Ramchandran,RamanaMutrhy,TMH.
2. ManagementScience,Ramchandra,TMH.
3. Industrial Engineering and Production Management, Mahajan,DRP.
4. BusinessOrganisation&ManagementbyR.K. Sharma, ShashiK.Gupta,KalyaniPublisher,NewDelhi.
5. PrinciplesofBusinessOrganisationbyY.K.Bhushan, S.Chand.

***Course Outcome:***
Atthe completion ofthe course,the studentwill be ableto:
1. Definetheconceptofmanagementanddiscusswhyorganizationsareneeded,whymanagersarenecessary,andwhy managementis a challenge.
2. Identifytheessentialcharacteristicsofdecisionmakingandindicatetherangeandtypesofdecisionsamanagerisaskedto make.
3. Analyzethleadershipfunction,recognizingleadershipastherelationshipbetweenasupervisorandsubordinatesinan organizationalenvironment.
4. Recognize the symptoms of organizational conflict, describe its sources, and discuss the manager's role in conflict management.
5. Recognizethelinkbetweenplanningandcontrolling,andthevariousmeansbywhichmanagersmeasureandcompare performance toobjectives.
6. To understanddifferentiate betweenthe various types oforganizationalstructures andpatterns.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:15:38 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics&Telecommunication** | Semester: | **VII** |
| Subject: | **Microwave Communication and EngineeringLab** | Code:**328761(28)** | |
| TotalLabPeriod: | **50** | BatchSize: | 30 |
| MaximumMarks: | **40** | MinimumMarks | 20 |

**Listof Experiments:(AtleastTenexperimentsaretobeperformedbyeachstudent)**

1. TomeasuretheVSWRatallthethreeopenportsofa Directional Coupler.
2. TomeasuretheCouplingFactor,directivityandinsertionlossofa DirectionalCoupler.
3. Tostudymodecharacteristicsofa Reflex Klystronandhencetodeterminemodenumber,transittime,Electronic TuningSensitivity(ETS)andElectronicTuningRange(ETR).
4. Tostudythecharacteristics ofWave PropagationinaWaveGuidebystudyingstandingwavepatternandhenceto plotω-βdiagramandverifyrelationshipbetweenguidewavelength(λg)and freespacewavelengthλ.
5. TostudytheV-Icharacteristicsofa GUNNDiodeandtomeasureoutputpowerandfrequencyvsvoltage.
6. Tostudyandmeasuresquare wavemodulationthroughPIN voltage.
7. Toenergizea GUNNOscillator.
8. Toenergizea ReflexOscillator.
9. TocalibratePhase Shifter.
10. TomeasureDielectricConstant.
11. Tostudythecharacteristicand behaviorofa Magic Tee.
12. TostudythecharacteristicsandbehaviorofIsolatorandCirculators.
13. Tostudythecharacteristicsandbehavior ofAttenuator(fixedandvariable type).
14. TomeasureMicrowave Frequencyusing Frequency Meter.
15. MeasurementofQofa cavity.
16. Tostudythefunctionof Multiple Directional Couplerbymeasuringthefollowingparameters:
    a. Tomeasure main-lineandauxiliary-lineVSWR.
    b.TomeasuretheCoupling FactorandDirectivityoftheCoupler.
17. TostudythecharacteristicsoftheReflexKlystron Tubeandtodetermineitselectronictuningrange.
18. Todeterminethefrequencyandwavelengthina Rectangular Wave GuideworkingonTE10mode.
19. Todeterminethestandingwaveratioandreflectioncoefficient.

**Listof EquipmentsRequired:**

Microwavesource,Isolator,Variableattenuator,FixedAttenuator,Frequency meter,Slottedline,Tunableprobe, Circulators,Matchedterminations,Gunn/Klystronpowersupply,Detectormount,Coolingfan, MagicTee,Phaseshifter, Movableshort,DielectricMaterial.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:15:52 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics&Telecommunication** | Semester: | **VII** |
| Subject: | **Computer Networks Lab** | Code: | **328762(28)** |
| TotalLabPeriod: | **50** | BatchSize: | 30 |
| MaximumMarks: | **40** | MinimumMarks | 20 |

**Listof Experiments:(AtleastTenexperimentsaretobeperformedbyeachstudent)**

1. IntroductiontoLocalAreaNetworkwithitscables,connectorsandtopologies.
2. TobuildCAT-5UTPEthernetcable (Cross-overandStraight–Through)
3. InstallationofSwitches,theircascadingandnetworkmapping.
4. InstallationofUTP,NICandLANcardtoconnecttwoPC.
5. CaseStudyofEthernet(10base5, 10base2, 10baseT)
6. InstallationandworkingofRemoteDesktop.
7. InstallationandworkingofTelnet(TerminalNetwork).
8. InstallationandworkingwithFTP(FileTransferProtocol).
9. InstallationandconnectingComputerstosharediskandprinter
10. InstallationofModemandProxyServer.
11. WorkingwithNullModem.
12. IntroductiontoServeradministration.
13. SimulationofLANProtocols:TokenBus, TokenRingetc.usingsimulator.

**RecommendedBooks:-**

1. ComputerNetworkandInternetbyDouglasE. Comer(PearsonEducation)

**ListofSoftwaresrequired:-**

1. Windows2003server/Windows2000server.
2. NetSIM,NS-2,Simulator.

**ListofHardwaresrequired:-**

1. LANTrainerKit, LANCardCable,Connectors,Switch,cables,CrimpingTools.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:16:05 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics&Telecommunication** | Semester: | **VII** |
| Subject: | **AdvanceCommunicationLab** | Code:**328763(28)** | |
| TotalLabPeriod: | **50** | BatchSize: | 30 |
| MaximumMarks: | **40** | MinimumMarks | 20 |

**Listof Experiments:(AtleastTenexperimentsaretobeperformedbyeachstudent)**

1. Implementation/simulation ofPNsequencegeneratorusinglinearfeedbackshiftregistertechnique.
2. Implementation/simulation ofQAMmodulationanddemodulation.
3. Implementation/simulation ofGMSK modulationanddemodulationusingGMSKtrainer module.
4. Implementation/simulation ofMSKmodulationanddemodulation.
5. Implementation/simulation ofMPSKmodulationanddemodulation.
6. Implementation/simulation ofDS-CDMAwithBERusingCDMAtrainermodule.
7. Implementation/simulation ofFrequencyhoppingspreadspectrumtechnique(FHSS).
8. Tounderstand RFenvironment,GSMtechnologyitsnetworkGSMcapabilityanddataservices usingGSMtrainer module.
9. Implementation/simulation ofencryptionanddecryptionof voiceinGSM(A5algorithm).
10. SimulationofHuffmancode algorithm.
11. SimulationofRunlengthcodealgorithm.
12. SimulationofShannon–Fanocodealgorithm.
13. Simulationof Linearblockcodealgorithm.
14. SimulationofHammingcodealgorithm.
15. SimulationofCycliccodealgorithm.
16. SimulationofBHCcodealgorithm.

**Listof EquipmentsRequired:**

1. PCs,simulationsoftware,trainerkits.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:16:16 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **MinorProject** Code:**328764(28)**

TotalPracticalPeriod: **50**

**TotalMarksin EndSemesterExamination:100**

- Thestudentsareexpectedtotakeupa Projectundertheguidanceofa facultyfromtheInstitute.
- Thetopicoftheprojectshouldbejustifiedforthedegreeof BE(Electronics&Telecommunication)
- The projectselectedshouldensurethesatisfactionoftheurgentneed toestablishadirectlinkbetweeneducation, nationaldevelopmentandproductivities.
- Thestudentsmaybeaskedtoworkindividuallyorina grouphavingnotmorethanFOURstudents.
- Thestudent/groupofstudentshallcollectallnecessaryinformationfromliteratureonselectedtopic/project.
- Itshouldincludethescopeofproject,identificationofnecessarydata,sourceofdata,developmentofdesign methodandidentification,methodology,softwareanalysis.
- Studentsshoulddelivera seminarontheselectedProject/topic.
- Thestudentsareexpectedto submitthereportinstandardformatapprovedbytheUniversityinpartialfulfillment oftherequirementforthedegreeofB.E.(Electronics&Telecommunication).
- Therewillbeanexternalviva-voceattheendofthesemesterandthestudentsaretodemonstratetheprojectat thetimeof viva-voce.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:16:30 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **Innovative&Entrepreneurial Skill** Code: **328765(28)**

TotalPracticalPeriods: **28** TotalTutorialPeriods: **NIL**

**UnitI** **Innovation:**Innovation:anabstractconcept;creativity,innovationandimagination;typesofinnovation-classifiedaccordingtoproducts,processesorbusinessorganizations.

**UnitII** **Entrepreneurship: who is an entrepreneur? Entrepreneurship:** A state of Mind, Emergence of entrepreneur;RoleofEntrepreneur;ADoernotaDreamer-Characteristics ofanentrepreneur;Factors affectingentrepreneurial growth–Social,cultural,personalityfactors,psychologicalandSocialFactors. ImpactofEntrepreneurshipfor sustainabledevelopment.

**UnitIII** **Difference between entrepreneur and entrepreneurship**: Difference between entrepreneur and intrapreneur,CommonEntrepreneurialcompetencies/Traits;Entrepreneurshipstimulants,Obstaclesinhibiting Entrepreneurship;Typesofentrepreneurs,Functionsofanentrepreneur.

**UnitIV** **IdentificationofBusinessOpportunities:**Introduction,SourcesofBusinessofProductIdeas,Stepsin IdentificationofBusinessopportunityanditsSWOTAnalysis.

**UNIT-V** **Techno-EconomicFeasibilityoftheproject:**Introduction,Techno-Economicfeasibility oftheProject, FeasibilityReport,Considerations whilepreparingaFeasibilityReport,ProformaofFeasibilityReport,Role ofInstitutionsandentrepreneurship..

***ReferenceBooks:***

1. CompetingthroughInnovation-Bellon&Whittington,Prentice Hall ofIndia
2. A Guide toEntrepreneurship –DavidOates-JAICO PublishingHouse.
3. Entrepreneurship-RoberD Hisrich,Peters,Shepherd-TMH
4. EntrepreneurshipinAction-Coulter,Prentice HallofIndia
5. EntrepreneurshipManagementandDevelopment–AjithKumar,HPH
6. Fundamentals ofentrepreneurship-Mohanty,PHI
7. Patterns ofEntrepreneurship-JackMKaplan,Wiley,studentEdition.***Course Outcomes***

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:16:45 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **IndustrialAutomation** Code: **325745(25)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

***CourseObjectives:***
1. To developand applyMathematicalandEngineeringskills toidentify,formulate andsolve industrial processproblems.
2. This subjectseeks toclosethe gap betweenInstrumentationandMechanicalEngineering.
3. This subject provides the knowledge ofdifferenttypes ofcontroller&theirapplications.
4. This subject provides thebasic knowledge ofPLC andDCS.

**UNIT–I** **IntroductiontoProcess C ontrol:**ProcessControlBlockDiagram,ControlSystemEvaluation,Digital Control,Supervisory Control,DirectDigitalControl,NetworkedControlSystems,DistributedDigital Control,Smart Sensor, Definitionsof the terms used to describeProcess C ontrol.Data Acquisition Systems:DASHardware,DASSoftware, DataLogger.

**UNIT–II** **Controller Principles:** Process Characteristics,Process Equation, Process Load, Process Lag, Self-Regulation,ControlSystemParameters: Error,Variable Range,Control ParameterRange,ControlLag, Dead Time, Cycling, ControllerModes: DiscontinuousControllerMode, Two Position Mode, Multi Position Mode,FloatingControlMode,ContinuousControlMode,ProportionalControlMode,Integral ControlMode,DerivativeControlMode,CompositeControlModes:PI Control,PIDControl,PIDControl.

**UNIT–III** **Analog Controllers:** Introduction, Electronic Controllers: Error Detector, Single Controller Modes, CompositeControllerModes,PneumaticControllers:Generalfeatures,ModeImplementation.

**UNIT–IV** **Programmable Logic Controller:** PLC Architecture, Basic Structure, PLC Programming:Ladder Diagram,Ladder Diagramsymbols,Ladder Diagramcircuits, PLCCommunications andNetworking,PLCSelection,I/OQuantityandType,I/ORemotingrequirements,Memorysizeandtype, ProgrammerUnits,PLCInstallation,Advantagesof usingPLCs.

**UNIT–V** **Distributed Control System:** Introduction,Overview of DistributedControl Systems, DCS Software configuration,DCSCommunication, DCSSupervisory ComputerTasks,DCSIntegrationwithPLCsand Computers,FeaturesofDCS,AdvantagesofDCS.

***TextBooks:***
1.ProcessControlInstrumentation TechnologybyC.D.Johnson,PHI
2.Computer AidedProcessControlbyS.K.Singh,PHI

***Reference Books:***
1.IntroductiontoInstrumentation&Controlby A.K.Ghosh,EasternEconomyEdition
2.IntelligentInstrumentation, byGeorge C.Barney,Prentice HallIndia.

***CourseOutcomes:***
The students will be ableto:
1 Understand process variables,degrees offreedom,and Selfregulation,first&second orderProcessSystem.
2 Knowthe importanceofon-off, proportional,integralandderivative modes,composite controlmodes-PI,PIDandPID controllers.
3 Understand,CommunicationinDCS,DCSsystemintegrationwithPLC and computers,Data loggers,Data Acquisitionsystems (DAS),computer control hierarchylevels andDirectDigitalcontrol(DDC).

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:16:58 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

| | | | |
|---|---|---|---|
| Nameofprogram: | **BachelorofEngineering** | | |
| Branch: | **Electronics&Telecommunication** | Semester: | **VII** |
| Subject: | **SystemDesignwith ARM** | Code: | **328742(28)** |
| TotalTheoryPeriods: | **40** | TotalTutorialPeriods: | **12** |
| ClassTests: | **Two(Minimum)** | Assignments: | **Two(Minimum)** |
| ESEDuration: | **ThreeHours** | **MaximumMarks:80** | **MinimumMarks:28** |

***CourseObjectives:***

1. TounderstandthefundamentalsofARMprocessorsandarchitecture.
2. TogainknowledgeofinternalfeaturesofARMProcessors.
3. Tounderstandvariousstandards,protocolsandtransmissiontechniques.
4. Tohaveaninsightintodesign methodology.
5. Togainknowledgeofdesignoptimization.

**UNIT-I** **Introduction to16/32-bitMicrocontrollers:** IntroductiontoRISCprocessor, DifferencebetweenCISC &RISC,ARMMicrocontrollers andProcessorCores,ARM-7/ARM-9ArchitectureandOrganization, ARM7TDMIProcessorBlockDiagram,ARM7TDMIMainProcessorlogic,ARM/THUMB Programming Model,ARM/THUMBInstructionSet,ARMExceptionHandling,MoreARMInstructions,ARM/THUMB AssemblyProgramming.

**UNIT-II** **Timers &Interrupts:** Data handling, Interfacing with Memory, Interrupts, Timers, ARM Bus, I/O Devices,Controllers,Simple&AutonomousI/O Controllers,

**UNIT-III** **BusStandardsandProtocols:**Parallel,Multiplexed,Tristate,andOpen-DrainBuses,BusProtocols,Serial TransmissionTechniques&Standards,WirelessprotocolsCAN&AdvancedBuses.

**UNIT–IV** **DesignMethodology:**DesignMethodology,DesignFlow,ArchitectureExploration,FunctionalDesign, FunctionalVerification,Synthesis,PhysicalDesign,

**UNIT–V** **Design Optimization:** Design Optimization, Area Optimization, Timing Optimization, Power Optimization,DesignforTest,FaultModelsandFaultSimulation,ScanDesignand BoundaryScan,Built-InSelfTest(BIST),Non-technicalIssues.

***TextBooks***

1. DatabooksofARM7/ARM9J.StaunstrupandW.Wolf,editors,Hardware/SoftwareCo-Design:PrinciplesandPractice, KluwerAcademic Publishers.

***Reference Books:***

1. ARMSystem-on-ChipArchitecture, bySteve Furber,2nd Edition,PearsonEducation.
2. ArmSystemDeveloper'SGuide:DesigningAndOptimizingSystemSoftware(Paperback)bySlossAndrewN.Et.Al,1st Edition,Publisher:MorganKaufmannPublishers.

***Course Outcome:***

1. Studentwill be abletounderstandthe fundamental ofARMarchitecture thatincludes register array,cache,virtualmemory, pipeline andmemory management units
2. Studentwill be abletounderstandthe assemblylanguage instructions forARM processor
3. Studentwill be abletounderstand the internalfeatures of ARMProcessor
4. Studentis able to create small embeddedsystemusingARMcontrollerandrealizationofhardware based designthrough teamproject
5. Implementationofcontrolsystem algorithms usingARMController

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:17:17 -08'00'

# ChhattisgarhSwami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Tele communication**

Semester: **VII**

Subject: **Robotics&Controls**

Code: **328743(28)**

TotalTheoryPeriods: **40**
ClassTests: **Two(Minimum)**
ESEDuration: **ThreeHours**

**TotalTutorialPeriods 12**
**:Assignments: Two(Minimum)**
**MaximumMarks:80 MinimumMarks:28**

***CourseObjectives:***
1. Tostudyoverviewofrobotmechanisms,dynamics,andintelligentcontrols.
2. Tostudybasicrobot co-ordinate configurations.

**UNIT–I** **IntroductiontoRobotics:**Evolution of Robots and Robotics, Laws of Robotics, ProgressiveAdvancement inRobots,RobotAnatomy,Human Arm Characteristics, Design and Control Issues, Manipulation and Control, Sensors and Vision,ProgrammingRobots,TheFutureProspects,Notations.

**UNIT– II** **CoordinateFrames,MappingandTransforms:**Coordinate Frames, Description of Objects in Space, Transformation of Vectors,Inverting aHomogeneousTransform, FundamentalRotationMatrices

**UNIT– III** **RoboticSensorsandVision:**The Meaning of Sensing, Sensors in Robotics, Kinds of Sensors used in Robotics, Roboticvision,Industrial Applications of Vision-Controlled Robotic Systems, Process of Imaging, Architecture ofRoboticVisionSystems,Image Acquisition, Description of Other components of Vision System, Image Representation, ImageProcessing.

**UNIT– IV** **ControlofManipulators:**Open-andClose-LoopControl,TheManipulatorControlProblem, Linear Control Schemes, Characteristics of Second-Order Linear Systems, Linear Second-OrderSISOModelofaManipulatorJoint,JointActuators,PartitionedPDControlScheme, PIDControlScheme,ComputedTorqueControl, ForceControlofRoboticManipulators, Description ofForce-ControlTasks, Force-ControlStrategies, Hybrid Position/Force Control, ImpedanceForce/Torque Control.

**UNIT–V** **Robot Applications:** IndustrialApplications, Material Handling, Processing Applications, Assembly Applications,InspectionApplication,Principles forRobot Application and Application Planning, Justification ofRobots, RobotSafety,Non-IndustrialApplications, Roboticapplicationforsustainable Development.

***TextBooks***
1. Robotics&ControlbyR.K.Mittal&I.J.Nagrath, TMHPublications
2. RoboticsforEngineersbyYoramKorean,McGrawHillCo.
3. IntroductiontoRoboticsbyS.K.Saha,McGraw-HillEducation.

***ReferenceBooks***
1. RoboticsControlSensing,VisionandIntelligenceby K.S.Fu,R.C.Gonzalex, C.S.G.Lee,McGrawHill.
2. KinematicsandSynthesisofLinkagesbyHartenbergandDenavit,McGrawHill.
3. KinematicsandLinkageDesignbyA.S.Hall- PrenticeHall
4. KinematicsandDynamicsofMachinarybyJ.Hirchhorn, McGrawHill.

***CourseOutcomes:***
Bystudyingthiscourse,studentswillbe
1. Familiarwiththeconceptdevelopmentandkeycomponents ofrobotics technologies.
2. Understandbasicmathematicmanipulations ofspatialcoordinate representationandtransformation.
3. Abletoundertakepracticalrobotics experiments thatdemonstratetheabove skills.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:17:34 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **Radar&NavigationalAids** Code: **328744(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. Mainobjective ofthis courseis tomake the studentsunderstandthebasic conceptinthe field ofRadarandNavigationalaids.
2. Students are taughtaboutdifferenttypes ofRadarSystems.

**UNIT–I** **PrinciplesandApplications:**BasicRadar,RadarBlockDiagram,RadarFrequencies,Applicationsof Radar,RadarRangeEquation,ProbabilitiesofDetectionofFalseAlarmIntegrationofRadarPulses, RadarCrossSectionofTargets.

**UNIT–II** **MTI And Pulse Doppler Radar**:Introductionto Dopplerand MTI Radar, Delay Line Cancellers, StaggeredPRF,Range GatedDoppler Filter,LimitationstoMTIPerformance,TrackingwithRadar, MonopulseTracking,ConicalScanandSequentialLobing,LimitationstoTrackingAccuracy,Low AngleTracking,Trackinginrange,ComparisonofTrackers.

**UNIT–III** **PropagationofRadarWaves:**ForwardScatteringfromaFlatEarth,ScatteringfromRoundEarths Surface,Atmospheric Refraction–StandardPropagation, Non-Standard Propagation, Diffraction, AttenuationbyAtmosphericGases,ExternalorEnvironmentalNoise,OtherPropagationEffects.

**UNIT–IV** **AntennasforDetectionofRadarSignals**:Parabolic Antennas, Introductionto Phased Array, Cosecant SquaredAntenna,Radome.

**UNIT–V** **RadarTransmitterandReceiver:**RadarReceiver,ReceiverNoiseFigure,SuperheterodyneReceiver, DuplexersandReceiverProtectors,RadarDisplays,introductiontoECMandECCM,LinearBeam PowerTubes,SolidStatePowerSources,Magnetron.

***TextBooks:***
1. IntroductiontoRadar Systems byM.I Skolnik,TMHPub.Co.
2. Microwave RadarandNavigationalAids by A.K. SenandA.B.Bhattacharya,KhannaPublisher.

***Reference Books:***
1. Radar:Principles,Technology,ApplicationsbyEdde,PearsonEcuationPub.
2. Elements ofElectronic NavigationbyNagaraj,TMH Pub.

***CourseOutcomes:***
1. Tobecomefamiliarwithfundamentals ofRadar.
2. Togainindepthknowledge aboutthe differenttypes ofRadarandtheiroperation.
3. NeedforsignaldetectioninRadarandvarious Radarsignal detectiontechniques.
4. TobecomefamiliarwithRadioNavigationtechniques

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:17:48 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **DigitalCircuitDesignwith VerilogHDL** Code: **328741(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. To understandbasics ofVerilogHDLLanguage,includingitsuseinsynthesis ofdigital designs.
2. Togainknowledge ofmodeling, simulationandverification ofdesigns withVerilogHDL.
3. To understandcombinationalcircuitdesign ofdigitalsystemswithVerilogHDL.
4. To understandsequentialcircuitdesign ofdigitalsystemswithVerilogHDL.
5. To understanddesigningusingMealyState and Moore State Model.

**UNIT-I** **OverviewofDigitalDesignwithVerilog-HDL:**Emergence of HDLs,TypicalDesignFlow,Importance of HDLs,Popularity of VerilogHDLs.DesignMethodologies,Modules,Instances,Lexicalconventions,Data Types,SystemTasksandCompilerdirectives.

**UNIT-II** **ModelinginVerilog-HDL:**Modules andPorts,**Gate-LevelModeling:**GateTypes,GateDelays;**Dataflow Modeling:**AssignmentStatement,Delays,Expressions, OperatorTypes,Operands;**BehavioralModeling:** StructuredProcedures,ProceduralAssignment,Timing Controls,Conditional AssignmentStatements,Loops, SequentialandParallel,Blocks,GenerateBlocks.

**UNIT-III** **CombinationalCircuitDesign:**Multiplexers,Demultiplexers,Encoder,Decoders,CodeConverters, ArithmeticComparisonsCircuits,TasksandFunctions.

**UNIT-IV** **SequentialCircuitDesign:**Flip-Flops:SR,JK,TandD;Registers:ShiftRegisters,ParallelAccessShift Registers;Counter:AsynchronousCounters,Synchronous Counters,CounterswithParallelload,BCD counter.

**UNIT-V** **FSM:**BasicDesign Steps,State Diagram,State Table, StateAssignment, State Assignment Problem, OneHot Encoding,MealyStateModel,MooreStateModel,DesignExample:SerialAdder,Vending Machine, Bus Architecture.

**TextBooks:**
1. VERILOGHDL:A Guide toDigitalandSynthesis,IEEE1364-2001Compliant,SamirPalnitkar,PearsonEd.
2. Fundamentals ofDigitalLogicwith VerilogDesign, StephenBrown&ZvonkoVranesic,The McGraw-Hill.

**Reference Books:**
1. DesignThroughVerilog-HDL,T.R.PadmanbhanandB.Bala Tripura Sundari;IEEEPress
2. VerilogHdl Synthesis: APracticalPrimer,J.BhaskerPHI.

**Course Outcome: Students will be able to:**
1. UseVLSI designmethodologies to understandanddesigncomplexdigitalsystems.
2. Create circuits thatrealize specified digitalfunctions.
3. Identifylogic andtechnology-specific parameters tocontrolthe functionality,timing, power,andparasitic effects.
4. Complete a significantVLSI designproject havinga setofobjective criteria &designconstraints.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:18:00 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **NeuralNetwork andFuzzy Logic** Code: **328746(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**

1. The mainobjective ofthis courseis toprovide the studentwiththe basic understandingofneuralnetworksandfuzzylogic fundamentals,Programthe relatedalgorithms andDesignthe required andrelatedsystems.
2. Tolearnthe various architectures ofbuilding anANN andits applications.
3. Tolearnthe advancedmethods ofrepresentinginformationinANN like selforganizingnetworks,associative and competitive learning
4. Tolearnthe fundamentals ofCrispsets, Fuzzysets and FuzzyRelations.

**UNIT-I** **IntroductiontoArtificialNeuralNetworks:**ElementaryNeurophysiology,ModelsofaNeuron,Neural Networksviewedas DirectedGraphs,FeedbackfromNeuronstoANN,ArtificialIntelligence andNeural Networks,NetworkArchitectures, Single-LayeredFeedforwardNetworks, Multi-LayeredFeedForward Networks,RecurrentNetworks,Topologies.

**UNIT-II** **LearningandTraining:**ActivationandSynapticDynamics,Hebbian,Memorybased,Competitive, Error-CorrectionLearning,CreditAssignmentProblem:SupervisedandUnsupervisedlearning,Memory models,StabilityandConvergence,Recalland Adaptation.

**UNIT-III** **ASurveyofNeuralNetworkModels:**Single-Layered Perceptron–Least Mean Square Algorithm,Multi-LayeredPerceptrons–BackPropagation Algorithm,XOR–Problem,The GeneralizedDeltaRule,BPN Applications,AdalinesandMadalines–AlgorithmandApplications.

**UNIT-IV** **Applications:**TalkingNetworkandPhoneticTypewriter,SpeechGeneration andSpeechRecognition, Neocognitron,CharacterRecognitionandHandwritten DigitRecognition, PatternRecognition Applications.

**UNIT-V** **NeuralFuzzySystems:**Introduction toFuzzySets,Operations,Relations,ExamplesofFuzzyLogic, Defuzzification,FuzzyAssociativeMemories,Fuzzinessin NeuralNetworksandExamples.

***TextBooks:***

1. ArtificialNeuralNetworksbyB.YagnaNarayan,PHI.
2. NeuralNetworksFuzzyLogic&GeneticAlogrithmsbyRajshekaran&Pai,PrenticeHall.

***ReferenceBooks:***

1. NeuralNetworksbyJamesA.FreemanandDavidM.Strapetuns,PrenticeHall.
2. NeuralNetwork&FuzzySystembyBartKosko,PHI.
3. NeuralNetworkDesignbyHaganDemuthDealeVikasPublicationHouse.

***CourseOutcomes:***

1. Students will be ableto understandArtificialNeuralNetwork conceptwiththehelp ofBiologicalNeuralNetwork.
2. Students will be ableto implementalgorithms totrainANN byusinglearning algorithms.
3. Students will be ableto testfuzzyset operations andbinaryrelations.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:18:13 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **RFCommunication Design** Code: **328747(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. To understandconcepts ofRadiofrequencydesign.
2. Togainknowledge ofsmithChartfundamentals.
3. To understandconcepts ofRFfilter design.
4. To have insightintoactive RFcomponents.
5. Tolearnmodelingusing active RFcomponents.

**UNIT-I** **Introduction:** Importance of RadiofrequencyDesign, Dimensions and Units, Frequency Spectrum, RF BehaviorofPassive Components,Transmission LineAnalysis,MicrostripTransmissionLines,Terminated Lossless Transmission Line:Voltage Reflection Coefficient, Propagation Constantand PhaseVelocity, Standing Waves, Special Terminated Conditions: Input Impedance of Terminated Lossless Line, Short Circuit Transmission Line,Open Circuit Transmission Line,Quarter WaveTransmission Line,SourcedandLoaded TransmissionLine.

**UNIT-II** **TheSmithChart:** Reflection CoefficientinPhasor Form,NormalizedImpedance Equation,Parametric Reflection Coefficient Equation, Graphical Representation,Impedance Transformation forGeneralLoad, Standing WaveRatio,Special Transformation Conditions,AdmittanceTransformations,Paralleland Series Connections:Parallel Connections ofRandL Connections,Parallelconnections ofRandCConnections, Series Connections ofRandLConnections,SeriesConnections ofRandCConnections,ExampleofaT Network.

**UNIT-III** **RFFilterDesign:**Filter Typesand Parameters,Low Pass Filter,HighPass Filter,Bandpass andBandstop Filter,InsertionLoss,SpecialFilterRealizations:Butterworth TypeFilter,Chebyshev TypeFilters, Denormalizationof Standard LowPassDesign,FilterImplementation:UnitElements,Kuroda'sIdentities andExamplesofMicrostripFilterDesign,CoupledFilters:OddandEvenModeExcitation,BandpassFilter Design,Cascadingbandpassfilterelements,Designexamples.

**UNIT-IV** **ActiveRFComponents:**SemiconductorBasics:Physical Propertiesof Semiconductors, PN-Junction, SchottkyContact,Bipolar-Junction Transistors:Construction,Functionality, Temperature Behaviour, LimitingValues,RFFieldEffectTransistors:Construction,Functionality,Frequency Response,Limiting Values,HighElectronMobilityTransistors:Construction,Functionality,FrequencyResponse.

**UNIT-V** **Active RF Component Modeling:** TransistorModels: Large-signalBJT Models,Small-signalBJT Models,Large-signalFETModels,Small-signalFETModels,Measurement ofActiveDevices,DC Characterization ofBipolarTransistors,MeasurementsofACparametersofBipolarTransistors, Measurement ofFieldEffectBipolarTransistors"TransistorParameters,ScatteringParameterDevice Characterization.

***TextBooks:***
1. RFCircuitDesignTheory AndApplicationby ReinholdLudwig2nd EditionPearsonEd.
2. RFCircuitDesignbyChristopherBowick,Newnes.
3. Wireless CommunicationElectronics:IntroductiontoRFcircuits, SpringerIndia ltd;(2014)

***Reference Books:***
1. Electromagnetic Field TheoryandTransmissionLines by Gottapu SasibhushanRao,WileyPrecise India.
2. Fields andWaves-AFundamentalApproach byDeepakSood,UniversityScience Press.

***Course Outcomes:***
1. Students will be able tounderstandImportance of Radiofrequency Design.
2. Students will be able tounderstandconcepts ofSmithChart.
3. Students will be able tounderstand Designing Concepts.
4. Conceptsofactive RFcomponents ismade clear.
5. Students will be able tounderstand Modeling concepts ofactive RFcomponents isdone andmeasurement ofvarious parameters ofsemiconductordevices.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:18:27 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **VLSISystemDesign** Code: **328748(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. To understand conceptsof MinimizationandTransformation of SequentialMachines.
2. Togainknowledgefor digital designing.
3. Togainknowledge about SM chart.
4. To understand FaultModeling&Test PatternGeneration.
5. To be able todiagnosefaultinsequentialcircuits.

**UNIT-I** **MinimizationandTransformationofSequentialMachines:**TheFiniteStateModel: Capabilitiesand LimitationsofFSM, StateEquivalenceand Machine,Minimization-Simplification of Incompletely Specified Machines, Fundamental Mode Model,FlowTable, State Reduction,MinimalClosed Covers, Races,CyclesandHazards.

**UNIT-II** **DigitalDesign:**DigitalDesignUsingROMs,PAI.sandPLAs,BCDAdder,32-bitAdder,State Graphsfor Control Circuits,Scoreboard andController,AShiftand AddMultiplier,Array Multiplier,KeypadScanner, Binary Divider.

**UNIT–III** **SMCharts:**State Machine Charts,DerivationofSMCharts,RealizationofSMChart,Implementationof BinaryMultiplier, Dice Game Controller.

**UNIT-IV** **FaultModeling&TestPatternGeneration**:LogicFault Model,Fault Detection&Redundancy,Fault EquivalenceandFault Location, Fault Dominance,SingleStuckatFault Model,Multiple Stuckat Fault Models, Bridging Fault Model,Fault Diagnosisof Combinational CircuitsbyConventional Methods, Path Sensitization Techniques,BooleanDifference Method: KohaviAlgorithm, Test Algorithm, DAlgorithm, PODEM,Random Testing,Transition Count Testing,Signature Analysisand Test BridgingFaults.

**UNIT-V** **FaultDiagnosisinSequentialCircuits:**CircuitTestApproach, TransitionCheckApproach–State Identificationand Fault Detection Experiment,Machine Identification,Designof Fault Detection Experiment.

***TextBooks:***

1. Fundamentals ofLogic Design byCharles H.Roth,5th Ed.,Cengage Learning.
2. DigitalSystemsTestingandTestableDesign byMironAbramovici,MelvinA.BreuerandArthurD.Friedman-JohnWiley&Sons Inc.
3. Logic DesignTheory byN.N.Biswas,PHI.

***Reference Books:***

1.Switching andFinite Automata Theory byZ.Kohavi,2ndEd., 2001,TMH.

***Course Outcomes:***

1. Students will be able tounderstand minimizationandtransformationof sequential machines
2. Students will be able todesign differentcombinationalcircuits.
3. Students will be able todesignandimplementationusingSMchart.
4. Students will be able togenerate text patternand able to diagnosefaultinsequentialcircuits.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:18:42 -08'00'

# Chhattisgarh Swami Vivekanand TechnicalUniversity,Bhilai

Nameofprogram: **BachelorofEngineering**

Branch: **Electronics&Telecommunication** Semester: **VII**

Subject: **DigitalImageProcessing** Code: **328749(28)**

TotalTheoryPeriods: **40** TotalTutorialPeriods: **12**
ClassTests: **Two(Minimum)** Assignments: **Two(Minimum)**
ESEDuration: **ThreeHours** **MaximumMarks:80** **MinimumMarks:28**

**CourseObjectives:**
1. Toknowthe basiccomponentsofanimage processingsystem..
2. To understandthe basics ofthehumanvisualsystem as theyrelatetoimage processingincludingspatialfrequencyresolutionand brightness adaptation.
3. Toteachthe students aboutvarious image enhancementtechniques andtransformation ofimages.
4. To have anillustrative idea about various edge detectiontechniques.
5. Togive knowledge aboutthenced ofthresholding andtypes ofthresholdingtechniques.
6. To have a briefidea aboutapproaches torestorationandimage compressions.

**UNITI** **Introductionto Image Processing**:Applicationsand Fieldsof ImageProcessing,Fundamental stepsin Digital Image Processing,Elementsof Visual Perception,ImageSensingand Acquisition,BasicConceptsin SamplingandQuantization, Representing Digital Images.

**UNITII** **Image Enhancement in the Spatial Domain**: Some basic gray level Transformations, Histogram Processing,HistogramModification, ImageSubtraction, Spatial Filtering,Sharpening Spatial Filters, Useof Firstand Second DerivativesforEnhancement,ImageEnhancement intheFrequencyDomain,Gaussian Filters,HomomorphicFiltering, Pseudocolouring: IntensitySlicing,Graylevelto Color Transformation.

**UNITIII** **Image Segmentation**: SomeBasicRelationshipsbetween Pixels,Point, LineandEdge Detection,Gradient Operators,Canny Edge Detection,Pyramid EdgeDetection, Edge Linkingand Boundary Detection,Hough Transform,ChainCodes,BoundarySegments,Skeletons,BoundaryDescriptors,FourierDescriptors.

**UNITIV** **Thresholding:**The Roleof Illumination,Global Thresholding,AdaptiveThresholding,UseofBoundary Characteristics for Histogram ImprovementandLocalThresholding,RegionbasedSegmentation,Region Growing,Region Splittingand Merging.

**UNIT–V** **ImageRestoration**:DegradationModel,Restoration in Spatial Domain, Geometric Transformation,Spatial Transformation, Approachto Restoration,Inverse&Wiener Filtering,Image Compression: Basicsof Image Compression.

***TextBooks:***
1. DigitalImage Processing by Gonzalez&Woods,PearsonEducation.
2. IntroductiontoDigitalImageProcessingbyAlasdair Mc Andrew,Cengage learning.
3. Fundamental ofDigitalImageProcessingbyAK Jain,PHI.

***Reference Book:***
1. Image Processing,Analysisand Machine VisionbyMilanSonka,ThomsonLearning.
2. DigitalImage ProcessingbyPrattW.K,JohnWiley&Sons.
3. DigitalImage Processing byMadhuriA.Joshi,PHI

***Course Outcomes:***
1. Students will understand howimages arerepresented;Understandimage types suchas binaryimages,gray-scale images,color andmulti-spectralimages.
2. Emphasiswill be todevelopengineeringskills andintuitive understandingofthe toolsusedinImage Processing.
3. Students will be able todo various operations onimages like Image enhancement, transformation, sharpening etc.
4. Students cananalyze various edge detectiontechniques andtheiralgorithms.
5. Students will be able touse various threshodingtechniques andsegmentations.
6. Students will be able tovisualizeapproaches usedinimage restoration.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:18:56 -08'00'

## *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

Scheme of Teaching and Examination

### B.E. VIII Semester Electronics & Telecommunication Engineering

| Sl. No. | Board of Study | Code No. | Theory Subjects | Period Per Week | | | Scheme of Exam | | | Total Marks | Credit L+(T+P) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | Theory/ Practical | | | | |
| | | | | | | | ESE | CT | TA | | |
| 1 | Electronics & Telecom. | 328831(28) | Advanced Communication Systems | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 2 | Electronics & Telecom. | 328832(28) | Consumer Electronics | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 3 | Electronics & Telecom. | 328833(28) | Power Electronics | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Refer Table -3 | | Professional Elective - III | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | Refer Table -4 | | Open Elective - IV | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | Electronics & Telecom. | 328861(28) | Optical Communication Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 7 | Electronics & Telecom. | 328862(28) | Digital Circuit Simulation Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 8 | Electronics & Telecom. | 328863(28) | Power Electronics Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 9 | Electronics & Telecom. | 328864(28) | Major Project | - | - | 5 | 100 | - | 80 | 180 | 3 |
| 10 | Electronics & Telecom. | 328865(28) | Project Management & Report writing | - | - | 2 | - | - | 40 | 40 | 1 |
| 11 | | | Library & Seminar | - | - | 1 | - | - | - | - | - |
| TOTAL | | | | 15 | 5 | 20 | 620 | 100 | 280 | 1000 | 30 |

L-Lecture, T- Tutorial, P - Practical, ESE- End Semester Examination, CT - Class Test, TA - Teacher's Assessment

**Table-3**
**Professional Elective - III**

| Sl. No. | Board of Study | Code | Subject |
|---|---|---|---|
| 1 | Electronics & Telecom. | 328840(28) | Cryptography & Secure Communication |
| 2 | Electronics & Telecom. | 328841(28) | MEMS in Communication Engineering |
| 3 | Electronics & Telecom. | 328842(28) | Embedded Systems & RTOS |
| 4 | Electronics & Telecom. | 328843(28) | CMOS Mixed Signal Circuit Design |
| 5 | Electronics & Telecom. | 328844(28) | Microelectronic Devices & VLSI Technology |
| 6 | Electronics & Telecom. | 328845(28) | Biometric Techniques |
| 7 | Electronics & Telecom. | 328846(28) | RISC Microcontrollers & DSP Processors |
| 8 | Electronics & Telecom. | 328847(28) | Artificial Intelligence & Expert Systems |
| 9 | Electronics & Telecom. | 328848(28) | Telecommunication Switching Circuits & Networks |
| 10 | Electronics & Telecom | 328849(28) | Speech Signal Processing |

Note (1)- 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a particular academic session.

Note (2) - Choice of elective course once made for an examination cannot be changed in future examinations.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:19:10 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

**Table - IV**

| Open Elective –IV | | |
|---|---|---|
| S.No. Board of Studies | Code | Name of Subject |
| Management | 300851(76) | Enterprise Resource Planning |
| Information Technology | 300852(33) | E-Commerce & strategic IT |
| Management | 300853(76) | Technology Management |
| Information Technology | 300854(33) | Decision Support & Executive Information system |
| Computer Science & Engg. | 300855(22) | Software Technology |
| Management | 300856(76) | Knowledge Entrepreneurship |
| Management | 300857(76) | Finance Management |
| Management | 300858(76) | Project Planning, Management & Evaluation |
| Mechanical Engg. | 300859(37) | Safety Engineering |
| Computer Science & Engg. | 300801(22) | Bio Informatics |
| Mechanical Engg. | 300802(37) | Energy Conservation & Management |
| Nanotechnology | 300803(47) | Nanotechnology |
| Management | 300804(76) | Intellectual Property Rights |
| Mechanical Engg. | 300805(37) | Value Engineering |
| Civil Engg. | 300806(20) | Disaster Management |
| Civil Engg. | 300807(20) | Construction Management |
| Civil Engg. | 300808(20) | Ecology and Sustainable Development |
| Chem. Engg. | 300809(19) | Non Conventional Energy Sources |
| Electrical Engg. | 300810(24) | Energy Auditing and Management |
| Mechanical Engg. | 300811(37) | Managing Innovation & Entrepreneurship |
| Information Technology | 300812(33) | Biometrics |
| Information Technolgy | 300813(33) | Information Theory & Control |
| Computer Science & Engg. | 300814(22) | Supply Chain Management |

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:19:25 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | |
|---|---|---|
| Computer Science & Engg. | 300815(22) | Internet & Web Technology |
| Electrical Engg. | 300816(24) | Electrical Estimation and Costing |
| Electrical& Electronics Engg. | 300817(25) | Non Conventional Energy Sources |

te (1)-1/4th of total strength of students subject to minimum

Note -1/4th of total strength of students is required to offer an elective in thecollege in a particular academic session.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:19:39 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Advanced Communication Systems** Code: 328831(28)

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To become familiar with fundamentals of satellite communication
2. To learn about the satellite link design
3. To gain knowledge about the different access techniques used in satellite communication.
4. To understand the concepts of Optical communication.
5. To learn about optical transmitters and receivers.

**UNIT- I** **Introduction to Satellite:** Synchronous Satellite, Synchronous Orbit, Orbital Parameters, Satellite Location with respect to Earth, Look Angles, Earth Coverage and Slant Range, Eclipse Effect, Satellite Frequency Allocation and Band Spectrum, General and Technical Characteristics of Satellite Communication System, Advantages of the Satellite Communication, Active and Passive Satellite Systems, Current trends in Satellite Communication.

**UNIT-II** **Communication Satellite Link Design:** Link Design Equation, System Noise Temperature, C/N, G/T Ratio, Atmosphere and Ionosphere Effects on Link Design, Uplink Deign, Complete Link Design, Interference effects on complete Link Design, Earth Station Parameters, Satellite Communication Links: Analog Baseband Signal, FDM Techniques, SNR and CNR in FM in Satellite link.

**UNIT-III** **Multiple Access Techniques:** TDMA-Frame and Burst Structure, Frame Efficiency, Superframe, TDMA Frame Acquisition and Synchronization, FDMA compared to TDMA, TDMA burst TME Plan, Multiple Beam TDMA Satellite System, Beam Hopping TDMA, CDMA and Hybrid Access Techniques, CSMA.

**UNIT-IV** **Optical Fiber Fundamentals:** Numerical Aperture, Optical Fiber Modes and Propagation, Single Mode and Multi-Mode Fibers, Step Index and Graded Index Fibers Structures, Different types of Attenuations in Optical Fiber Communication.

**UNIT-V** **Light Sources, Detectors & Optical Networks:** Light Emitting Diodes, LASER Principles, Laser Diode, Operating Characteristics and Modulation Circuits of LED and LASER Diodes Principle of Photo- Detection, Semiconductor Photodiode, PIN Photodiode, Avalanche Photodiode, Optical Networks: SONET/SDH Networks.

***Text Books:***
1. Fundamentals of Satellite Communication by Raja Rao, Pearson.
2. Satellite Communication by Monojit,Mitra, PHI.
3. Optical Fiber Communication by Keiser, TMH.
4. Fiber Optic Communications by Palais, 4th Edition, Pearson Education.

***Reference Books:***
1. Satellite Communications by Dr. D.C. Agarwal, Khanna Publisher.
2. Satellite Communication System Engineering by Pritchard, Pearson Education.
3. Satellite Communication, Timothy Pratt, John Wiley & sons
4. Opto Electronics and Fiber Optic Communication by Sarkar & Sarkar, New Age International Publishers
5. Fundamentals of Optical Fiber Communication by Satish Kumar, PHI
6. Optical Fiber Communication-Principles and Practice by John Senior, PHI

**Course Outcomes:**
1. Understand the basic concepts of Satellite.
2. Able to calculate the complete C/N ratio of satellite link design.
3. Able to understand multiple access techniques related to satellite.
4. Able to understand the concepts of optical fiber communication.
5. Student gains knowledge how optical signal is transmitted and received
6. Student gets an insight into SONET/SDH networks.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:19:52 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Consumer Electronics** Code: 328832(28)

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To understand fundamentals of television.
2. To gain knowledge of color TV fundamentals.
3. To understand working of microphones and know concepts of optical recording.
4. To gain knowledge of public address system.
5. To gain knowledge of use of electronics in home and automobiles.

**UNIT-I** **Fundamentals of Television:** Elements of Television system, Scanning Process, Scanning Methods and Aspect Ratio, Persistence of Vision and Flicker, Vertical Resolution, Picture Elements, Kell Factor, Horizontal Resolution and Video Bandwidth, Interlacing of Scanning Lines, Video Signals, Control Pulses, Composite Video Signal, TV Standards: 625 Line System.

**UNIT-II** **Color TV:** Introduction, Color Spectrum, Compatibility Consideration, Color TV Signal, Luminance Signal, Chrominance Signal, Luminance and Chrominance, Recombination to Natural Color Voltages, Interleaving Process, Color Subcarrier Frequency, Phase Errors, Composite Color Signal, High Definition TV, Digital TV.

**UNIT-III** **Microphone and Optical Recording: Microphone:** Characteristics of Microphones, Construction and working Principles of Microphones, Carbon Microphone, Dynamic Microphone, Capacitor Microphone, Tie Clip Microphone, Wireless Microphone.
**Optical Recording of Audio Signal:** Disc, Processing of Audio signal, Readout from the Disc, Reconstitution of the Audio Signal.

**UNIT-IV** **Public Address System: Loudspeaker:** Ideal Loudspeaker, Basic Loudspeaker, Capacitor Loudspeaker, Permanent Magnet Loudspeaker, Voice coil, Loudspeaker Impedance, Acoustic Impedance and Resonance, Woofers, Horn Type Tweeters. **Loudspeaker System:** Horns, Indoor Acoustics.
**Public Address system:** Introduction to PA system, Planning a PA System, Speaker Matching System, PA System Characteristics, PA Amplifiers.

**UNIT-V** **Electronics in Home Appliances and Automobiles: Microwave Oven:** Block diagram, LCD Timer with Alarm, Single Chip Controller, **Washing Machine:** Electronic Controller for Washing Machine, Washing Machine Hardware, Washing Cycles-Hardware and Software Development, Fuzzy Logic Washing Machine, **Electronics in Automobiles**: In Car Computers: Applications, Electronic Ignition, Electronic Ignition Lock System, Anti Lock Braking System, Electronically Control Suspension, Instruments Panel Displays, Ultrasonic Car Safety Belt System Air Bag System, Vehicle Proximity Detection System, Car Navigation System.

***Text books:***
1. Consumer Electronics by S. P Bali, Pearson Publication
2. Color Television by S.P Bali, McGraw Hill.

***Reference books:***
1. Monochrome and color TV by R.R. Gulati, 3rd Edition, New Age International.
2. Basic TV and video systems by Benard Globb.
3. Audio and Video System by R.G. Gupta, 2nd Edition, McGraw Hill.

***Course Outcome:***
1. Students will be able to understand the concepts of television.
2. Students gain a deep insight into concepts of color television.
3. Students will be able to know about various microphones and also optical recording technique.
4. Students learn the design aspect of PA system.
5. Students will be able to get complete knowledge of working of microwave oven, washing machine and in car computers.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:20:06 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Power Electronics** Code: 328833(28)

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***
1. To understand basic knowledge of Thyristor family members.
2. To understand the various firing schemes for convertors.
3. To understand the operation of power conditioning circuits.

**UNIT – I** **Silicon Controlled Rectifiers:** Introduction to SCR and its Construction, Principle of Operation, Characteristics & SCR Terminologies, Two-Transistor Analogy of SCR,
**General idea of Modern Power Semiconductor Devices:** Power Diode, Power BJT, Power MOSFET, GTO, DIAC, TRAIC, IGBT, SIT, SITH, MCT, SUS, SBS, SCS.

**UNIT – II** **Switching and Triggering of SCRs:** Different Methods of Turning-ON & Turning-OFF of SCRs, Types of Triggering Circuits, Series & Parallel Operation of SCRs.

**Phase Controlled Rectifier I:** Phase Angle Control Techniques, Classification of Converter, Single Phase Half and Full Wave Converters with R, RL and RLE Loads.

**UNIT – III** **Phase Controlled Rectifier II:** Symmetrical and Asymmetrical Bridge Converters with R and RL Load, Three-Phase three and six pulse Converters, Three-phase fully Controlled Bridge Converters, Dual Converters: Phase Controlled Dual Converter, Single-Phase Dual Converter, Three-Phase Dual Converter, Circulating Current Type Dual Converter: Mid-Point Configuration & Dual Bridge Configuration.

**UNIT – IV** **Power Conditioning Circuits I: Inverters:** Single Phase - Half and Full Bridge Inverter with R and RL Load, 3-Phase Bridge Inverter, Memurray Full Bridge Inverter. **Choppers**: Principle of Operation, Chopper Control Technique, Voltage Step-Down (Buck) Chopper & Step-Up (Boost) Chopper, Buck-Boost Chopper, Jones Chopper.

**UNIT – V** **Power Conditioning Circuits II: A C Voltage Controller:** Types of Power Control, Integral Cycle Control, Full Wave AC Voltage Regulator with R and RL, TRIAC based AC Voltage Regulators,

**Cycloconverters:** Single Phase to Single Phase: Midpoint Configuration & Bridge Configuration, Three Phase to Single Phase Cycloconverter: Circulating Current Type, Non-Circulating Current Type.

***Text Books:***
1. Industrial Electronics & Control by B. Paul, PHI.
2. Power Electronics by M. D. Singh, Khanchandani, TMH.
3. Power Electronics by P.S Bhimbra, Khanna publications.

***Reference Books:***
1. Industrial & Power Electronics by H.C. Rai, Umesh Publications.
2. Power Electronics by K. Hari Babu, SCITECH Publications.
3. Power Electronics by P.C. Sen, TMH.

***Course Outcomes:***
1. Students will be able to understand the controlled and uncontrolled rectifications.
2. Students will be able to understand phase control operation of different power electronics devices.
3. Students will be able to understand mechanism of invertors and choppers.
4. Students will be able to understand mechanism of cyclo converters and AC voltage controllers.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:20:22 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication** | Semester: | **VIII** |
| Subject: | **Optical Communication Lab** | Code: 328861 (28) | |
| Total Lab Period: | **50** | Batch Size: | 30 |
| Maximum Marks: | **40** | Minimum Marks | 20 |

**Experiments to be performed:**

1. To measure bending loss of a fiber.
2. To measure propagation or attenuation loss in a fiber.
3. To obtain amplitude modulation and to transmit the same over fiber optic cable and to demodulate the same at the receiver end.
4. To determine the numerical aperture of a fiber.
5. To measure various types of losses occur in an optical fiber.
6. To study the AC characteristics of intensity modulation of laser and fiber optic system.
7. To measure optical power of a laser diode vs forward current.
8. To monitor photo diode current vs laser optical output.
9. Demonstration of voice transmission through optical fiber using FM.
10. Communication between two computers using RS232 interface via optical fiber.
11. To measure plastic fiber patch cord loss for various lengths of fiber.
12. To study voice transmission through fiber optic cable using PWM.
13. To transmit and receive text files over fiber optic cable.
14. To transmit, receive and observe digital signals over fiber optic cable.
15. To measure rise time, fall time, pulse width distortion of a laser and to determine transmission delay.

List of Equipments/Machine Required:

Fiber optic trainer kit, Optical fiber, Splicing unit, Data Acquisition card for optical signal, O/E & E/O Converter, CRO.

Recommended Books:

1. Fundamentals of Optical Fiber Communication – Sathish Kumar, PHI

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:20:36 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication** | Semester: | **VIII** |
| Subject: | **Power Electronics Lab** | Code: 328862 (28) | |
| Total Lab Period: | **50** | Batch Size: | 30 |
| Maximum Marks: | **40** | Minimum Marks | 20 |

**List of Experiments: - (To be performed minimum 10 experiments)**

1. Study of VI characteristic of a silicon controlled Rectifier (SCR).
2. Study of VI characteristic of a DIAC.
3. Study of VI characteristic of a TRIAC.
4. Study of VI characteristic of a UJT.
5. Application of UJT as relaxation Oscillator.
6. Study of Half wave gate controlled rectifier-using SCR.
7. RC triggering Scheme of SCR.
8. Study of Voltage Commutation.
9. Study of Current Commutation.
10. Study of single-phase, Half –controlled, full-wave rectifier using two SCRs, and two diodes.
11. Speed controls of a dc shunt Motor using SCR.
12. Study of a three –phase rectifier using power diodes.
13. Study of a three phase full-wave half –controlled rectifier.
14. To study a TRIAC power control circuit (i) use to control the speed of a fan (ii) used as a dimmer.
15. To observe how a Photoconductive cell may be used to trigger an SCR.

Apparatus required:

1. Diodes
2. SPST switch.
3. Transformer
4. Oscilloscope
5. Photo cells
6. CRO
7. Voltmeter, Ammeter
8. DC shunt motor

Reference books:-

1. Fundamentals of Power Electronics ISTE S .K Bhattacharrya.
2. Fundamentals of Power Electronics by S.Rama Raddy.
3. Industrial and Power Electronics by Harish C. Rai.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:20:50 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication** | Semester: | **VIII** |
| Subject: | **Digital Circuit Simulation Lab** | Code: | 328863(28) |
| Total Lab Period: | **50** | Batch Size: | 30 |
| Maximum Marks: | **40** | Minimum Marks | 20 |

**Experiments to be performed:**

1. To design, implement and simulate the combinational logic circuit for the function f{A,B,C) = ∑(0,4,5,8,II,I5) + d (1)
2. To design, implement and simulate the Full adder using two half adder.
3. To design, implement and simulate the 8 bit adder using Full adder.
4. To design, implement and simulate the 3 : 8 Decoder.
5. To design, implement and simulate the 16 : 1 Multiplexer using 4 : 1 Multiplexer.
6. To design, implement and simulate the Binary to BCD code Converter by Showing BCD No. on7segment Display.
7. To design, implement and simulate the Look ahead carry.
8. To design, implement and simulate the Flip-Flop.
9. To design, implement and simulate the Ring Counter.
10. To design, implement and simulate the Decade counter using D-Flip-Flop.
11. To design, implement and simulate the Divide by 32 (÷32) digital logic by counter and flip-flop.
12. To design, implement and simulate the Hamming code converter.
13. To design, implement and simulate the 4 bit comparator.
14. To design, implement and simulate the Finite State Machine by Moore method.
15. To design, implement and simulate the Finite State Machine by Mealy circuit.
16. To design, implement and simulate the Digital clock.

List of Equipments/Machine Required:

1. PCs with simulation software like MULTISIM, COMSIM, MATLAB, TINA PRO installed

Recommended Books:

1. D. V. Bout : The Practical Digital Circuit Designer Lab Book ; Prentice-Hall., 1999.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:21:04 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Major Project** Code:328864(28)

Total Practical Period :**60** **Total Marks in End Semester Examination: 100**

1. The students are expected to take up a Project under the guidance of a faculty from the Institute. This may be an extension of the Minor project undertaken in VII semester or a new one.
2. The topic of the project should be justified for the degree of BE (Electronics & Telecommunication)
3. The project selected should ensure the satisfaction of the urgent need to establish a direct link between education, Industrial application, national development and productivities.
4. The students may be asked to work individually or in a group having not more than FOUR students.
5. The student/group of student should collect all necessary information from literature on selected topic/project.
6. It should include the scope of project, identification of necessary data, source of data, development of design method and identification, methodology, software analysis (if any).
7. Students should deliver a seminar on the selected Project/topic.
8. The students are expected to submit the report in standard format approved by the University in partial fulfillment of the requirement for the degree of B.E. (Electronics & Telecommunication).
9. There will be an external viva-voce at the end of the semester and the students are to demonstrate the project at the time of viva-voce.
10. The project report should contain the following:

    A cover page mentioning the project title, names of the students, Affiliated Institute/College, Session, Batch and the name of the University.

    A bonafide certificate to be issued by the Head of the Institute.

    A forwarding certificate from the Head of the Department.

    A completion certificate from the Project guide.

    A certificate of Approval from both Internal and External Examiner.

    Acknowledgement from the students

    Abstract

    Contents

    Description of the Project (to be divided in chapters)

    Conclusion

    Bibliography

    A CD containing the Software/Program used in the project.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:21:17 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics & Telecommunication** | Semester: | **VIII** |
| Subject: | **Project Management & Report Writing** | Code: | 328865 (28) |
| Total No. of Periods: | **2 per week** | Total Tutorial Periods: | **NIL** |
| Class Tests: | **Two (Minimum)** | Teacher's Assessment: | **40** |

**UNIT -I** **Identification of Projects -** Generation and screening of idea, Monitoring corporate appraisal, Preparing project profiles and Project Rating Index.
**Feasibility studies:** Introduction to the Market and demand analysis, Technical analysis, Financial analysis and Economic viability.

**UNIT- II** **Project Selection Criteria:** Criterion: Discounting and Non-Discounting, Net Present Value, Internal Rate of Return, Pay Back Period and Accounting Rate of Return methods.

**UNIT -III** **Project Management and Implementation:** Project planning, project control, prerequisites of implementation.
**Network Techniques of Project Management:** Project Evaluation and Review Technique (PERT) and Critical Path Method (CPM).

**UNIT–IV** **Proposals & Presentation:** Title page, Cover letter, Table of Content, list of illustrations, summary, discussion, conclusion, references, glossary, appendix, Case Studies. Oral Presentation/ Seminar.

**UNIT –V** **Report Writing:** Criteria for report writing, Types of Report: Trip report, Progress report, lab report, Feasibility report, project report, incident report, etc., Case Studies.

***Text books:***

1. Project Planning, Analysis, Selection, Implementation and Review by Prasanna Chandra, TMH.
2. Sharon J. Gerson & Steven M. Gerson "Technical Writing -Process& Product", Pearson Education.

***Reference Books:***

1. Project Management by Dr. Harold Kerzner. 2nd Edition, Wiley

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:21:31 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Cryptography and Secure Communication** Code: **328840(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***

1. To emphasize students the importance of modular arithmetic, and some algorithms required in cryptography.
2. To make students understand the symmetric and asymmetric cryptosystem.
3. To provide a broad overview of the requirements of authentication, digital signature, algorithms to achieve this aim.
4. To teach the students about IP-level security, its architecture and about the threats to computer system and its countermeasures.
5. To get students idea about general requirements for web security and focus on two standard schemes for web commerce SSL/TLS and SET.

**UNIT -I** **Mathematics of Cryptography:** Greatest Common Divisor(GCD),Euclidean Algorithm, Extended Euclidean Algorithm, Group, Modular Arithmetic : Modulo operator, Set of residues, Congruence, Operations in $Z_n$, Inverses: Additive inverse, Multiplicative inverse, Linear Congruence: Solution of Linear Equations, Primes, Euler's Phi-Function, Fermet's Theorem, Euler's Theorem. Groups: Order of group, Finite group, Exponentiation and Logarithm: Fast Exponentiation, Discrete Logarithm.

**UNIT-II** **Introduction and Symmetric Cipher:** The OSI Security Architecture: Security Attack, Security Mechanism, Security Service, Symmetric Cipher Model(Conventional Cryptosystem), Cryptyanalysis, Substitution Techniques, Monoalphabetic Cipher, Playfair Cipher, Hill Cipher, Polyalphabetic Ciphers, Transpositional Techniques, Block Cipher and DES-Stream Cipher and Block cipher: The Fiestel Cipher and The DES: Encyption and Decryption. Stream cipher: LFSR; Public Key Cryptography: Principles of Public Key Cryptosystems, The RSA Algorithm, Key Management, D-H key Exchange, Man-in the-Middle Attack.

**UNIT-III** **Message Authentication, Hash Functions, Hash and MAC Algorithms:** Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash functions, Security of hash functions and MAC, Secure Hash Algorithm: MD-5, SHA-512, HMAC, Digital Signatures: Requirements, Direct Digital Signature, Arbitrated Digital Signature, Digital Signature Algorithm.

**UNIT-IV** **IP Security, Malicious Software and Firewalls:** IP Security Overview, IP Security architecture, Authentication Header, Encapsulating Security Payload, Viruses and Related Threats, Virus Countermeasures, Trojans, Firewalls: Characteristics, Types, Configurations, Trusted Systems.

**UNIT-V** **Web Security:** Web Security Threats, Secure Socket Layer and Transport Layer Security: SSL Architecture, SSL Record Protocol, Change Cipher Spec Protocol, Alert Protocol, Handshake Protocol, TLS, Secure Electronic Transaction: SET Overview, Key features of SET, Dual Signature.

***Text Books***

1. Cryptography and Network Security by B.A. Forouzan, TMH
2. Cryptography and Network Security by William Stallings,4th Edition, Pearson

***Reference Books***

1. Cryptography and Network Security by Atul Kahate, McGrawHill
2. Computer Networks by Tannenbum , PHI

***Course Outcomes:***

1. The students will be able to calculate ged, discrete logarithm, exponents etc. on the basis of discrete mathematics used in cryptography.
2. The students will be able apply the knowledge of symmetric and asymmetric ciphers for encryption and decryption.
3. The students will be able to understand the practical use of authentication and various algorithms for producing hash and MAC.
4. The students will be able to see the need of IP Security ,malicious software's , their countermeasures and also briefly understand the use of Firewall.
5. The students will get the idea about need for security services at transport layer of the Internet model SSL architecture and use of SET to protect credit card transactions.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:21:47 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **MEMS in Communication Engineering** Code: **328841(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To enable the students to acquire knowledge about the principles of MEMS & MOEMS.
2. To understand the designing of MEMS.
3. To get an idea about what all materials are used in MEMS.
4. To give an insight to the working of RF MEMS Technology.
5. To understand the concepts of Optical MEMS & its application in communication.

**UNIT- I** **Introduction to MEMS Technology :** Basic Concepts of MEMS, Scaling in Microdomain: Scaling Laws in Electrostatic, Electromagnetic, Structures etc.
MEMS working Principles and Design: Transduction Principles in Microdomain.
MEMS Modeling and Simulation: Modeling Elements in Electrical, Mechanical, Thermal and Fluid Systems. Modeling Elastic, Electrostatic, Electromagnetic Systems.

**UNIT-II** **Microfabrication/Micromachining:** Overview of Micro Fabrication, Review of Microelectronics Fabrication Processes like Photolithography, Deposition, Doping, Etching, Structural and Sacrificial Materials, and other Lithography Methods, MEMS Fabrication Methods like Surface, Bulk, LIGA and wafer bonding methods.

**UNIT-III** **Radio Frequency (RF) MEMS:** Introduction, Review of RF-based communication systems, RF-MEMS like switches and relay, MEMS inductors and Capacitors, RF filters, resonators, phase shifters, transmission lines, micromachined antenna (Qualitative treatment only)

**UNIT-IV** **Optical MEMS:** Preview, passive optical components like lenses and mirrors, actuators for active optical MEMS, Basic optical communication network using MOEMS devices.

**UNIT-V** **Case Studies:** Case studies of Microsystems including micro-cantilever based sensors and actuators with appropriate selection of material properties: thermal, mechanical properties, Static and dynamic mechanical response with different force mechanisms: electrostatic, electromagnetic, thermal.

***Text Books:***
1. MEMS Nitaigour Mahalik, Tata McGraw Hill.
2. MEMS and MOEMS Technology and Applications, Rai Choudhary, PHI Learning.
3. MEMS, Vijay Vardan, Wiley Publication.
4. MEMS and Microsyostems Design and Manufacture, Tai-Ran Hsu, Tata McGraw Hill

***Reference Books:***
1. Stephen D. Senturia. Microsystem Design, Kluwer Academic Publishers.
2. Marc Madou. Fundamentals of Microfabrication, CRC Press.
3. Kovaes. Micromachined Transducers Sourcebook. WCB McGraw-Hill, Boston
4. M-H Bao, Elsevier, Micromechanical Transducers: Pressure sensors, accelerometers and gyroscopes. New York, 2000

***Course Outcomes:***
After completing the course students will –
1. have knowledge of the operation of MEMS & MOEMS.
2. have knowledge of design and analyse MEMS devices using suitable mechanical/electrical engineering principles.
3. able to apply knowledge of MEMS & Optical MEMS in Communication area.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:22:04 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Embedded System and RTOS** Code: **328842(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***
1. To understand the fundamental of Embedded system
2. To know about characteristics, hardware, software, computational model
3. To get the knowledge of RTOS, different types task process and trades.
4. To know about multimicroprocessor based system and different modeling.
5. To know the RTOS and operating system concepts.
6. To make the student familiar with the industrial aspects of embedded system using case study.

**UNIT I** **Hardware Software Codesign And Programme Modeling:** Characteristics of an Embedded System, Quality Attributes of Embedded Systems, Fundamental Issues in Hardware Software Co-Design, Computational Models in Embedded Design, Introduction to Unified Modelling Language (UML), Hardware Software Tradeoffs.

**UNIT II** **Real-Time Operating Systems (RTOS) Based Embedded System** DESIGN: Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling, Threads, Processes and Scheduling :Putting them Altogether, Task Communication, Task Synchronization, Device Drivers, How to Choose an RTOS.

**UNIT III** **Program Modeling Concepts**: Program Models, DFG Models, state Machine Programming Models for Event controlled Program Flow, Modeling of Multiprocessor Systems, UML Modeling.

**UNIT IV** **Real Time Operating Systems:** OS Services, Process Management, Timer junctions, Event Functions, Memory Management, Device, File and IO Subsystems Management, Interrupt Routines in RTOS Environment and Handling of Interrupt, Source Calls, Real time Operating Systems, Basic Design an RTOS, RTOS Task Scheduling Models, Interrupt Latency and Response of the Tasks as Performance Matrices, OS Security Issues.

**UNIT V** **Design Examples And Case Studies Of Progam Modeling And Programming With Rtos:** Case study of Communication between Orchestra Robots, Embedded Systems in Automobile, Case study of an Embedded System for an Adaptive Cruise Control(ACC) System in a Car, Case study of an Embedded System for a Smart Card, Case study of a Mobile Phone Software for Key Inputs.

**Text Books**:
1. Introduction to Embedded System by Shibu K V, McGraw Hill Higher Edition.
2. Embedded Systems Architecture, Programming and Design by Raj Kamal, Second Edition, McGraw Hill Companies.
3. Embedded System Design by Peter Marwedel, Springer.

**Reference Books**:
1. Embedded System Design – A Unified Hardware/Software Introduction, by Frank Vahid, Tony D. Givargis, John Wiley.
2. Embedded/ Real Time Systems, by KVKK Prasad, Dreamtech Press.

***Course Outcomes:***
1. To let the student able to understand the concept the embedded system.
2. To unable the student to understand the application and characteristics of RTOs.
3. Student understand program modeling concept.
4. Student learn about RTOs services environments and security issues.
5. Student gain the knowledge of industrial requirement of embedded system by case study.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:26:08 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **CMOS Mixed Signal Circuit Design** Code: **328843(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To understand concepts of Switched Capacitor Circuits.
2. To understand Basics of Phased Lock Loop (PLL)
3. To understand concepts of Data Converter.
4. To gain Knowledge of Nyquist Rate A/D and Oversampling Converter.

**UNIT -I** **Switched Capacitor Circuits:** Introduction to Switched Capacitor circuits- basic building blocks, Operation and Analysis, Non-ideal effects in switched capacitor circuits, Switched capacitor integrators first order filters, Switch sharing, biquad filters.

**UNIT –II** **Phased Lock Loop (PLL):** Basic PLL topology, Dynamics of simple PLL, Charge pump PLLs-Lock acquisition, Phase/Frequency detector and charge pump, Basic charge pump PLL, Non-ideal effects in PLLs-PFD/CP non-idealities, Jitter in PLLs, Delay locked loops, applications

**UNIT-III** **Data Converter Fundamentals:** DC and dynamic specifications, Quantization noise, Nyquist rate D/A converters- Decoder based converters, Binary-Scaled converters, Thermometer-code converters, Hybrid converters

**UNIT-IV** **Nyquist Rate A/D Converters:** Successive approximation converters, Flash converter, Two-step A/D converters, Interpolating A/D converters, Folding A/D converters, Pipelined A/D converters, Time -interleaved converters.

**UNI -V** **Oversampling Converters:** Noise shaping modulators, Decimating filters and interpolating filters, Higher order modulators, Delta sigma modulators with multibit quantizers, Delta sigma D/A

***Text Books:***
1. Design of Analog CMOS Integrated Circuits by Behzad Razavi, TMH.
2. CMOS Analog Circuit Design by Philip E. Allen and Douglas R. Holberg, 2nd Edition/Indian Edition, Oxford University Press.
3. Analog Integrated Circuit Design by David A. Johns, Ken Martin, Wiley.

***Reference Books:***
1. CMOS Integrated Analog-to- Digital and Digital-to-Analog converters by Rudy Van De Plassche, Kluwer Academic Publishers.
2. Understanding Delta-Sigma Data converters by Richard Schreier, Wiley.
3. CMOS Mixed-Signal Circuit Design by R. Jacob Baker, Wiley.

***Course Outcome:***
1. Student is able to understand operation of Switched Capacitor Circuits.
2. Student is able to understand operation of PLL and its application..
3. Student is able to understand Data Converter Fundamentals
4. Student is able to understand Nyquist rate and oversampling Converter .

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:26:38 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Microelectronic Devices & VLSI Technology** Code: **328844(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To get and overview of the field of integrated circuit design.
2. To understand various oxidation techniques.
3. To understand diffusion and ion implantation methods.
4. To understand steps of wafer preparation.
5. To understand MOSFET technology.

**UNIT – I** **Introduction:** The Historical Prospect of Integrated Circuits, Silicon Wafers, Wafer Terminology. Crystal Growth: The Czochralski Technique, Bridgeman Technique, Float Zone Process.

**UNIT – II** **Oxidation:** Thermal Oxidation, Kinetics of Thermal Oxidation, Film Deposition, Dielectric Deposition, Polysilicon Deposition.

**UNIT – III** **Diffusion:** Diffusion Mechanics, Diffusion Equation, Diffusion Profile. **Ion Implantation:** Implantation Mechanism, Ion Implantation System, Low Energy Implantation, High Energy Implantation.

**UNIT – IV** **Epitaxy:** Vapour Phase Epitaxy, Liquid Phase Epitaxy, Molecular Beam Epitaxy. **Lithography:** Optical Lithography, Electron Beam Lithography, X-Ray Lithography, Ion Beam Lithography. **Etching:** Wet Chemical Etching, Reactive Chemical Etching. **Metallization:** Physical Vapour deposition, Chemical Vapour deposition, Aluminum Metallization, Metallization with Silicides. **Process Simulation and Integration**

**UNIT – V** **MOSFET Technology:** Introduction, MOS Structure. MOS Transistor: MOSFET Structure, Enhancement MOSFET, Threshold Voltage, Depletion MOSFET, Operation of MOSFET. MOSFET Characteristics: Gradual Channel Approximation, Charge Control Model, Velocity Saturation Effects, Channel Length Modulation, Subthreshold region. MOS Capacitance and Equivalent Circuit. Scaling of MOSFET: Short channel Effects, SPICE model for MOSFETs. MOSFET Fabrication.

***Text Book:***
1. VLSI Design by Sujata Pandey & Manoj Pandey, Dhanpat Rai & co.
2. VLSI Technology by S.M. Sze, TMH Book Company

***Reference Book:***
1. VLSI Fabrication Principles by Sorab K. Gandhi, Wiley & Sons, New York.
2. Physics & Technology of Semiconductor Devices by A.S. Grove, Wiley & Sons, New York.

***Course Outcomes***
1. Student gets brief historical overview specific to VLSI design field.
2. Student learns about oxidation techniques.
3. Student gets an insight into diffusion and ion implantation mechanism.
4. Student is able to understand different steps of wafer preparation.
5. Student gets an overview of microelectronics devices and MOSFET technology.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:26:59 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Biometric Techniques** Code: **328845(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
The basic objective in offering this course is to study the state-of-the-art in biometrics technology can explore the way to improve the current technology. The students can learn and implement various biometrics technologies using advanced algorithm.

**UNIT-I** **Introduction of Biometrics:** Biometrics: definition, history, basic working architecture, types; Performance measures of biometrics; applications and benefits of biometrics; design of biometrics; biometric identification versus verification.

**UNIT-II** **Face and Iris Biometrics:** Background of face and iris recognition; Face recognition methods: Eigen face methods, contractive transformation method; Challenges of face biometrics; Design of iris biometrics: image segmentation, image preprocessing, determination of iris region; Advantages and disadvantages of face and iris biometrics.

**UNIT-III** **Fingerprint and Sign Language Biometrics:** Fingerprint matching: image acquisition, image enhancement and segmentation, image binarization, minutiae extraction and matching; Sign language biometrics: Indian sign language (ISL) biometrics, SIFT algorithm, advantages and disadvantages of ISL and fingerprint biometrics.

**UNIT-IV** **Biometric Cryptography and Privacy Enhancement:** Introduction to biometric cryptography; general purpose cryptosystems; Cryptographic algorithms: DES and RSA; Privacy concerns and issues related to biometrics; biometrics with privacy enhancement; soft biometrics; comparison of various biometrics; Identity and privacy.

**UNIT-V** **Scope of Biometrics and Biometric Standards:** Multimodal biometrics: basic architecture and fusion scheme, application, example of AADHAAR; scope and future market of biometrics; role of biometrics in enterprise and border security; DNA biometrics; biometric standards; biometric APIs.

***References Books***

1. Biometrics: concepts and applications by Dr G R Sinha and Sandeep B. Patil, Wiley India Publications, 2013.
2. Introduction to biometrics by Anil K Jain, Arun Ross and Karthik Nandakumar, Springer, 2011.
3. Biometrics Identity verification in a networked world by Samir nanawati, Michael Thieme and Raj Nanawati, US edition of Wiley India, 2012.

***Course Outcomes:***
On completion of this program student will:
1. Understand the basic definition of 'Biometric Recognition' and the distinctive of this form of biometrics.
2. Be able to state precisely what functions these systems perform.
3. Be able to draw a system-level diagram for any biometric system and discuss its components.
4. Be able to solve verification, identification, and synthesis problems for a variety of biometrics such as fingerprint, face, iris, hand gestures and cryptography.
5. Be able to use the biometrics ingredients of existing system to obtain a given security goal.
6. Judge the appropriateness of proposal in research papers for a given applications.
7. Be able to design a biometric solution for a given application.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:27:21 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **RISC Microcontrollers and DSP Processors** Code: **328846(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***
1. To get knowledge of RISC and DSP processor.
2. To understand the Internal Architecture Design.
3. To unable to student to know about memory mapping and pipeline and BUS interface.
4. To understand the fault exception handling and interrupts.
5. To understand the need of ADC UART and serial interface.

**UNIT - I** **The Cortex-M3 processor:** Applications, Simplified view – block diagram, programming model – Registers, Operation modes, Exceptions and Interrupts, Reset Sequence.

**UNIT - II** **Architectural Detail:** Instruction Set, Unified Assembler Language, Memory Maps, Memory Access Attributes, Permissions, Bit-Band Operations, Unaligned and Exclusive Transfers. Pipeline, Bus Interfaces.

**UNIT - III** **Exception Handling:** Exceptions, Types, Priority, Vector Tables, Interrupt Inputs and Pending behavior, Fault Exceptions, Supervisor and Pendable Service Call, Nested Vectored Interrupt Controller, Basic Configuration, SYSTICK Timer, Interrupt Sequences, Exits, Tail Chaining, Interrupt Latency.

**UNIT - IV** **LPC 17xx microcontroller-** Internal memory, GPIOs, Timers, ADC, UART and other serial interfaces, PWM, RTC, WDT .

**UNIT - V** **Programmable DSP (P-DSP) Processors -** Harvard architecture, Multi port memory, architectural structure of P-DSP- MAC unit, Barrel shifters, Introduction to TI DSP processor family.

***Text books:***
1. The definitive guide to ARM Cortex-M3 by Joseph Yiu, 2nd Edition Elsevier,.
2. Digital Signal Processors: Architecture, Programming and Applications by Venkatramani B. and Bhaskar M. 2nd Edition TMH.

***Reference books:***
1. ARM System Developer's Guide: Designing and Optimizing, by Sloss Andrew N, Symes Dominic, Wright Chris, Morgan Kaufman Publication.
3. ARM System-on-Chip Architecture by Steve furber, Pearson Education.
4. Embedded System Design, by Frank Vahid and Tony Givargis, Wiley.
5. DSP Processor Fundamentals-Architecture and Features by Lapsley P., Bier J., Shoham A., Lee E.A. (IEEE Press).
6. Digital Signal Processing and Applications, by Dag Stranneby and William Walker, 2nd edition, Elsevier.

***Course Outcome:***
1. Student learn about RISC and DSP processor.
2. The student understand the Architecture pipeline and BUS interface of the DSP processor.
3. The student get the knowledge of ADC, UART and serial interface .
4. The student get the knowledge of architecture of DSP processor family.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:27:36 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Artificial Intelligence And Expert Systems** Code: **328847(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***

1. To make students learn to define problem of complex nature , state space of problem domain and searching techniques to solve them.
2. To make students understand concept of heuristic and how it is applied to solve AI based problem along with mechanism to represent knowledge structures and inference procedure.
3. To make student learn processing of natural language and challenges associated with it.
4. To make students understand concept of Expert System, its design issues and applications
5. To make students aware with fundamental concept of Neural Network and Fuzzy logic and its use for solving complex problem domain

**UNIT-I** **General Issues and overview of AI:** The AI problems; what is an AI technique; Characteristics of AI applications Problem Solving, Search and Control Strategies General Problem solving; Production systems; Control strategies: forward and backward chaining Exhaustive searches: Depth first Breadth first search.

**UNIT-II** **Heuristic Search techniques:** Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/OR Graphs; Problem reduction and AO* algorithm; Constraint Satisfaction problems Game Playing Minmax search procedure; Alpha-Betacutoffs; Additional Refinements

**UNIT-III** **Knowledge Representation:** First Order Predicate Calculus; Skolemnisation; Resolution Principle and Unification; Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems and Value Inheritance; Scripts; Conceptual Dependency AI Programming Languages Introduction to LISP, Syntax and Numeric Functions; List manipulation functions; Iteration and Recursion; Property list and Arrays, Introduction to PROLOG.

**UNIT-IV** **Natural Language Processing and Parsing Techniques**: Context - free Grammar; Recursive Transition Nets (RTN); Augmented Transition Nets (ATN); Semantic Analysis, Case and Logic Grammars; Planning Overview - An Example Domain: The Blocks Word; Component of Planning Systems; Goal Stack Planning (linear planning); Non-linear Planning using constraint posting ; Probabilistic Reasoning and Uncertainty; Probability theory; Bayes Theorem and Bayesian networks; Certainty Factor.

**UNIT-V** **Expert Systems**: Introduction to Expert Systems, Architecture of Expert Systems; Expert System Shells; Knowledge Acquisition; Case Studies: MYCIN, Learning, Rote Learning; Learning by Induction; Explanation based learning.

***Text Book:***

1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata McGraw Hill.
2. Dan W.Patterson, Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.

***Reference Books:***

1. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
2. Artificial Intelligence : A Modern Approach, Stuart Rusell, Peter Norvig, Pearson Education.,
3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education.

***Course Outcome:***

1. Student will have ability to understand and define different AI problem and apply suitable problem solving technique.
2. Student will have ability to define the heuristics and apply them for solving complex problem with understanding of different heuristic based search techniques.
3. Student will develop an understanding of game playing techniques
4. Student will have understanding of different knowledge structure and inference mechanism with ability to apply them in intelligent solutions of complex problem .
5. Students will develop skills needed for processing of natural language at syntactic and semantic level.
6. Student will understand the existence of uncertainty in problem solving and how mathematical /statistical models are used to overcome these problems.
7. Students will understand planning system and different types of planning required for problem solving process
8. Student will be able to understand working of Expert system.
9. Student will have fundamental concept of Artificial Neural Networks and Fuzzy Logic.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:31:29 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Telecommunication Switching Circuits & Networks** Code: **328848(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To study the working of different Telecommunication switching system.
2. To learn and understand the digital switching system.
3. To study the hardware configuration and software organization of CCSS.
4. To understand the telephone network management with switching hierarchy and routing.
5. To know the switching techniques for data transmission in PSTNs.
6. To study and acquire the knowledge of ISDN standards and signaling techniques.

**UNIT – I** **Evolution Of Telecommunication Switching Systems:** Basics of Switching Systems, Strowger switching System: Rotary Dial Telephone, Signalling Tones, Stroger Switching Components, Step-by-step Switching, Design Parameters,100-line Switching System. Cross-bar switching: Principles of Common Control, Principles of Cross-bar Switching, Cross-bar Switch Configurations, Crosspoint Technology, Crossbar Exchange Organisation. Electronic Space division switching: Stored Program Control, Centralised SPC, Distributed SPC.

**UNIT – II** **Digital Switching System:** Time Division Switching, Two Dimensional Digital Switching, Computer Controlled Switching Systems: Call Processing, Hardware Configuration, Software Organization, History of CCSS, Early Electronic Switching System, Popular Digital Switching Systems, Electronic Exchanges in India.

**UNIT – III** **Telephone Network Management:** Traffic Engineering: Network Traffic Load and Parameters, Grade of Service and Blocking Probability, Blocking Models and Loss Estimates, Telephone Network: Subscriber loop system, switching hierarchy & routing. Transmission plan, Transmission System, Numbering Plan, Charging plan, Signaling Technique, In-Channel signaling.

**UNIT –IV** **Data Through Telephone Networks:** Data transmission in PSTNs, Switching technique for Data transmission, Data communication Architecture, Link-to-Link Layers, End-to-End Layers, Satellite Based Data Network.

**UNIT – V** **ISDN:** Motivation for ISDN, New services, Network and Protocol Architecture, Transmission Channel, User-Network interface, Signaling, Numbering & Addressing, Service characterization, ISDN standards.

***Text Books:***

1. Telecommunication Switching and Network, Thyagarajan and Viswanathan - PHI
2. Telecommunication Switching and Networks, P. Gnanasivam, New Age International Publishers

***Reference Books:***

1. Data and Computer Communications, William Stalling; Pearson Education.
2. Telecommunication Switching, Traffic and Networks, Flood, Pearson Education

***Course Outcomes:***
1. The student will be able to understand the working of different switching system.
2. The student will understand the processing of digital switching system.
3. The student will acquire the knowledge of hardware configuration and software organization of CCSS.
4. The student will understand telephone network management.
5. The student will be able to know and used to various switching techniques for data transmission PSTNs.
6. Student will know about ISDN standards and signaling techniques.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:32:54 -08'00'

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics & Telecommunication** | Semester: | **VIII** |
| Subject: | **Speech Signal Processing** | Code: | **328849(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

***Course Objectives:***

1. Fundamental concepts of speech production and speech perception
2. Mathematical foundations of signal processing and pattern recognition
3. Computational methods for speech analysis, recognition, synthesis and modification

**UNIT- I** **Speech: Production, Perception And Acoustic-Phonetic Characterization:** Introduction, Speech production process, Time and frequency domain representation of speech, Speech sounds and features, The vowels, Diphthongs, Semivowels, Nasal Consonants, Unvoiced Fricatives, Voiced Fricatives, Voiced & Unvoiced Stops, Acoustic-Phonetic Approach to Speech Recognition..

**UNIT- II** **Spectral Analysis Of Speech:** Short time Fourier analysis, filter bank design, speech coding, subband coding of speech, transform coding, channel vocoder, formant vocoder, cepstral vocoder, vector quantizer coder.

**UNIT- III** **Speech Synthesis:** Pitch extraction algorithms, Gold Rabiner pitch trackers, autocorrelation pitch trackers, voice/unvoiced detection, homomorphic speech processing, homomorphic systems for convolution, complex cepstrums, pitch extraction using homomorphic speech processing.

**UNIT- IV** **Automatic Speech Recognition Systems:** Isolated word recognition, connected word recognition, large vocabulary word recognition systems, pattern classification, DTW, HMM, speaker recognition systems, speaker verification systems, speaker identification systems.

**UNIT- V** **Hidden Markov Models:** Discrete-Time Markov Processes, Extensions to HMMs, Coin-toss Models, The Urnand-Ball Model, Elements of an HMM, HMM generator of observations. Three Basic problems for HMMs and their solutions, Probability Evaluation, 'Optimal' State sequence, Parameter estimation, Re - estimation procedure. HMM types, continuous observation densities in HMMs, Autoregressive HMMs, Variants on HMM structures, Inclusion of Explicit State Duration Density in HMMs.

***Text Books:***

1. Fundamentals of Speech Recognition, Rabiner L. and Juang B., Pearson Education
2. Signal Processing of Speech, Owens F.J., Macmillan New Electronics

***Reference Books:***

1. Speech and Language Processing, Jurafsky, Pearson Education
2. Discrete Time Speech Signal processing: Principles and Practice, Quatieri, Pearson Education
3. Fundamentals of Speech Signal Processing, Saito S. & Nakata K., Academic Press
4. Voice and Speech Processing, Thomas Parsons, McGraw Hill Series.

***Course Outcomes:***

1. Manipulate, visualize, and analyze speech signals
2. Perform various decompositions, codifications, and modifications of speech signals
3. Build a complete speech recognition system using state of the art tools

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:33:19 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

## SCHEME OF TEACHING AND EXAMINATION

## BE (MECHANICAL ENGINEERING) III Semester

| S. No. | Board of Study | Sub. Code | SUBJECT | PERIODS PER WEEK | | | SCHEME OF EXAM Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1. | Appl Mathematics | 337351(14) | Mathematics-III | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2. | Mech. Engg | 337352(37) | Machine Drawing | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 3. | Mech. Engg | 337353(37) | Material Science & Metallurgy | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 4 | Mech. Engg | 337354(37) | Mechanics of Solids-I | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 5 | Mech. Engg | 337355(37) | Engineering Thermodynamics | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 6 | Mech. Engg | 337356(37) | Mechanical Measurements & Metrology | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 7 | Mech. Engg | 337361(37) | Machine Drawing Lab | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 8 | Mech. Engg | 337362(37) | Material Testing Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 9 | Mech. Engg | 337363(37) | Engineering Thermodynamics Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 10 | Mech. Engg | 337364(37) | Mechanical Measurements & Metrology Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 11 | Humanities | 337365(46) | Value Education | - | - | 2 | - | - | 40 | 40 | 1 |
| 12 | | | Library | - | - | 1 | - | - | - | - | - |
| | | | **Total** | **22** | **6** | **12** | **640** | **120** | **240** | **1000** | **34** |

***L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment***
***Note: Duration of End Semester Examination all theory papers will be of Three Hours*** **except for Machine Drawing Paper (at Sl. No. 2) which is of four hours duration.**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:33:49 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Mathematics - III** | Code: | **337351(14)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To make the students understand that Fourier series analysis is a powerful method where the formulas are integrals and to have knowledge of expanding periodic functions that explore variety of applications of Fourier series.
2. To provide knowledge of Laplace transform of elementary functions including its properties and applications to solve ordinary differentials equations.
3. To have a thorough knowledge of PDE which arise in mathematical descriptions of situations in engineering.
4. To provide a sound background of complex analysis to perform a thorough investigation of major theorems of complex analysis and to apply these ideas to a wide range of problems that include the evaluation of both complex line integrals and real integrals.
5. To study about a quantity that may take any of a given range of values that can't be predicted exactly but can be described in terms of their probability

**UNIT- I** **FOURIER SERIES:** Euler's Formula, Functions having points of discontinuity, Change of interval, Even & Odd functions, Half range series, Harmonic analysis.

**UNIT-II** **LAPLACE TRANSFORM:** Definition, Transform of elementary functions, Properties of Laplace transform, Transform of derivatives & integrals, Multiplication by tn, Division by t, Evaluation of integrals, Inverse Laplace Transform, Convolution theorem, Unit step function, Unit impulse function, Periodic function, Application to solution of ordinary differential equations.

**UNIT- III** **PARTIAL DIFFERENTIAL EQUATION:** Formation, Solution by direct integration method, Linear equation of first order, Homogeneous linear equation with constant coefficients, Non-homogeneous linear equations, Method of separation of variables.

**UNIT-IV** **COMPLEX VARIABLES:** Derivative, Cauchy-Riemann equations, Analytic functions, Harmonic functions, Flow problems, Complex integration, Cauchy theorem, Cauchy integral formula, Taylor & Laurent series, Singularity, Residue, Evaluation of real definite integrals.

**UNIT-V** **STATISTICS:** Random variables, Discrete & continuous probability distributions, Expectation, Mean & Standard Deviation, Moments & moment generating function, Distributions- Binomial, Poisson and Normal distributions.

**Text Books:**

1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons.

**Reference Books:**

1. Advanced Engg.Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N.Wartikar & J.N. Wartikar. Vol- II– Pune Vidyarthi Grih Prakashan,Pune
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

**Course Outcome:**After studying the contents of the syllabus in detail the students will be able to

1. define Fourier series including half range series, Harmonic analysis and variety of its applications.
2. define (mathematically) Unit step, Unit impulse, Laplace transforms, its properties, Inverse and applications to solve ordinary differential equations.
3. form and solve by direct integration method Linear equation of first order including Homogeneous and Non-homogeneous Linear equations and also method of separation of variables.
4. solve difficult problems using theorems of complex analysis and apply Residue theorem to evaluate real integrals.
5. understand discrete and continuous probability distribution and be able to find mean and standard deviation and use the Uniform distribution.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:34:48 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Machine Drawing** | Code: | **337352(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Four Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- Understand the different steps in producing drawings according to bureau of Indian standards (B.I.S.) as per SP:46 (1988)
- Understand the application of industry standards and techniques applied in Machine Drawing
- Comprehend general projection theory, with an emphasis on the use of orthographic projection to represent three-dimensional objects in two-dimensional views
- Apply auxiliary or sectional views to most practically represent engineered parts
- Assemble important parts used in major mechanical engineering applications.

**UNIT- I** **Machine Drawing Conventions**

**a) Conventional representation of machine components-**leaf spring, leaf spring with eyes, coil spring (tension and compression),disc spring, spiral spring, splined shaft, serrated shaft, square end of shaft, ball and roller bearing, spur gearing, bevel gearing ,worm and worm wheel, straight knurling, diamond knurling, internal and external thread, method of designating and dimensioning metric thread.

**b) Representation of geometrical and dimensional tolerance-**Straightness, flatness, circularity, cylindricity, parallelism, perpendicularity, angularity, concentricity and coaxiality, symmetry, radial run out and axial run out. Representation of dimensional tolerance of hole, shaft and fits.

**c) Representation of surface roughness and direction of lay of machining.**

**d) Representation of welded joints-** representation of form, location and size of welds.

**UNIT-II** **a) Conversion of pictorial views into orthographic views-**First angle projection and third angle projection.

**b) Sectional view**

Introduction, cutting plane line, type of sectional views-full section, half section, partial or broken section, revolved section, removed section, offset section, sectioning conventions-spokes, web, rib, shaft, pipes, different types of holes, hatching or section lines, conventions of section lines for different metals and materials.

**UNIT- III** **a) Screwed Fasteners**

Drawing hexagonal nut and square nut, hexagonal headed bolt, square headed bolt and washer.

**b) Riveted Joint**

Form and properties of snap or cup head rivet, dimensions of rivet joint, Type of riveted joints, single riveted lap joint, double riveted (chain) lap joint ,double riveted (zigzag) lap joint, single riveted (single strap) butt joint, single riveted (double straps) butt joint.

**UNIT-IV** **Assembly Drawing**

Preparation of assembly drawing and bill of materials of following assemblies from its disassembled views:

(i) Cotter joint- Sleeve & Cotter Joint, Spigot and Cotter joint
(ii) Pin Joint or Knuckle joint
(iii) Bearing-Bushed bearing, Plummer block
(iv) Coupling-Flange coupling ,Flexible coupling
(v) Pulley-Fast and loose pulley
(vi) Valves-Steam stop valve, Blow-off cock, Lever safety valve

***Marks allotted to UNIT I to UNIT III is 16 each whereas for UNIT IV it is 32***

**Text Books:**

1. Machine Drawing, N.D. Bhatt, Charotar Book Stall, Anand
2. A Text Book of Machine Drawing, P.S.Gill, S.K.Kataria, Delhi

**Reference Books:**

1. Machine Drawing, R.K.Dhawan,S,Chand,Delhi
2. Textbook of Machine Drawing, K.C. John,PHI,Delhi
3. Machine Drawing, N.Sidheswar,P. Kannaiah, &V.V.S. Sastry, TMH,Delhi
4. Machine Drawing With Autocad,, Pohit, Goutam & Ghosh, Goutam,Pearson,Delhi
5. Engineering Drawing Practice for School & Colleges, SP 46:1988, Bureau of Indian Standards

**Course outcomes:**

- After going through this course, the student shall be able to understand the drawings of mechanical components and their assemblies along with their utility for design and development of mechanical system.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Skillfully use modern engineering tools and techniques such as CAD- CAM softwares for mechanical engineering design, analysis and application

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:35:03 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Material Science & Metallurgy** | Code: | **337353(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To understand various mechanical properties of materials.
- To understand how and why the properties of materials are controlled by its structure at the microscopic and macroscopic levels.
- To understand how and why the structure and composition of a material may be controlled by processing.
- To understand the inter-relationship between composition, structure and properties of engineering materials.
- Get knowledge about different materials, their properties and application.

**UNIT I** **Solidification of Metals and Alloys:** Mechanism of solidification, nucleus formation and crystal growth, Homogeneous and Heterogeneous nucleation, Metal ingot structure-dendritic and columnar grains, grain boundaries, grain growth, solidification process, effect of grain size on properties of metals.

**UNIT II** **Mechanical Properties of Materials:** Elastic and Plastic behaviour of solids, Material properties – Elasticity, Plasticity, Ductility, Malleability, Brittleness, Toughness, Stiffness, Yield strength, Resilence, Hardness, Hardenability, fatigue, creep, and Tensile strength.
**Deformation of Metals:** Elastic deformation: Elastic after effect, Plastic deformation: Deformation by Slip (shear deformation)-Critical Resolved Shear Stress, Deformation by twinning, Differences between slip and twinning. Dislocation theory-Edge dislocation, Screw dislocation. Imperfection in crystal structure: Point defects – Interstitial Defect, Frankel Defect and Schottky defect; Line defects- Edge dislocations, Screw dislocation; Surface defects – Tilt boundary, Twin boundary and Stacking fault; Volume defects. Strain hardening, Seasons cracking, Baushinger effect, Cold and Hot working processes, effect on properties like recovery, recrystallization, grain growth and grain size.

**UNIT III** **Phase Diagrams:** Phase and phase equilibrium: solidification of pure metals and alloys, Gibb's phase rule, Hume-Rothery's rule, Types of Phase Equilibrium diagrams: Isomorphous- Lever rule, Monotectic, Eutectic-Hyper, hypoeutectic, Eutectoid-Hyper, hypoeutectoid, Peritectic and Peritectoid system. Allotrophy of iron and Fe-C diagram.

**UNIT IV** **Heat Treatment of carbon and alloy steels:** Introduction, purpose and advantages of heat treatment, defects due to faulty heat treatment, T-T-T curve and micro constituents in steel heat treatment processes like Annealing-stress relief, spheroidising, Process and Full annealing; Normalising, Hardening, Tempering- Austempering, Martempering, Surface hardening-Flame, Induction and Case hardening: Carbuising- Pack and Gas carburizing, Nitriding, Cyaniding, Carbo-Nitriding.

**UNIT V** **Engineering Materials:** Composition, Properties and Application of the following Engg. Materials:-
Ferrous Metals: Cast Iron & Steel, **Cast Iron**-Grey Cast Iron, White Cast Iron, Malleable Cast Iron, Nodular Cast Iron, Chilled CI, Alloy CI, Mechanite CI, **Steels-** Unalloyed steels or Plain carbon steels- Low, Medium, High carbon steels. Alloy steels-Stainless steel, Martensitic stainless steel, Ferritic stainless steel, High Speed Steel, Heat resisting alloys; spring steel. **Non-Ferrous Metals & Alloys** - Copper Alloys: Brasses – Muntz metal, Cartridge brass, Admiralty brass, Naval Brass, Bronzes – Gun Metal, Phospher Bronze, Aluminium Bronze, Copper-Nickels alloys. Bearing metals- Babbit, Copper lead alloys, Bronze bearing alloys. Light metal alloys: Aluminium alloys- Duralumin, Cast Aluminium alloys, Aluminium Silicon Alloys. Sintered Carbide.

**Text Books:**

1. Material Science & Engg. – A first course – V. Raghavan – PHI(P) Ltd., Delhi, 2003
2. A Text Book of Material Science & Science & Metallurgy,O.P. Khanna ,Dhanpat Rai & Sons, New Delhi

**Reference Books:**

1. Elements of Material Science & Engg. – Van Vlack. – Addison – Wesley Longman, 6th Edn., New York
2. Physical Metallurgy – Clark & Varney, East West Edn., New Delhi
3. Engineering Physical Metallurgy – Lakhtin – CBS Publishers & Distributors
4. Materials Science – Narang – CBS Publishers & Distributors
5. Engineering Materials – Woulf Series.
6. Physical Metallurgy Principles – Robert E Re3ed Hill – Affiliated East-West Press Pvt. Ltd., New Delhi, 2004

**Course outcomes:**

- Acquire knowledge and hands-on competence in applying the concepts of material science in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering .
- Identify, analysis, and solve mechanical engineering problems useful to the society.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:35:40 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Mechanics of Solids – I** | Code: | **337354(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To gain a fundamental understanding of the concepts of stress and strain by analysis of solids and structures.
- To study engineering properties of materials, force-deformation and stress-strain relationship
- To learn fundamental principles of equilibrium, compatibility, and force-deformation relationship, and principle of superposition in linear solids and structures
- To analyze; determinate and indeterminate axial members, torsional members and beams to determine axial forces, torque, shear forces, bending moments, slopes and deflection.
- To determine stress, strain, and deformation of bars, beams and springs.
- To be able to perform structural analysis by hand computations and design axial and torsional members.

**UNIT I** **Introduction:** Basic of Stress & Strain, elastic constants, stress – strain diagram, Hooke's law, Poisson's ratio, shear stresses, stresses in the components subjected to multi-axial forces, thermal stresses, statically indeterminate systems.

**UNIT II** **(A) Beams:** Introduction of Beams, Various type of Beams, Various type of Supports, Reactions at supports, Shear force and bending moment at any section of a beam, Methods for determination of S.F. and B.M. diagrams of beams (simply supported, overhang and cantilever) subjected to various loads, Relation between Shear Force and Bending Moment, Point of contra-flexure.
**(B) Bending of beams:** Bending of beams with symmetric section, boundary conditions, pure bending, and bending equation problems of simple bending,
**(C) Transverse shear stress**

**UNIT III** **Deflection of beam:** Relation between slope deflection and radius of curvature, solution of beam deflection, problem by Macaulay's method, Direct integration method, Moment Area Method, Conjugate Beam method.

**UNIT IV** **(A) Torsion:** Deformation in circular shaft due to torsion, basic assumptions, torsion equations, stresses in elastic range, angular deflection, hollow & stepped circular shaft.
**(B) Springs:** Types of spring, Closed & Open Coil Helical Springs subjected to Axial Load, springs in parallel & series.

**UNIT V** **(A) Principal stresses and strain:** Transformation of plane stresses, Principal stresses, Maximum shear stresses, Mohr's circle for plane stresses, Plain strain and its Mohr's circle representation, Principal strains, Maximum shear strain.
**(B) Combined Loading:** Components subjected to bending, torsion & axial loads.

**Text Books:**

1. Elements of Strength of Material – Timoshenko & Young- EWP press
2. Strength of Materials – Dr. Sadhu Singh – Khanna publication

**Reference Books:**

1. Strength of Materials – R.K. Rajput – Dhanpat Rai & Sons
2. Mechanics of Material-Gere and Timoshenko CBS Publications
3. Mechanics of Solids – Beer & Johnson, Tata McGraw Hill Publications
4. Strength of material – Ryder–ELBS
5. Introduction to Solid Mechanics – I.H.Shames–PHI
6. Engineering Mechanics of Solids – E.P. Popov – PHI

**Course outcomes:**

- Apply knowledge of mechanics of deformable body for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts mechanics of solid in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:37:15 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Engineering Thermodynamics** | Code: | **337355(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To provide a mature approach to the basic principle of classical thermodynamics and to apply it to system surroundings interactions; involving work and heat transfer with associated property changes.
- To Use classical thermodynamics principles to develop algebraic relationships among key physical parameters and variable based on analysis of a specified system
- Use references that provide tabulated physical data that are useful to mechanical engineers.
- Familiarity with construction and performance parameters of Boilers

**UNIT I** **a) Second law of thermodynamics:** Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence, PMM of Second kind, reversibility and irreversibility, causes of irreversibility, Carnot cycle, Carnot theorem, Absolute thermodynamic temperature scale.
**b) Entropy:** Clasius theorem, the property of entropy, the inequality of Clausius, Entropy principle and its applications, Entropy change during different thermodynamic processes.

**UNIT II** **a) Availability and Irreversibility:** Available energy, availability of a closed system, availability function of a closed system availability of steady flow system, availability function of open system , Helmholtz function , Gibbs functions, Irreversibility for closed and open system, Second law efficiency.
**b) Thermodynamic Relationships:** Maxwell's equations, T-ds equations, difference in heat capacities, coefficient of Volume expansion and isothermal compressibility, adiabatic compressibility, ratio of specific heat, energy equations, Joule-Kelvin effect, Clausius-Clapeyran equation.

**UNIT III** **a) Equation of state:** Ideal gas equation of state, deviation of Real gas from ideal gas, van der waal's equation of state, correction for the intermolecular attractions, correction for finite size of molecules, evaluation of constants a and b, virial expansions, limitations of the van der Wall's equation, Reduced coordinates, compressibility factor, the law of corresponding states as per van der Wall's principle.
**b) Mixture of perfect gases:** Mass Fraction, Mole fraction , Dalton's Law of additive pressure, Amagat-Leduc of additive volumes , Properties of mixture of ideal non reactive gases –gas constant, molecular weight, specific heat, internal energy, enthalpy and entropy.

**UNIT IV** **Properties of Pure substances:** Thermodynamic properties of pure substances in solid,liquid and vapour phases, Phase Transformations, dryness fraction, Triple point, critical state, p-v, p-T, T-s, h-s diagrams, P-V-T surfaces,– Properties and processes in ideal vapour, use of steam tables and Mollier's diagram in determination of steam properties, energy interaction and entropy calculations.

**UNIT V** **Boilers:** Classification of boiler, difference between water tube and fire tube boiler, construction and working of Cochran fire tube boiler, construction and working of Babcock Wilcox water tube boiler, High pressure boiler- advantages, construction and working of Lamont boiler, function of various boiler mounting and accessories, Draught-definition and classification.
Performance of Boiler: Evaporation rate, equivalent evaporation, factor of evaporation, Boiler efficiency, Boiler trial, heat balance sheet of boiler.

**Text Books:**

1. Thermodynamics- An Engineering Approach – Cengal & Boles – McGraw Hill
2. Engineering Thermodynamics – P.K. Nag – TMH Publishers

**Reference Books:**

1. Fundamental of engineering thermodynamics- R.Yadav ,CPH, Allahabad
2. Thermal Science & Engineering – D.S. Kumar – S.K. Kataria & Sons
3. Fundamental of Thermodynamic- Claus Borgnakke, Richard E. Sonntag,Wiley,Delhi
4. An Introduction to Thermodynamics-Y.V.C.Rao University Prass, Hyderabad
5. Engineering Thermodynamics-M.Achuthan –PHI- New Delhi
6. Thermodynamics & Thermal Engineering – J. Selwin Rajadurai – New Age, Delhi
7. Thermodynamics – C.P. Arora – TMH Pub.
8. Thermodynamics – S.C. Gupta – Pearson Education

**Course outcomes:**

- Apply knowledge of classical thermodynamics for formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts of thermal sciences in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.
- To continue the study of the applied thermodynamics.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:37:55 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Mechanical Measurement & Metrology** | Code: | **337356(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To understand the concepts in measurement and metrology.
- To be familiar with different sensors and transducers.
- To build suitable measurement technique.
- To have the confidence to apply automation solutions for given industrial applications.
- To demonstrate the ability to design and conduct experiments, interpret and analyze data, and report results.
- To familiar with various standards and calibration methods used in industry.

**UNIT I** **Generalized Measurement System:** Introduction - Introduction to measurement and measuring instruments, Generalized measuring system and functional elements, static and dynamic performance characteristics of measurement devices, calibration, error- concept and sources, statistical analysis of errors sensors and Transducers – Types of sensors, type of transducers and their characteristics.

**UNIT II** **Measurement of pressure:** pressure standard, bourdon tubes, Diaphragm and bellows, Measurement of very low pressure –Mcleod gauge and Pirani gauge.
**Measurement of Strain:** Type of strain gauges and their working,temperature compensation. Strain rosettes. Measurement of temperature by thermometers, bimetallic, thermocouples, thermistors and pyrometers-total radiation and optical pyrometry.

**UNIT III** **Measurement of flow:** Variable head meters, hot wire and magnetic meters, ultrasonic flow meters.
**Vibration measurement** : Seismic instruments, vibration pick ups.
**Data acquisition system:** Introduction to data acquisition systems, single and multi channel systems, microprocessors and PC based data acquisition systems. Input – output devices signal transmission and Processing. Devices and systems.

**UNIT IV** **Metrology:** Standards of measurement. Linear and angular measurement devices and systems limit gauges, gauge blocks. Measurement of geometric forms like straightness, flatness, roundness and circularity, surface texture measurement, principles and application of optical projectors, tool makers, microscope, autocollimators etc.

**UNIT V** **Metrology:** Principle and use of interferometry. Comparators, screw threads Measurement, Measurement of Gears tooth. Coordinate measuring machine (CMM)- need construction, types and application.

**Text Books:**

1. Mechanical Measurements – G. Beckwith Thomas G. – Pearson Education
2. Mechanical Measurements and Control – D.S. Kumar – S.K. Kataria & Sons

**Reference Books:**

1. Metrology and quality control- A.M. Badadhe Technical Publication Pune
2. Measurement Systems, Application Design – E.O. Deoblein - McGraw Hill
3. Engineering Metrology – K.J. Hume - MacDonald and Company
4. Engineering Metrology – I.C. Gupta - Dhanpat Rai & Sons
5. Mechanical & Industrial Measurements – R.K. Jain – Khanna Publishers

**Course outcomes:**

- Acquire knowledge and hands-on competence in applying the concepts of measurement and metrology in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:38:20 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Machine Drawing Laboratory** | Code: | **337361(37)** |
| Total Lab Periods: | **36** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. General introduction of GUI
2. Setting up the drawing environment: Drawing aids, setting drawing units, setting grid, setting limits, function keys, object snap.
3. Using co-ordinate system-Cartesian coordinate, polar coordinate (Absolute and relative co-ordinate, direct distance entry methods).
4. Drawing Object-Use of various draw tools with illustrative exercise.
5. Modifying Objects- Use of various modify tools with illustrative exercise.
6. Creating texts and tables
7. Basic dimensioning, Geometric dimensioning and tolerancing
8. Adding constraints to sketches
9. Advance options for making complicated drawings –Layers, Blocks, View port.
10. Exercise problems on conversion of pictorial view to orthographic view
11. Exercise problems on conversion of pictorial view to orthographic sectional view
12. Assembly drawing of machine components.

**Equipment/Machines/Instruments/Tools/Software Required:**

1. P-IV, 2.6 G. Hz., 128/256 MB SDRAM, 40 GB HDD, 1.44 MB FDD, 14" Colour Monitor, 52 X CD RW, Laser Scroll Mouse
2. Software Required – Drafting Software

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:38:38 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Materials Testing Laboratory** | Code: | **337362(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To study the Universal Testing Machine.
2. To perform the Tensile Test of Mild Steel on U.T.M and To Draw Stress–Strain Curve.
3. To determine strength of wood on U.T.M (i) Along the Grain (ii) Across the Grain.
4. To determine shear strength of Mild Steel on U.T.M.
5. To observe Flexural Behavior of Timber specimen and to determine it's strength under transverse loading on U.T.M.
6. To study the Impact Testing Machine and test specimen of Izod and Charpy.
7. To determine Izod and Charpy Value of the given mild steel specimen.
8. To study the Fatigue Testing Machine and to discuss the procedure to find out endurance limit of given material.
9. To study the Spring Testing Machine.
10. To determine modulus of rigidity for the material of open and closed Coiled Helical Spring Subjected to Axial Load by spring testing machine.
11. To study the Torsion Testing Machine
12. To determine ultimate shear stress and modulus of rigidity under Torsion.
13. To study the Cupping Test Machine and to determine Erichsen value of Mild Steel sheet.
14. To study the Rockwell Hardness Testing Machine and to determine the Rockwell Hardness of the given material.
15. To study the Brinell Hardness Machine and to determine the Brinell hardness of the given material.
16. To study the Vickers Hardness Machine and to conduct a hardness test on the machine.
17. To study Column testing machine and to conduct Buckling Test of column.

**Equipment/Machines/Instruments/Tools/Software Required:**

- Universal Testing Machine
- Impact Testing Machine
- Fatigue Testing Machine
- Spring Testing Machine
- Torsion Testing Machine
- Cupping Testing Machine
- Rockwell Hardness Testing Machine
- Brinell Hardness Machine
- Vickers Hardness Machine
- Column Testing Machine

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:38:59 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Engineering Thermodynamics Laboratory** | Code: | **337363(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To study the rise in temperature of liquid due to external work.
2. Effect of reduction in temperature in a steam pressure vessel.
3. To study the expansion process using throttling devices.
4. To study the effect of mixing of two/three fluid streams having different flow rates and temperatures.
5. To study the different thermodynamic working fluid e.g. air, steam.
6. To study Mountings & Accessories of a Boiler.
7. To study the Cochran Boiler and it's Accessories and Mountings.
8. To study the Lancashire and it's Accessories and Mountings.
9. To study the Babcock Wilcox and it's Accessories and Mountings.
10. To study a Simple Steam Engine.
11. To study a Compound Steam Engine.
12. Performance and testing of surface steam condenser.
13. Performance and testing of steam jet condenser.
14. Study of Steam Turbines
15. Study of Reciprocating Compressor

**Equipment/Machines/Instruments/Tools/Software Required:**

- Insulated agitated vessel.
- Steam pressure vessel with arrangement for external cooling.
- Compressed air tank with expansion device.
- Arrangement of mixing of two/three fluid streams.
- Boiler mountings
- Boiler accessories
- Cochran boiler
- Lancashire boiler
- Babcock and Wilcox boiler
- Simple steam turbine
- Compound steam turbine
- Surface steam condenser
- Jet steam condenser
- Steam turbine
- Reciprocating air compressor

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:39:18 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Mechanical measurement & Metrology Laboratory** | Code: | **337364(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

***(Minimum Seven experiments to be performed from the following group)***

1. To Measure Pressure Using Bourdon Pressure Gauge.
2. To Calibrate Pressure Gauge Using Dead Weight Pressure Gauge Tester.
3. To Measure Displacement Using LVDT
4. To Measure Temperature Using Thermister
5. To Measure Flow Rate Using Rotameter.
6. To Measure Angle Using Angular Sensor.
7. To Measure Torque Using Torque Transducer
8. To Measure Pressure Using Pressure Transducer.
9. To Measure Strain Using Strain Cantilever Beam.
10. To Measure Temperature Using RTD.
11. To Measure Temperature Using Thermo Couple.
12. To perform the following experiments using Data Acquisition System
13. To measure Temperature by Themocouple

***(Minimum Three experiments to be performed from the following group)***

1. Measurements of lengths, heights, diameter by Vernier Calipers, Vernier Height Gauge,
2. Micrometers.
3. Measurement of various angles using Bevel Protractor, Sine Bar & Combination Set.
4. Determining the accuracy of Electrical and Optical Comparator.
5. Determine the Surface Flatness and Contour using Interferometer.
6. Determine the Effective Diameter of screw threads by using Two wire & Three wire methods.
7. Measurement of Gear Elements using Profile Projector and image analyzer.
8. Measurement of Tool Angles of a Single Point Cutting Tool by using Tool Makers Microscope.
9. Calibration of Vernier Caliper, Micrometer, Height Gauge, Depth Micrometer using Slip Gauges.

**LIST OF EQUIPMENTS/MACHINES REQUIRED**

| MEASUREMENT | METROLOGY |
|---|---|
| 1. Data Acquisition System | 1. Vernier Calipers |
| 2. Software compatible with DAS | 2. Vernier Height Gauge |
| 3. Displacement Measurement Tutor Using (LVDT) | 3. Depth Micrometers |
| 4. Pressure Measurement Tutor Using Pressure Transducer | 4. Set of Slip Gauges |
| 5. Strain Measurement Tutor Using Strain Cantilever Beam | 5. Interferometer |
| 6. Torque Measurement Tutor Using Torque Transducer | 6. Tool Makers Microscope |
| 7. Temperature Measurement Tutor Using RTD Sensor | 7. Profile Projector |
| 8. Temperature Measurement Tutor Using Thermocouple | 8. Bevel Protector |
| 9. Temperature Measurement Tutor Using Thermister | 9. Sine Bar |
| 10. Angular Measurement Tutor Using Angular Sensor | 10. Combination Set |
| 11. Rotameter Trainer Module | 11. Optical & Electrical Comparator |
| 12. Dead Weight Pressure Gauge Tester | 12. Optical Flats |
| 13. Bourdon Gauge Trainer | 13. Surface Plates |
| 14. Image Analyzer | 14. Dial Indicators |
| | 15. Snap and Ring Gauges (GO and NO-GO type) |

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:40:26 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **III** |
| Subject: | **Value Education** | Code: | **337365(46)** |
| No. Of Periods: | **2 Periods/Week** | Total Tutorial Periods: | **NIL** |
| **Maximum Marks:** | **40** | **Minimum Marks:** | **24** |

**Course Objectives:**

1. This course is designed to provide the importance of education with why, what & how.
2. To impart students with an understanding of fundamental humanitarian viewpoint and its outcomes.
3. To provide the knowledge about whole existence and its impact on values.
4. To bring the awareness about life long exercise so that they can fulfill their responsibility towards themselves, the family, the society, the planet.

**UNIT- I** **Aim of Education and Necessity for Value Education:** Education in values/wisdom/etc and education in traits/technologies/etc as the two fundamental strands of education; Answer to the frequently asked questions such as "Why to do studies", "What studies to do in overall", "How to do studies in a proper way", "How to think systematically and talk systematically"

**UNIT-II** **Humanitarian Viewpoint and Basic Human Objective:** Meaning and concept of happiness, Need for a fundamental viewpoint to judge things in all cases of human concerns, Proposal of the natural path of humanitarian coexistentialism; Consciousness development and its expression; Fundamental want of sustainable happiness in human being; Understanding the distinct activities and needs of self (I) and body in human being; Fundamental goal of human being; Sustainable-solution in individual (At the place of delusion); Sustainable-prosperity in family (At the place of poverty); Sustainable-cooperation in society (At the place of competition); Sustainable-coexistence in planet (At the place of struggle)

**UNIT- III** **Elements of Holistic and Systematic Perspective:** Need for study of fundamental information categories to develop holistic perspective; Particular-time actions and general-time laws; Need for fundamental information sequence to develop systematic perspective, Some examples for systematic study sequence

**UNIT-IV** **Elements of Society-friendly and Environment-friendly Goals:** Elements of Knowledge of whole existence; Elements of Knowledge of human being; Elements of fundamental Values and Wisdom; Value spectrum with reference to general relationships and particular relationships of the objects in nature; Elements of History and Contemporarity used to set current goals; Elements of Sciences and Techniques to formulate methods to achieve goals; Elements of Motoricity and Mattericity to make actions to execute the methods

**UNIT-V** **Lifelong Exercise for All-round Sustainability:** Collecting information for sustainability issues; Motivating people towards sustainable life-style; Ability to identify and develop appropriate technologies and management patterns for society-friendly and environment-friendly systems for production /protection/ utilization/ experimentation ; Ability to establish and execute the fundamental five-fold system in order to ensure sustainable peace-and-prosperity worldwide.

**Text Books:**

Value Education for Consciousness Development by Dr P B Deshmukh, Radha K Iyer, and Deepak K Kaushik (2nd Edition, 2012, ISBN: 978-81-924034-0-3)

**Reference Books:**

1. International Research Handbook on Values Education and Student Wellbeing by Terence Lovat, Ron Toomey, Neville Clement (Eds.), Springer 2010, ISBN: 978-90481-86747
2. Values Education and Lifelong Learning: Principles, Policies, Programmes by David N Aspin and Judith D Chapman (Eds.); Springer 2007, ISBN: 978-1-4020-6183-7
3. Fundamentals of Ethics for Scientists and Engineers by E G Seebaur and Robert L Berry, 2000, Oxford University Press

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:40:55 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

## SCHEME OF TEACHING AND EXAMINATION

## BE (MECHANICAL ENGINEERING) IV Semester

| S. No. | Board of Study | Sub. Code | SUBJECT | PERIODS PER WEEK | | | SCHEME OF EXAM Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1. | Mech. Engg | 337451(37) | Fluid Mechanics | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2. | Mech. Engg | 337452(37) | Mechanics of Solids-II | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 3. | Mech. Engg | 337453(37) | Applied Thermodynamics | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4 | Mech. Engg | 337454(37) | Kinematics of Machines | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 5 | Mech. Engg | 337455(37) | Numerical Analysis & Computer Programming (C & C++) | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 6 | Mech. Engg | 337456(37) | Manufacturing Science-I | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 7 | Mech. Engg | 337461(37) | Fluid mechanics Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8 | Mech. Engg | 337462(37) | Computer Aided Drafting Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 9 | Mech. Engg | 337463(37) | Kinematics of Mechanics Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 10 | Mech. Engg | 337464(37) | NACP Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 11 | Humanities | 337465(46) | Health, Hygiene & Yoga | - | - | 2 | - | - | 40 | 40 | 1 |
| 12 | | | Library | - | - | 1 | - | - | - | - | - |
| | | | Total | 23 | 6 | 11 | 640 | 120 | 240 | 1000 | 34 |

*L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment*
*Note (1): Duration of all theory papers will be of Three Hours.*
*Note (2): Industrial Training of six weeks is mandatory for B.E. students. It is to be completed in two parts. The first part will be in summer after IV semester after which students have to submit a training report which will be evaluated by the college teachers during V Semester.*

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:41:11 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Fluid Mechanics** | Code: | **337451(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**
- Obtaining a solid understanding of the fundamentals of Fluid Mechanics
- The ability to formulate basic equations for Fluid Engineering problems
- The ability to use tables and figures to determine the friction energy loss for various pipes/ducts geometries and Fluid engineering applications
- The ability to perform dimensional analysis and identify important parameters

**UNIT- I** **Properties of fluid:** Fluid, ideal and real fluid, properties of fluid : mass density, weight density, specific volume, specific gravity, viscosity, surface tension, capillarity, vapour pressure, compressibility and bulk modulus. Newtonian and non-Newtonian fluids
**Fluid Statics:** Pressure, Pascal's law, Hydrostatic law, Manometry, Hydrostatic force on submerged plane and curved surface, Buoyancy and Flotation.

**UNIT-II** **Fluid Kinematics:** Description of fluid motion, Langragian and Eulerian approach, Type of fluid flow, Type of flow lines-path line, streak line, stream line, stream tube.Continuity equation, acceleration of a fluid particle, motion of fluid particle along curved path, Normal and tangential acceleration, Rotational flow, Rotation and Vorticity, circulation, stream and potential function, flow net ,its characteristics and utilities. Liquid in relative equilibrium.

**UNIT- III** **Fluid Dynamics:** Euler's Equation, Bernoulli's equation and its practical application, Venturimeter, Orifice meter, Nozzle, Pitot tube. Impulse momentum equation, Momentum of Momentum equation, Kinetic energy and Momentum correction factor, Vortex motion, Radial flow.

**UNIT-IV** **Laminar Flow:** Reynold's experiment, flow of viscous fluids in circular pipe, shear stress and pressure gradient relationship, Velocity distribution, Hagen-Poiseuille Equation, flow of viscous fluids between two parallel plates (Coutte flow) shear stress and pressure gradient relationship, Velocity distribution, Drop of pressure head.
**Turbulent flow:** Effect of turbulence, Expression for loss of head due to friction in pipes (Darcy-Weisbach equation), Expression for co-efficient of friction in terms of shear stress.
**Flow through pipe:** Loss of energy in pipes, Hydraulic gradient and total energy line, pipe in series and parallel, equivalent pipe power transmission through pipe, water hammer in pipes.

**UNIT-V** **Dimensional Analysis:** Methods of dimensional analysis, Rayleigh's method, Buckingham's theorem, Limitations.
**Model analysis:** Dimensionless number and their significance, model laws, Reynolod's model law, Fraude's model law, Euler's model law, Weber's model law, Mach's model law, Type of models, scale effect in model, limitation of hydraulic similitude.

**Text Books:**
1. Fluid Mechanics and Fluid Power Engineering – D.S. Kumar– Kataria & Sons – New Delhi
2. A text of Fluid Mechanics – R. K. Rajput – S. Chand & Company Ltd., Delhi

**Reference Books:**
1. Fluid Mechanics & Hydraulics Machines-R.K.Bansal-Laxmi Publications.,Delhi
2. Engineering Fluid Mechanics –K.L. Kumar, Eurasia Publication House, Delhi
3. Mechanics of Fluid – B.S. Massey – English Language Book Society (U.K.)
4. Fluid Mechanics- Yunush A. Cengel, John M. Cimbala- TMH,Delhi
5. Introduction to Fluid Mechanics and Fluid Machines – S.K. Som and G. Biswas- TMH ,Delhi
6. Hydraulics and Fluid Mechanics Including Hydraulic Machine- PN Modi,& SM Seth-Standard, Delhi
7. Theory and Application of Fluid Mechanics- K.Subramanya-TMH Delhi

**Course Outcomes:**
- Apply knowledge of Fluid Mechanics formulating and solving engineering problems.
- Acquire knowledge of fluid mechanics for the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.
- Develop fundamentals to continue the study of the advance subject fluid machinery, Heat and mass transfer etc.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:41:33 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Mechanics of Solids – II** | Code: | **337452(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To analyze solid mechanics problems using energy methods
- To analyze fixed beams and continuous beams.
- To solve for stresses and deflections of beams under unsymmetrical loading;
- To analyze column
- To analyze thin and thick pressure vessels

**UNIT- I** **Energy Methods**: Introduction, Strain energy, Elastic strain energy in tension, compression, bending and torsion. Impact loading in tension and bending, Theorem of Castiglione's and its applications, Reciprocal relations, Maxwell -Betti theorem,

**UNIT-II** **Fixed Beams:** Fixed beam subjected to different types of loads and couples, Calculations of fixing moments and reactions at supports, deflection. Effect of sinking of support.
**Continuous beams**: Continuous beams subjected to different type of loads and couples, beams with overhang, beams with one end fixed, Chaperon's theorem. Effect of sinking of supports.

**UNIT- III** **Bending of curved bars:** Bending of curved bars in plane of loading, Winkler- Bach theory, crane hooks, chain links, bending of circular bars subjected to symmetric loading, bending of circular rings, stresses in circular rings.

**UNIT-IV** **Unsymmetrical Bending:** Introduction to unsymmetrical bending, Stresses and deflection in unsymmetric bending, Shear center for angle, Channel and I-sections.
**Columns:** Struts and Columns, Stability of columns, Euler's formula for different end conditions, Equivalent load, Eccentric loading, Rankine's formula.

**UNIT-V** **Thin Pressure Vessel:** Thin Pressure Vessels, Circumferential and longitudinal stresses in thin cylindrical shells and thin spherical shell under internal pressure,
**Thick Pressure Vessel:** Introduction, Lames Theorem, Thick Pressure vessels subjected to internal pressure, External Pressure & both, compound cylinders.

**Text Books:**

1. Elements of Strength of Material – Timoshenko & Young – EWP Press
2. Strength of Material – S.S.Rattan TMH Publications

**Reference Books:**

1. Strength of Material – Dr. Sadhu Singh – Khanna Publishers
2. Mechanics of Material-Gere and Timoshenko CBS Publications
3. Advanced Mechanics of Materials–A.P. Boresi and O.M. Sidebottom–John Wiley & Sons
4. Strength of Materials – G.H. Rider – Macmillan
5. Mechanics of Material – J.M. Gere and S.P. Timoshenko – CBS publisher
6. Mechanics of Material – F.P. Bear & E.E. Johnston – McGraw Hill
7. Introduction to Solid Mechanics – I. H. Shames – PHI
8. Engineering Mechanics of Solids – E.P. Popov – PHI
9. Strength of Material – Shaums Outline Series – McGraw Hill

**Course Outcomes:**

- Apply knowledge of mechanics of deformable body for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts mechanics of solid in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:42:01 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Applied Thermodynamics** | Code: | **337453(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To understand the applications of engineering thermodynamics in real life situations
- To perform gas power cycle analysis
- To analyze reciprocating air compressors
- To perform vapour power cycle analysis
- To analyze steam condenser, cooling pond and cooling towers.
- To analyze thermodynamic system with compressible fluid.

**UNIT- I** **Gas power cycles:** An overview of reciprocating engine, Air standard cycle, Otto, Diesel, dual cycle - Description and representation on P-V and T-S diagram, Thermal Efficiency, Mean Effective Pressures, comparison of cycles. An overview (only p-v and T-s diagram) of Stirling ,Erricson, Atkinson and Lenoir cycle

**UNIT-II** **Reciprocating Air Compressors:** Classification of air compressors, working of single acting single cylinder reciprocating compressor, single acting reciprocating compressor without clearance, single acting reciprocating compressor with clearance-equation of work, volumetric efficiency. Multistage reciprocating air compressors, advantage of multistage compression, two stage air compressor-minimum work, Indicator diagram, mean effective pressure and indicated power, compressor power , efficiencies, shaft power of the compressor, Advantages and limitations of reciprocating compressors.

**UNIT- III** **Vapour Power Cycle:** Simple steam power cycle, Rankine cycle; p-v, T-s and h-s diagrams, efficiency, steam rate, heat rate. Comparison of Rankine and Carnot cycles, mean temperature of heat addition, reheat cycle, ideal regenerative cycle, practical regenerative cycle, Feed Water Heaters (FWH)- open and closed FWH, characteristics of ideal working fluids, binary vapour cycle

**UNIT-IV** **Steam Condensers:** The function of condenser, Element of a water cooled condensing unit, types of condenser, advantages and disadvantages of various types of condenser, condenser vacuum, mass of circulating water required, source of air its effects and removal, vacuum efficiency, condenser efficiency
**Cooling ponds and Cooling tower:** Cooling pond, cooling towers, classification and working principles.

**UNIT-V** **Thermodynamics of Compressible Fluids:** Velocity of pressure waves in a fluid, Mach number, isentropic stagnation state , stagnation enthalpy, temperature, pressure, density, one dimensional steady isentropic flow, area velocity relationship, critical properties-choking in isentropic flow, dimensionless velocity, Effect of back pressure on the performance of nozzle flow. Flow of steam through nozzle, throat area for maximum discharge, supersaturated Flow in nozzle.

**Text Books:**

1. Thermodynamics- An Engineering Approach – Cengal & Boles – McGraw Hill, Delhi
2. Engineering Thermodynamics – P.K. Nag – TMH Publishers

**Reference Books:**

1. Fundamental of engineering thermodynamics- R.Yadav ,CPH, Allahabad
2. Thermal Science & Engineering – D.S. Kumar – S.K. Kataria & Sons
3. Fundamental of Thermodynamic- Claus Borgnakke, Richard E. Sonntag, Wiley,Delhi
4. An Introduction to Thermodynamics-Y.V.C.Rao ,University Prass, Hyderabad
5. Thermodynamics & Thermal Engineering – J. Selwin Rajadurai – New Age International Publishers
6. Thermodynamics – C.P. Arora – TMH , Delhi
7. Thermodynamics – S.C. Gupta – Pearson Education,Delhi

**Course Outcomes:**

- Apply knowledge of classical thermodynamics for formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts of thermal sciences in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:42:24 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Kinematics of Machines** | Code: | **337454(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To synthesis, both graphically and analytically, multilink mechanisms.
- To perform mechanism analyses to find the position, velocity, acceleration, and dynamics of multi-bar mechanisms.
- To synthesis mechanism to perform certain prescribed task/motion
- To analyze gear trains.
- To analyze thrust bearings, Brakes and dynamometers.

**UNIT- I** **Relative velocity:** Elements, pairs, Mechanism, Four bar chain and its inversion, Velocity diagrams, Relative velocity method, Instantaneous centre method.

**UNIT-II** **Relative Acceleration:** Synthesis of mechanism, Pantograph, Lower pair mechanism, Relative acceleration diagram, Kliens construction, Coroillis component of acceleration.

**UNIT- III** **Cams:** Classification of cams and followers, Nomenclature of a radial cam, Description of follower movement, Displacement diagrams, Uniform and modified uniform motion, Simple harmonic motion, Uniform acceleration motion and its modifications, Cycloidal motion, Synthesis of cam profile by graphical approach, Considerations of pressure angle. Cams with specified contours: Circular arc cam & tangent cam.

**UNIT-IV** **Gear:** Types of gears, Gear terminology, Law of gearing, Gear tooth forms, Involute and Cycloid tooth profile, Interference and Undercutting of Involutes teeth, Minimum number of teeth on pinion to avoid interference.
**Gear trains:** Simple, Compound, Reverted, and Epicyclical gear trains, computation of velocity ratio in gear trains by different methods.

**UNIT-V** **(a) Friction:** Applications of friction, Pivot and collar friction, Thrust bearing.
**(b) Belt-Drives**: Ratio of tensions for flat belt & V-belt, Centrifugal tension, condition for maximum power transmission.
**(c) Brakes and dynamometer:** Simple block and shoe brake, Band brake, Band and block brake, and internal expanding shoe brake, Absorption dynamometer, Transmission dynamometer.

**Text Books:**

1. Theory of Machine – S. S. Ratan-Tata McGraw Hill.
2. The Theory of Machine – Thomas Beven – CBS Publishers.

**Reference Books:**

1. Theory of mechanism and machine – A. Ghosh, A.K. Mallik –EWP Press.
2. Theory of Machine – Shigley, JE
3. Theory of Machine Jagdish Lal
4. Theory of machine – J.E. Singh – McGraw Hill.

**Course Outcomes:**

- Apply knowledge of Kinematics of machine for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts kinematics of machine in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:42:59 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Numerical Analysis & Computer Programming (C & C++)** | Code: | **337455(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To learn about existence and uniqueness criteria for numerical methods
- To learn about convergences criteria and to be aware of reasons why numerical methods may fail.
- Find numerical approximations to the roots of an equation by Newton method, Bisection Method, Secant Method, etc.
- Find numerical solution to a system of linear equations by Gaussian Elimination and Gauss-Siedel Iterative
- Find numerical solution for Curve fitting
- Find numerical solution for ordinary differential equation.
- Find numerical solution for Partial differential equation.
- To understand the basics of computer programming

**UNIT- I** **Approximation and Errors in Computation:** Approximation and round of errors, truncation errors and Taylor Series, Determination of roots of polynomials and transcendental equations by Graphical methods and Bisection, Regula-falsi, Secant and Newton-Raphson methods, Solution of Linear simultaneous, linear algebraic equations by Gauss Elimination Gauss-Jordan and Gauss-Siedel iteration method.

**UNIT-II** **Empirical laws, Curve Fitting & Interpolation:** Curve fitting linear and non-linear regression analysis (Method of group average and Least squares) Finite differences, Backward, forward and central difference relation and their use in Numerical differentiation and integration and their application in interpolation.

**UNIT- III** **Numerical Solution of Ordinary Differential Equations:** Numerical integration by Trapezoidal rule, Simpson's (1/3rd & 3/8th ) rule and its error estimation. Application of difference relations in the solution of partial differential equations. Application of difference relations in the solution of partial differential equations. Numerical solution of ordinary differential equations by Taylor's series, Euler, Modified Euler, Runge-Kutta and Predictor-Corrector method.

**UNIT-IV** **Numerical Solutions of Partial Differential Equations:** Introduction, Classification of second order equations, Finite difference approximations to partial derivatives, Elliptic equations, solution of Laplace equation, Solution of Poisson's equation, Solution of elliptic equations by relaxation method, Parabolic equations, Solution of one-dimensional heat equation, Solution of two-dimensional heat equation, Hyperbolic equations, solution of wave equation.

**UNIT-V** **Computer Programming:** I/O statement, Mathematical, Relational & Conditional Statements & Expressions. Switch Loops and Control Statements. Introduction to one dimensional arrays and two dimensional arrays. Basics of I/O file handling.

**Text Books:**

1. Numerical Methods in Engineering & Science – Dr. B.S. Grewal – Khanna Publishers, 6th Edn. 2004
2. Numerical Methods – P. Kandasamy, K. Thilagavathy & K. Gunavathy – S. Chand & Co., 2nd Rev. Edn. – 2003

**Reference Books:**

1. Let us C – Yashwant Kanitkar, 5th Edn. – BPB Publihsers – New Delhi. 2004
2. Introductory Methods of Numerical Analysis – S.S. Sastry, 3rd Edn. – PHI – New Delhi, 2003
3. Numerical Mathematical Analysis – James B. Scarborough, 6th Edn. – Oxford & IBH Publishing Co. – New Delhi
4. Theory & Problems in Numerical Methods – T. Veerarajan, T. Ramchandran – TMH, New Delhi, 2004
5. Numerical Methods for Engineers – Steven C. Chapra, Raymond P. Canale, 4th Edn. – TMH, New Delhi
6. The Spirit of C – Henry Mullish & Herbert L. Cooper - Jaico Pub. House

**Course Outcomes:**

- Apply knowledge of numerical analysis for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts of Numerical Analysis and Computer Programming in the analysis of mechanical systems.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary analysis.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:43:19 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Manufacturing Science – I** | Code: | **337456(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

- To understand various manufacturing processes & its classifications
- To understand various Casting processes
- To understand various welding processes
- To understand various metal removal process
- To appreciate the capabilities, advantages and the limitations of the processes

**UNIT- I** **Introduction to Manufacturing Processes:** Importance of Manufacturing Processes, classification, technological definitions. **Metal Casting (Foundry): Introduction** : Basic Principle, Advantages and Limitations, Applications. **Pattern Making**: Pattern materials, allowances, types of pattern, color code scheme **Mould Making**: Green and dry sand casting process, types of sand, molding sand and its properties, molding sand composition and applications. **Elements of mould**: Cores; Use, core material, types of cores, advantages and limitations, core prints, chaplets, Gating and Risering System, Sand casting defects: appearance, causes & remedies. **Special Molding Processes**: Carbon dioxide molding process, investment casting process, Die casting process, shell molding process, continuous casting process, centrifugal casting processes.

**UNIT-II** **Welding – I: Introduction:** Principle, classification based on application of filler material & without filler material, source of energy, fusing and pressure welding processes, application of welding processes. **Arc welding**: Principle, power source and equipments, welding electrodes- types composition & specification, Metal Arc welding (MAW), flux Shielded Metal Arc Welding (FSMAW), Inert Gas Welding (TIG & MIG) Submerged Arc Welding (SAW) and Atomic Hydrogen Welding processes. (AHW). **Gas Welding**: Principle, Oxy-Acetylene welding, Reaction in Gas welding, Flame characteristics, Gas torch construction & working, forward and backward welding.

**UNIT- III** **Welding – II: Resistance Welding:** General, principle of heat generation in resistance welding, application of resistance welding processes. Process details and working principle of spot, seam and projection welding, electrode materials, shapes of electrodes, electrode cooling, selection of welding currents, voltages. **Special type of welding**: Friction welding, Explosive welding, Thermit welding, Laser welding, Electron beam welding, Electroslag welding, Ultrasonic welding; principle, equipments, operations. **Soldering, Brazing & Braze welding, Welding Defects**

**UNIT-IV** **Machine Tools: Lathe:** Principle of operation, basic parts of a lathe, types – speed lathe, engine, bench, tool room, capstan, turret, automatic, specification, construction, operations-facing, turning, knurling, taper turning, thread cutting, drilling, boring, reaming, work holding devices & tools, mechanism and attachments for various operations. **Shaper**: Principle of operation, parts, types- horizontal, vertical, universal, Operations – horizontal cutting, vertical cutting, angular cutting, irregular cutting, specification, Quick return Mechanisms. Table feed mechanism, work holding devices. **Planner:** Principle of operation, parts, types – double housing, open side, pit type, plate type, divided table. Specification, types of drives.

**UNIT-V** **Milling :** Principle of operation, parts, specification, types- horizontal, vertical, universal, milling operations – plain, face, slotting, gear cutting mechanisms and attachments for milling, indexing-simple, compound and differential. **Broaching:** Principle of operation, parts, types of broaches- horizontal, vertical, pull, surface-internal and external broaching machines, nomenclature, of broach. **Drilling**: Principle of operation, parts, drill nomenclature, types of drilling machines, other operations like counter boring, counter sinking, spot facing etc. **Reaming**: Principle of operation, parts, description of reamers, type of reaming operations. **Boring:** Principle of operation, parts, types of boring machines, boring operations, boring tools

**Text Books:**

1. Manufacturing Technology (Vol. – I & II) – P.N. Rao – Tata McGraw Hill Pub. Company, New Delhi.
2. A Text Book of Production Technology (Manufacturing Processes) – P.C. Sharma – S. Chand and Company Ltd., New Delhi.

**Reference Books:**

1. Manufacturing Science – A. Ghosh & A.K. Mallik – East West Press Pvt. Ltd., New Delhi
2. Manufacturing Engineering and Technology – S. Kalpakjian & S.R. Schmid – Addision Wesley Longman, New Delhi
3. Production Technology – R. K. Jain – Khanna Publishers, New Delhi
4. A Text Book of Production Technology (Vol. I & II) – O.P. Khanna – Dhanpat Rai & Sons, New Delhi.

**Course Outcomes:**

- Acquire knowledge and hands-on competence in applying the concepts of manufacturing science in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:43:43 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Fluid Mechanics Laboratory** | Code: | **337461(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:*** *(At least Ten experiments are to be performed by each student)*

1. To determine the meta-centric height of a ship model.
2. To verify Bernoulli's Theorem.
3. To verify Impulse Momentum Principle.
4. To calibrate a Venturimeter and study the variation of coefficient of discharge.
5. To calibrate an orifice-meter.
6. Experimental determination of critical velocity in pipe.
7. To determine of head loss in various pipe fittings.
8. Flow measurement using Pitot tube.
9. To study the transition from laminar to turbulent flow and to determine the lower critical Reynold's number.
10. To determine the hydraulic coefficients (Cc, Cd and Cv) of an orifice.
11. To determine the coefficient of discharge of a mouth piece.
12. To obtain the surface profile and the total head distribution of a forced vortex.
13. To study the velocity distribution in pipe and to compute the discharge by integrating velocity profile.
14. To study the variation of friction factor for pipe flow.
15. To determine the roughness coefficient of an open channel.

**List of Equipment/Instruments/Machines/Software Required:**

- Apparatus for determination of metacentric height
- Bernoulli's apparatus
- Impact of jet apparatus
- Venturimeter
- Orificemeter
- Pipe friction apparatus
- Orifice apparatus
- Mouth Piece apparatus with the provision for determination of hydraulic coefficient Cc, Cd & Cv
- Vortex flow apparatus
- Apparatus of head loss in various pipe fittings.
- Reynold's apparatus
- Complete setup for flow measurement using Pitot tube
- Complete set for open channel apparatus

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:44:10 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Computer Aided Drafting Laboratory** | Code: | **337462(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:***

1. Understanding of various 3D CAD commands and creating simple 3D objects.
2. Understanding of holes, cuts and model tree relations.
3. Creation shafts, rounds, chamfers and slots.
4. Sketch Tools & Datum planes
5. Creation of objects by Extrusion, revolved features (Simple protrusion), patterns and copies.
6. Creation of objects by sweeps and blends (Advance protrusion) methods.
7. Creation of engineering drawing details such as dimensioning, sectional views, adding esthetics.
8. Assembling of part models using constraints
9. Assembly operations - part modifications, adding another assembly features – display

**List of Equipment/Instruments/Machines/Software Required:**

1. P-IV, 2.6 G. Hz., 128/256 MB SDRAM, 40 GB HDD, 1.44 MB FDD, 14" Colour Monitor, 52 X CD RW, Laser Scroll Mouse
2. Software Required – Drafting Software

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:44:30 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Kinematics of Machines Laboratory** | Code: | **337463(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:***

1. To determine the jump phenomena of cam follower apparatus.
2. To draw displacement, velocity and acceleration curve of cam motion.
3. To find out the load carrying capacity of bearing.
4. To find out the Coefficient of friction of bearing.
5. To find out the frictional horse power of bearing.
6. To find out the Pressure around the bearing by journal bearing apparatus.
7. To measure co-efficient of friction, power transmitted with varied belt tension by slip & creep apparatus.
8. To find out the percentage slip at fixed belt tension by varying load with slip & creep apparatus.
9. To find out belt slip and creep by slip and creep measurement apparatus.
10. To verify the coriolli's component of acceleration with theoretical and practical results.
11. To find the speed and torque of different gear in an epicyclic gear train.
12. To find the speed and torque of different gear in a simple, compound and reverted gear train.
13. To Study and analysis of Pantograph.
14. To study Four-bar mechanism and its inversions.
15. To study internal expanding and external contracting shoe brakes.
16. To study rope brake dynamometer and calculation of torque and power.

**List of Equipment/Instruments/Machines/Software Required:**

- Cam analysis apparatus
- Journal bearing apparatus.
- Coriolli's component of acceleration apparatus
- Slip & Creep Measurement Apparatus in Belt Drive
- Simple, compound, reverted and epicyclic gear train apparatus.
- Pantograph apparatus (with all accessories)
- Internal / external shoe brake (complete set with accessories)
- Four bar mechanism and its inversions.
- Rope brake dynamometer apparatus (with all accessories)
- Mechanoset.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:46:52 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Numerical Analysis & Computer Programming Laboratory** | Code: | **337464(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

***List of Experiments:***

1. Write a program to calculate the area & perimeter of the rectangle and the area & circumference of the circle. The length and breadth of a rectangle and radius of a circle are input through keyboard.
2. Write a program to determine whether the character entered through a keyboard is a capital letter, a small case letter, a digit or a special symbol.
3. Write a program to add first seven terms of the following series using looping statements series is

$$S = \frac{1}{1!} + \frac{2}{2!} + \frac{3}{3!} + \frac{4}{4!} + \ldots\ldots\ldots$$

4. Write a program which has the following options:
   a. Factorial of a number
   b. Prime or not
   c. Odd or even
5. Write a program to implement Bubble sort on a set of 10 numbers.
6. Write a program to store every character typed at the keyboard into a file. The procedure should come to an end as soon as the 'Esc' key is pressed.
7. Write a program to find the roots of an equation using Newton Raphson Method.
8. Write a program to practice one of the Numerical Integration Method.
9. Write a program to find the solution of Differential Equation by Modified Euler's Equation.
10. Write a program to find the solution of Differential Equation by Runge Kutta Equation.

**List of Equipment/Instruments/Machines/Software Required:**

1. P-IV, 2.6 G. Hz., 128/256 MB SDRAM, 40 GB HDD, 1.44 MB FDD, 14" Colour Monitor, 52 X CD RW, Laser Scroll Mouse
2. Software Required – C & C++

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:47:10 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Mechanical Engineering** | Semester: | **IV** |
| Subject: | **Health, Hygiene & Yoga** | Code: | **337465(46)** |
| No. Of Periods: | **2 Periods/Week** | Total Tutorial Periods: | **NIL** |
| **Maximum Marks:** | **40** | **Minimum Marks:** | **24** |

**Course Objectives:**

1. To provide understanding the importance of health.
2. To provide insight into the hygiene aspect & quality of life.
3. To study the concepts of various medical therapy.
4. To practice the various yogasans.
5. To provide knowledge about common diseases and its cure through yagasans and pranayam.
6. To develop concentration through various methods.

**UNIT- I** **HEALTH & HYGIENE:** Concept of health, Physical health and mentall health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and underrating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs nutritious food; fruits, vegetables cereals and qualities of each of these.

**UNIT-II** **INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE:** History, development, basic concepts, modes of operation of Alopathy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accurpressure, Accupunture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

**UNIT- III** **YOGASANS:** Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshcp Mudra.

**UNIT-IV** **YOGASANS FOR COMMON DISEASES:** From Yogic Materia Medica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomache disorders, such as, indigestion, acidity, dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:** Shavasan, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain:** Shirsh padasan, Shashankasan.
- **Asans for eye sight:** Tratak, Neti Kriya .
- **Pranayam:** Definition and types: Nadi Shodhan, Bhastrik, Shitakari, Bhramari useful for students.

**UNIT-V** **CONCENTRATION:** Concentration of mind and how to achieve it. Tratak (त्राटक), Concentration on breath, Japa (जप), Ajapajap (अजपाजप), internal silence (अन्तर्मौन), visualization in mental sky (चिदाकाश धारणा), Concentration on point of light (ज्योति ध्यान), Concentration on feeling (नाद ध्यान), Concentration on figure (मूर्त ध्यान).

**Text Books:**

Health, Hygiene & Yoga, Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

**Reference Books:**

(1) Yogic Materia Medica
(2) Asan, Pranayam and Bandh.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:47:24 -08'00'

# Chhattisgarh Swami Vivekanand Technical University
# Bhilai (C.G.)

**SCHEME OF TEACHING AND EXAMINATION**

**B.E. V SEMESTER MECHANICAL ENGINEERING**

| S. No. | Board of Study | Sub. Code | SUBJECT | PERIODS PER WEEK | | | SCHEME OF EXAM Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1. | Mech. Engg | 337551 (37) | Machine Design – I | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2. | Mech. Engg | 337552 (37) | Turbo Machinery | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 3. | Mech. Engg | 337553 (37) | Dynamics of Machines | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4. | Mech. Engg | 337554 (37) | Fluid Machinery | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 5. | Mech. Engg | 337555 (37) | Manufacturing Science - II | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6. | Mech. Engg | 337556 (37) | Operations Research | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 7. | Mech. Engg | 337561 (37) | Machine Design-I Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8. | Mech. Engg | 337562 (37) | Manufacturing Science Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 9. | Mech. Engg | 337563 (37) | Dynamics of machines Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 10. | Mech. Engg | 337564 (37) | Fluid Machinery Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 11. | Humanities | 300565 (46) | Personality Development | - | - | 2 | - | - | 20 | 20 | 1 |
| 12. | Mech. Engg | 337566 (37) | *Practical Training Evaluation/Library | - | - | 1 | - | - | 20 | 20 | 1 |
| **Total** | | | | **23** | **6** | **11** | **640** | **120** | **240** | **1000** | **35** |

**L:** Lecture **T:** Tutorial **P:** Practical
**ESE:** End Semester Examination **CT:** Class Test **TA:** Teacher's Assessment

**** Industrial Training of eight weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV semester after which students have to submit a training report which will be evaluated by the college teachers during B.E. V semester.***

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:47:40 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering/Mechatronics Engineering** | Semester: | **V** |
| Subject: | **Machine Design I** | Code: | **337551(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |

ESE Duration: **Four Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

**Note: Design data book by PSG and ISI data sheets are allowed in the examination.**

**Course Objectives:**

- To choose proper materials to different machine elements depending on their physical and mechanical properties.
- To design and analyze basic elements of machine e.g. key, shaft and axle.
- To design and analyze various type of joints for members with axial load
- To design and analyze couplings and clutches for members in torsion
- To design and analyze threaded fastener and power screws
- To design and analyze riveted and welded joint

**Course outcomes:**

- Apply knowledge of machine design for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analyze, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

**UNIT I** **General Considerations:** Selection of Materials, Design Stress, Factor of Safety, Stress concentration factor in tension, bending and torsion, theories of failures. Notch sensitivity, design stress for variable and repeated loads, fatigue stress concentration factor, endurance diagrams.

**UNIT II** **Basic Elements Design:** Design of socket-spigot cotter joint, sleeve and cotter joint, design of Knuckle joint.
**Keys and Couplings:** Types of keys, design of keys, design of splines.
Types of couplings, design of flange and flexible couplings, compression coupling, muff coupling.

**UNIT III** **Shafts and Axles:** Transmission shaft, Design against static load, Design for strength, rigidity and stiffness, design under continuous loading for fatigue.
**Clutches:** Friction clutches, Friction materials, Torque transmitting capacity, Single & Multiple plate clutch, centrifugal clutches.

**UNIT IV** **Threaded fasteners:** Geometry of thread forms, terminology of screw threads and thread standards, specifications of steel bolts, initial tension, and relation between bolt tension and torque, design of statically loaded tension joints, design of bolted joints due to eccentric loading.
**Power Screws:** Power screws, Force analysis-square and trapezoidal threads, Collar friction, Stresses in screw, coefficient of friction, efficiency of thread.

**UNIT V** **Riveted Joints:** Types of rivet heads, types of riveted joints, failure of riveted joint, strength of rivet joint, efficiency of riveted joint, design of riveted joint for boiler.
**Welded joints:** Types of welded joints, stresses in butt and fillet welds, strength of welded joints, location and dimension of weld design, eccentrically loaded joint, welded joint subjected to bending moment, design procedure, fillet welds under varying loads, stress relieving techniques.

**TEXT BOOKS:**

1. Design of Machine Elements- V.B.Bhandari - TMH, New Delhi
2. Mechanical Engineering Design - Shigley – McGraw Hill, Delhi

**REFERENCE BOOKS:**

1. Machine Design - Movnin – MIR Publishers,Moscow
2. Machine Design - Fundamental & Application – Gope –PHI, New Delhi
3. Machine Design - Sharma &Agrawal – Katson, New Delhi
4. Principles of Mechanical Design - R. Phelan – McGraw Hill, New Delhi.
5. Machine Design – Sundarajamoorthy&Shanmugum– Anuradha Agencies, Chennai

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:47:54 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **V** |
| Subject: | **Turbo Machinery** | Code: | **337552(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |

ESE Duration: **Four Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

**Note: Steam tables are allowed in the Examination**

**Course Objectives**

- To study classifications of turbo-machines.
- To study construction and working of different turbo- machines

To acquire the knowledge and skill of analyzing different turbo- machines

**Course Outcomes:**

1. Apply knowledge of turbo machinery for understanding, formulating and solving engineering problems.
2. Acquire knowledge and hands-on competence in the design and development of mechanical systems.
3. Identify, analysis, and solve mechanical engineering problems useful to the society.
4. Work effectively with engineering and science teams as well as with multidisciplinary designs.

**UNIT I** Impulse Turbine: Steam turbine – Principal of operation of steam turbine, types of impulse turbine, compounding of steam turbine-pressure compounded, velocity compounded and pressure velocity compounded impulse turbine. Velocity diagram for impulse turbine, force on the blade and work done. Blade or diagram efficiency, axial thrust, gross stage efficiency. Influence of ratio of blade velocity to steam velocity on blade efficiency in a single stage impulse turbine. Efficiency of multi-stage turbine. Impulse blade sections, choice of blade angle. Blade height in velocity compounded impulse turbine.

**UNIT II** Impulse Reaction Turbine: Velocity diagram, degree of reaction, impulse-reaction turbine with similar blade section and half degree of reaction. (Parson's turbine) Height of reaction turbine blading ,Losses in steam turbine ,Internal losses-throttling losses, ,Nozzle friction losses, blade friction losses, disc friction losses, blade windage losses or partial admission losses, leakage or clearance losses, loss due to wetness of steam, carry-over loss. , residual loss, radiation loss, external losses-Mechanical friction and bearing losses.

**UNIT III** State Point Locus and Reheat Factor: Stage efficiency of impulse turbines, stage point locus of an impulse turbine, state point locus for multistage turbine, reheat factor. Internal efficiency, overall efficiency, relative efficiency, Governing of steam turbine.Throttle governing, nozzle governing, bypass governing, combination of throttle and nozzle, governing and combination of bypass and throttle governing. Effect of governing on the performance of steam turbine.

**UNIT IV** Gas Turbine: Classification of gas turbine. Applications, Simple open cycle gas turbine, Ideal and actual cycle for gas turbine, polytropic or small stage efficiency, cycle air rate, cycle work ratio, Optimum pressure ratio for maximum specific output in actual gas turbine ,optimum pressure ratio for maximum cycle thermal efficiency, means of improving the efficiency and specific output. Open cycle gas turbine with regeneration, reheat and inter cooling and effect of these modification on efficiency and output. Closed cycle gas turbine.

**UNIT V** **Turbo Compressors:** Introduction, classifications of Centrifugal compressors – components, working, velocity diagrams, calculations of power and efficiencies. Slip factor, surging and choking, power and efficiencies.
**Axial Flow Compressor:** Construction and working, velocity diagram, calculation of power and efficiencies. Degree of reaction, work done factor, stalling, comparison of centrifugal and axial flow compressor.

**TEXT BOOKS**

1. Steam and Gas Turbine and Power Plant Engineering-R. Yadav - Central Publishing House, Allahabad
2. Turbine, Compressors and Fan- S.M. Yahya - TMH, Delhi

**REFERENCE BOOKS**

1. Gas Turbine – V. Ganeshan – TMH, Delhi
2. Fundamental Of Compressible Flow- S.M. Yahya - TMH, Delhi
3. Gas Dynamics with Application: S.K. Kulshrestha
4. Fundamentals Of Compressible Fluid Dynamics- P.Balachandran- PHI, Delhi
5. Fundamental of Gas Dynamics-K.L.Yadao-Khanna Publications,Delhi

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 01:48:08 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering/Mechatronics Engineering** | Semester: | **V** |
| Subject: | **Dynamics of Machines** | Code: | **337553 (37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**

- To study types of mechanical governors and to analyze its performance parameters
- To Apply the theory of balancing to rotating and reciprocating masses.
- To analyze gyro-effect on moving bodies
- To understand the concepts of mechanical vibration
- To perform inertia force analysis of machine elements
- To draw turning moment diagram of reciprocating engines
- To analyze performance parameters flywheel

**Course Outcome**

- Apply knowledge of Dynamics of machine for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts Dynamics of machine in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering
- Identify, analyze and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

**UNIT I** **Governors:** Characteristics of centrifugal governors, Gravity controlled governors, Porter and proell. Spring controlled centrifugal governor: Hartung, &Hartnell governor. Performance parameter: Sensitivity, stability, Isochronisms, Governor Effort and power.

**UNIT II** **Balancing:** Balancing of rotating masses, Static and dynamic balancing, Determination of balancing masses in two plane balancing, Balancing of internal combustion engines, Balancing of in-line engines, Firing order, Balancing of V-twin and radial engines, Forward and reverse crank method, Balancing of rotors.

**UNIT III** **Gyroscope:** Gyroscopic forces and couple, gyroscopic effect in Airplanes, Ship motion and Vehicles moving on curved path.

**UNIT IV** **Mechanical Vibrations:** One-dimensional, longitudinal, Transverse, and torsional vibrations, Natural frequency, Effect of damping on vibrations, Different types of damping.Forced vibration, Forces and displacement, Transmissibility, Vibration Isolation, Vibration sensors: seismometer and Accelerometers, Whirling of shafts with single rotor.

**UNIT V** **(a) Inertia force analysis:** Effective force and inertia force on link, Inertia force on reciprocating engine. Inertia force in four bar chain mechanism.
**(b)Turning moment diagram and flywheel:** Turning moment diagram for single and multi cylinder internal combustion engine, Coefficient of fluctuation of speed, Coefficient of fluctuation of energy, Flywheel.

**TEXT BOOKS**

1. Theory of Machine- S.S.Rattan - Tata McGraw Hill,New Delhi
2. Theory of Machines - Thomas Bevan, - CBS/ Cengage Publishers

**REFERENCE BOOKS**

1. Theory of Machines and Mechanism– Uicker, Pennock, &Shigley – Oxford Univ. Press
2. Theory of Mechanisms and Machines- A. Ghosh, A. K. Mallik – EWP Press.
3. Mechanism and Machine theory-Ambekar-PHI,Delhi
4. Theory of Machine – P.L. Ballaney – Khanna Publishers, New Delhi
5. Theory of Machine -JagdishLal- Metro Politan Books, New Delhi

**Name of the Programme: Bachelor of Engineering** :::: **Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:48:22 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **V** |
| Subject: | **Fluid Machinery** | Code: | **337554 (37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**
- To understand boundary layer theory
- To formulate basic equations for impact of free jets
- To understand construction and working and performance of various Turbines
- To understand construction and working & performance of various Pumps
- To solve and analyze a variety of fluid mechanics and fluid machinery related problems.

**Course Outcomes:**
- Apply knowledge of fluid mechanics and fluid machinery for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts of fluid mechanics and fluid machinery in the design and development of mechanical systems.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
  Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.

**UNIT I** **Boundary Layer Theory :** Boundary layer definition and characteristics, momentum equation, Laminar and turbulent boundary Layer, Total drag, separation and control. Flow around submerge bodies Force exerted by flowing fluid on a body: Drag and lift; stream lined and bluff body, Drag on sphere and cylinder, circulation and lift on circular cylinder, lift of an air foil, induced drag.

**UNIT II** **Impact of Free Jets:** Impulse momentum principle, force exerted by the jet on stationary flat and curved plate, hinged plate, moving plate and moving curve vanes, jet propulsion of ship.
**Impulse Turbine:** Classification of turbine, impulse turbine, Pelton wheel, Construction working, work done, head efficiency and Design aspects, Governing of impulse turbine.

**UNIT III** **Reaction Turbine :** Radial flow reaction turbine, Francis turbine: construction, working, work done, efficiency, design aspect, advantages & disadvantages over Pelton wheel. Axial flow reaction turbine Propeller and Kaplan turbine, bulb or tubular turbine, draft tube, specific speed, unit quantities, cavitation, degree of reaction, performance characteristics, surge tanks, governing of reaction turbine.

**UNIT IV** **Centrifugal Pumps :** Classification of Pumps, Centrifugal pump, Construction, working, work done, heads, efficiencies, multistage centrifugal pump, pump in series and parallel, specific speed, characteristic, net positive suction head, cavitation.

**UNIT V** **Reciprocating Pumps:** Classification, component and working, single acting and double acting pump, discharge, work-done and power required, slip & coefficient of discharge, indicator diagram, air vessels.

**TEXT BOOKS:**
1. Fluid Mechanics and Fluid Power Engineering – D.S. Kumar– Kataria & Sons -Delhi
2. Fluid Mechanics- Yunush A Cengel, John M. Cimbala- TMH, Delhi

**REFERENCES BOOKS:**
1. A text of Fluid Mechanics – R. K. Rajput – S. Chand & Company Ltd., Delhi
2. Fluid Mechanics & Hydraulics Machines-R.K.Bansal- Laxmi Publications, Delhi
3. Mechanics of Fluid – B.S. Massey – English Language Book Society (U.K.)
4. Introduction to Fluid Mechanics and Fluid Machines – S.K. Som and G. Biswas- TMH, Delhi
5. Hydraulics and Fluid Mechanics Including Hydraulic Machine- PN Modi, & SM Seth-Standard, Delhi
6. Hydraulic Machines: Fundamentals of Hydraulic Power Systems – P. Kumar – BSP Books Pvt, Ltd., Hyderabad

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:48:39 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **V** |
| Subject: | **Manufacturing Science - II** | Code: | **337555 (37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**

- To understand grinding and other surface finishing operations.
- To understand various non conventional machining processes and their applications.
- To get knowledge of various metal forming processes.
- To understand principle of sheet metal forming operations
- To understand the process of Gear Shaping and Gear Hobbing.
- To understand the design considerations of Jigs and Fixtures.

**Course Outcomes:**

- Acquire knowledge and hands on competence in applying concept of manufacturing science in design and development of mechanical and other engineering systems.
- Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.
- Demonstrate creativeness in designing new system components and processes in the field of engineering in general and mechanical engineering in particular.
- Work effectively with engineering and science teams as well as with multidisciplinary design.

**UNIT I** **Grinding :** Processes. Grinding wheels, compositions- abrasives, bonding materials. Grinding wheel characteristics-abrasive type, grain size, bonding material, structure, and grade. Wheel specification and selection. Wheel life. Types of grinding operations, design consideration for grinding, specification of grinding wheel, process parameters, economics of grinding.
**Surface finishing operations:** Honing, lapping, super finishing, polishing, buffing, process parameters and attainable grades of surface finish.

**UNIT II** **Unconventional Machining:** Advantages, application and limitation, Processes- Electro Discharge Machining (EDM), Electro Chemical Machining (ECM), Ultrasonic Machining (USM), Abrasive Jet Machining (AJM), Electron Beam Machining (EBM), Laser Beam Machining (LBM), Electro Chemical grinding(ECG) .Mechanics of metal removal, tooling, equipment, process parameters and surface finish obtained & specific applications.

**UNIT III** **Introduction to metal forming:** Classification, Hot and Cold working.
**Forging:** Principle. Forging operations, drawing out and upsetting. Types of forging method-smith, drop, press and machine forging. Forging equipment. Forging dies. Tools and fixture of forging, forging dies. Forging design, Forging designs factors. Drop forging die design, Upset forging die design. Forging practice – sequence of steps. Forging defects. Inspection and testing of forged parts.
**Extrusion**: Principle, extrusion processes-hot extrusion, cold extrusions. Process parameters. Extrusion equipment. Extrusion of seamless tubes. Extrusion defects.

**UNIT IV** **Rolling :** Principle, classification of rolled products, Types of rolling mills, rolling mill train components, Roll pass sequences-break down passes, roughing passes, finishing passes. Roll passes design for continuous mill. Roll separating force. Rolling load calculation. Power required in rolling. Effect of front and back tensions. Effect of friction. Shape rolling operations-ring rolling, thread rolling. Defects in rolled products.
**Drawing**: Principle. Wire drawing, tube drawing. Drawing equipments and dies. Calculation of drawing load and power requirement

**UNIT V** **Sheet metal forming**
**Types of presses**: Selection of press, components of a simple press, press working operations – shear, bending. **Shearing operations**: Blanking, piercing, trimming, shaving, nibbling and notching .Calculation of punching force and shear force. Punch and die size calculation. **Drawing operation:** Principle of operation. Draw die design. **Bending operation:** Principle of operation. Bend allowances. Bending force. Length of sheet estimation. Bend radius. Spring back effect. **Other operation:** Spinning. Stretch forming, Embossing and Coining.

**TEXT BOOKS:**

1. Manufacturing Technology (Vol. - I & II) – P.N. Rao – Tata McGraw Hill Pub. Company, New Delhi
2. A Text Book of Production Technology (Manufacturing Processes) – P.C. Sharma – S. Chand and Company Ltd., New Delhi

**REFERENCE BOOKS:**

1. Manufacturing Engineering and Technology – S. Kalpakjian & S.R. Schmid – Addision Wesley Longman, New Delhi
2. Tool Engineering & Design – G.R. Nagpal – Khanna Publishers – New Delhi
3. A Text Book of Production Technology – O.P. Khanna – Dhanpat Rai & Sons, New Delhi
4. Manufacturing Science – A. Ghosh & A.K. Mallik – East West Press Pvt. Ltd., New Delhi
5. Production Technology – R.K. Jain – Khanna Publishers, New Delhi

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:48:54 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **V** |
| Subject: | **Operation Research** | Code: | **337556 (37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Note: Four questions of 20 marks to be set taking one from each unit.**

**Course Objectives:**

- Understand definition, scope, objectives, phases, models & limitations of operations research.
- To understand different application areas of operations research like transportation problem, assignment model, sequencing models, dynamic programming, game theory, replacement models & inventory models

**Course Outcomes:**

- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimization problems.
- Use mathematical software to solve the proposed models.
- Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.
- A student will be able use knowledge of operations research to solve transportation problems, assignment problems, sequencing problems, dynamic programming & game theory.

**UNIT I** **Introduction:** Various stages of O.R., Fields of application, optimization and its classification. General Linear Programming Problems- Introduction, maximization and minimization of function with or without constraints, formulation of a linear programming problem, graphical method and simplex method, Big M method degeneracy, application of L.P.P. in Mechanical Engineering.

**UNIT II** **The Transportation Problems:** Mathematical formulation computational procedures, Stepping stone method, Modified Distribution Method, Vogels Approximation Method, Solution of balanced and unbalanced transportation problems and case of Degeneracy.
**The Assignment Problems:** Mathematical formulation of assignment problems, solution of assignment problems, traveling salesman problems, Air crew Assignment problems.

**UNIT III** **Waiting Line Theory:** Basic queuing process, basic structure of queuing models, some commonly known queuing situations Kendall's service time, solution to M/M/1: ∞ /FCFS models.
**Network Analysis:** CPM/PERT, Network Representation, Techniques for drawing network. Resource smoothing and leveling, project cost, Optimum project duration, project crashing, updating, Time estimation in PERT.

**UNIT IV** **Game Theory:** Introduction, two person zero sum game, methods for solving two person zero sum game: when saddle point exists, when no saddle point exists, solution of 2xn and mx2 game.
**Simulation:** Basic concept of simulation, applications of simulation, merits and demerits of simulation, Monte Carlo simulation, simulation of Inventory system, simulation of Queuing system.

**TEXT BOOKS:**

1. Operation Research , Sasien Yaspan
2. Operation Research – N. D. Vohra – TMH
3. Operation Research– Hira & Gupta – S. Chand & Co.
4.Engineering Optimization: Theory and Practice- S.S.Rao- New Age Publishers

**REFERENCE BOOKS:**

1. Operation Research – H. Gillette – TMH, New Delhi
2. Operations Research – Hamdy.M. Taha – TMH, New Delhi
3. Fundamentals of Operation Research – Ackof Sasieni – Dhanpat Rai & Sons
4. Quantitative Approach to Management – Lovin and Krit Patrick – TMH
5. Operation Research– S.D. Sharma – S. Chand & Com. New Delhi

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:50:28 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **V** |
| Subject: | **Machine Design I Laboratory** | Code: | **337561(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of Experiments/Activities:**

1. Select a daily use product and design the conceptual design by applying the design process taking the controlling parameters
2. Make a list of mechanical components and know their materials and suggest some alternative materials for the each one of them.
3. Find a flange coupling in the college laboratory and justify its design by actual measurements
4. Design a shaft used in some practical application, by actual working and loading conditions
5. Justify the design of single plate clutch of an engine assembly
6. Design a wall bracket, which is being used in real life by actual measurement of load
    a. Welded joints
    b. Riveted and bolted joints

    In addition, justify your findings.
7. Design a screw jack.
8. Design a software in some high level language or excel sheets for design of a component
9. **Mini Project:** Each student will be given a real life problem for the complete design of a subsystem/system using either manual calculation with the help of design handbook or through computer programme, if needed. This will be done as home assignment to be submitted at the end of the semester.

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:50:45 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **V** |
| Subject: | **Manufacturing Science Laboratory** | Code: | **337562(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of Experiments to be Performed (Minimum ten experiments are to be performed by each student)**

**Foundry**

1. Moulding of a multi-piece pattern by green sand moulding
2. Making a mould (with core) and casting.

**Machine Tool**

3. Taper turning in a Lathe
4. Thread cutting in Lathe
5. Slot cutting in Shaper
6. Gear cutting in milling machine using indexing head.
7. Alignment testing of Lathe
8. Drilling, boring and reaming of a hole.

**Cutting Tool**

9. Study of turning tool of Lathe (Tool signature)
10. Study of twist drill

**Welding**

11. Joining MS plates by arc welding (SMAW,MIG)
12. Joining metal sheet by resistance welding
13. Joining metal by soldering/brazing

**Inspection and Testing**

14. Inspection of casting defect and welding defects
15. Non destructive testing of casting and welding defects

**LIST OF EQUIPMENTS/MACHINES REQUIRED**

1. Moulding equipment
2. Melting facility
3. Lathe
4. Shaper
5. Drilling Machine
6. Milling Machine
7. Reamers
8. Arc welding equipments
9. Soldering /Brazing equipments
10. Non destructive testing equipments

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:51:00 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **V** |
| Subject: | **Dynamics of Machines Laboratory** | Code: | **337563(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of Experiments to be Performed (Minimum ten experiments are to be performed by each student)**

1. To find out the oscillations of simple pendulum with universal vibration apparatus.
2. To find out the oscillations of Compound pendulum with universal vibration apparatus.
3. To find out the radius of gyration of bi-filler suspension with universal vibration apparatus.
4. To find out undamped torsional vibrations of single rotor system with universal vibration apparatus.
5. To find out the frequency of damped torsional vibration of single rotor system with universal vibration vibration apparatus.
6. To measure the frequency of torsional vibrations of single rotor system with universal vibration apparatus.
7. To measure the frequency of torsional vibrations of double rotor system with universal vibration apparatus.
8. To find out free vibration of helical coiled spring with universal vibration apparatus.
9. To study forced damped vibration of a spring mass system and simple supported beam with universal vibration apparatus.
10. To find out the Gyroscopic couple and prove the Gyroscopic law with Gyroscope apparatus.
11. To find out the Power and effort of Proel, Porter & Hartnell Governor with Governor Apparatus.
12. To find out the critical speed for different diameters of shaft by whirling of shaft apparatus.
13. To verify the static and dynamic balancing for different planes and masses by balancing apparatus.

**LIST OF EQUIPMENTS/MACHINES REQUIRED**

1. Universal Vibration Apparatus
2. Whirling of Shaft Apparatus.
3. Balancing Apparatus (Both Static & Dynamic)
4. Epicyclic Gear Train and Holding Torque Apparatus
5. Gyroscope apparatus
6. Governor apparatus with differential attachments

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:51:15 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **V** |
| Subject: | **Fluid Machinery Laboratory** | Code: | **337564(37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of Experiments/Studies to be Performed (Minimum seven experiments and three studies are to be performed by each student)**

1. Performance characteristics of Pelton wheel turbine.
2. Performance characteristics of Francis turbine.
3. Performance characteristics of Kaplan turbine.
4. Performance characteristics of variable speed centrifugal pump.
5. Performance characteristics of rated speed centrifugal pump.
6. Performance characteristics of multistage centrifugal pump.
7. Study of Wind Tunnel (Open Circuit blower type)
8. Determination of Lift and drag force over an air foil.
9. To study the working of fluidic devices (Analog and Digital)
10. To study the Hydraulic Accumulator
11. To study the Hydraulic Intensifier
12. To study the Hydraulic Crane
13. To study the Hydraulic lift
14. To study the Hydraulic Ram
15. To study the Jet Pump
16. To study the Air Lift Pump

**List of Equipments/Machines Required:**

1. Pelton Wheel Turbine
2. Francis Turbine Test Rig
3. Kaplan Turbine Test Rig
4. Variable Speed Centrifugal Pump Test Rig
5. Rated Speed Centrifugal Pump Test Rig
6. Multi Stage Centrifugal Pump Test Rig
7. Reciprocating Pump Test Rig
8. Complete setup of Wind Tunnel (Open circuit blow type) with minimum wind speed not less than 30m/sec.
9. Fluidic devices (Analog and Digital)
10. Airofoil with the provision of measurement of pressure distribution over the surface.
11. Cut section model of Hydraulic Accumulator
12. Cut section model of Hydraulic Intensifier
13. Cut section model of Hydraulic Crane
14. Cut section model of Hydraulic Lift
15. Cut section model of Hydraulic Ram
16. Cut section model of Hydraulic Jet and Air lift pump.

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 01:51:30 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of Program: | **Bachelor of Engineering** | | |
| Branch: | **Common to All Branches** | Semester: | **V** |
| Subject: | **Personality Development** | Code: | **300566 (46)** |
| No. of Lectures: | **2/Week** | Tutorial Period: | **NIL** |
| Total Marks in ESE: | **NIL** | Marks in TA: | **20** |
| Minimum number of Class Tests to be conducted: | **Two** | | |

**Objective:** The course is introduced to develop one's outer and inner personality tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Personality Development is essential for overall development of an individual apart from gaining technical knowledge in the subject.

**Course Objectives**

Upon completion of this course, the student shall be able

- To understand the concept of personality and image;
- To develop leadership, listening and interacting skills;
- To develop attitudinal changes;
- To develop decision-making qualities; and
- To communication skill.

**UNIT I** **Personality concepts:** What is Personality – its physical and psychic aspects. How to develop a positive self-image. How to aim at Excellence. How to apply the cosmic laws that govern life and personality. How to improve Memory – How to develop successful learning skills. How to develop and effectively use one's creative power. How to apply the individual MOTIVATORS that make you a self-power personality.

**UNIT II** **Interpersonal Skills:** Leadership: Leaders who make a difference, Leadership: your idea, What do we know about leadership? If you are serious about Excellence. Concepts of leadership, Two important keys to effective leadership, Principles of leadership, Factors of leadership, Attributes. Listening: Listening skills, How to listen, Saying a lot- just by listening, The words and the music, How to talk to a disturbed person, Listening and sometimes challenging. How to win friends and influence people, How to get along with others. How to develop art of convincing others. How can one make the difference. How to deal with others particularly elders. Conflicts and cooperation.

**UNIT III** **Attitudinal Changes: Meaning of attitude,** benefits of positive attitudes, How to develop the habit of positive thinking.

**Negative attitude and wining:** What is FEAR and how to win it. How to win loneliness. How to win over FAILURE. How to win over PAIN. How to win over one's ANGER and others anger. What is stress and how to cope up with it? The art of self-motivation. How to acquire mental well-being. How to acquire physical well-being.

**UNIT IV** **Decision Making:** How to make your own LUCK. How to plan goals/objectives and action plan to achieve them. How to make RIGHT DECISION and overcome problems. How to make a Decision. Decision making: A question of style. Which style, when? People decisions: The key decisions. What do we know about group decision making? General aids towards improving group decision making.

**UNIT V** **Communication Skills: Public Speaking:** Importance of Public speaking for professionals. The art of Speaking - Forget the fear of presentation, Symptoms of stage fear, Main reason for speech failure, Stop failures by acquiring Information; Preparation & designing of speech, Skills to impress in public speaking & Conversation, Use of presentation aids & media.

**Study & Examination:** How to tackle examination, How to develop successful study skills.

**Group discussions:** Purpose of GD, What factors contribute to group worthiness, Roles to be played in GD.

**Course Outcomes:**

- The students will be able to develop inner and outer personality exposure;
- The students will be able to develop effective leadership qualities and interacting skills;
- The students will be able to develop positive attitude, motivating skills and develop winning philosophies;
- The students will be able to develop decision-making tools; and
- The students will be able to develop group presentation, public speaking and impressive conversation.

**Text Books:**

1. Basic Managerial Skills for all by E. H. McGrawth, prentice Hall India Pvt. Ltd., 2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

**Reference Books:**

1. How to Develop a Pleasing Personality by Atul John Rego, Better Yourself Books, Mumbai, 2000
2. How to Succeed by Brain Adams, Better Yourself Books, Mumbai, 1969
3. Personality: Classic Theories & Modern Research; Friedman ; Pearson Education, 2006
4. How to Win Friends and Influence People by Dale Carnigie, A. H. Wheeler 2006

**Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:51:43 -08'00'

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

## SCHEME OF TEACHING AND EXAMINATION

## B.E. VI SEMESTER MECHANICAL ENGINEERING

| S. No. | Board of Study | Sub. Code | SUBJECT | PERIODS PER WEEK | | | SCHEME OF EXAM Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1. | Mech. Engg | 337651 (37) | Machine Design – II | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2. | Mech. Engg | 337652 (37) | Energy Systems | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 3. | Mech. Engg | 337653 (37) | Internal Combustion Engines | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4. | Mech. Engg | 337654 (37) | Heat & Mass Transfer | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 5. | Mech. Engg | 337655 (37) | Production Management | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6. | *Refer Table I* | | Professional Elective-I | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 7. | Mech. Engg | 337661 (37) | Machine Design-II Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8. | Mech. Engg | 337662 (37) | Internal Combustion Engines Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 9. | Mech. Engg | 337663 (37) | Production Management Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 10. | Mech. Engg | 337664 (37) | HMT Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 11. | Management | 300665 (76) | Managerial Skills | - | - | 2 | - | - | 40 | 40 | 1 |
| 12. | Mech. Engg | ---------- | Library | - | - | 1 | - | - | - | - | - |
| **Total** | | | | **23** | **6** | **11** | **640** | **120** | **240** | **1000** | **34** |

**L:** Lecture **T:** Tutorial **P:** Practical
**ESE:** End Semester Examination **CT:** Class Test **TA:** Teacher's Assessment

**Note:** Industrial Training of eight weeks is mandatory for B.E. students. It is to be completed in two equal parts. The first part must have been completed in summer after IV semester. The second part to be completed during summer after VI semester after which students have to submit a training report which will be evaluated by college teachers during B.E. VII semester.

**Table – 1**
**Professional Elective – I**

| S. No. | Board of Study | Subject Code | Subject |
|---|---|---|---|
| 1 | Mechanical Engineering | 337671 (37) | Industrial Hydraulics |
| 2 | Mechanical Engineering | 337672 (37) | Control Engineering |
| 3 | Mechanical Engineering | 337673 (37) | Engineering Economics |
| 4 | Mechanical Engineering | 337674 (37) | Composite Materials |
| 5 | Mechanical Engineering | 337675 (37) | Power Plant Engineering |
| 6 | Mechanical Engineering | 337676 (37) | Maintenance and Reliability |
| 7 | Mechanical Engineering | 337677 (37) | Computer Graphics |

**Note (1) – 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a particular academic session.**
**Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.**

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 01:51:59 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering/Mechatronics Engineering** | Semester: | **VI** |
| Subject: | **Machine Design II** | Code: | **337651(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Four Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Note: Design data book by PSG and ISI data sheets are allowed in the examination.**

**Course Objectives**

- To design and analyze coil, leaf and laminated springs.
- To design and analyze spur, helical and bevel gears.
- To design and analyze rolling contact bearings.
- To design and analyze journal bearing.

To design and analyze chain and belt drive.

**Course outcomes:**

- Apply knowledge of machine design for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

**UNIT I** **Spring:** Spring materials and their mechanical properties, equation for stress and deflection, helical coil springs of circular section for tension, compression and torsion, dynamic loading, fatigue loading, Wahl line, leaf spring and laminated spring.

**UNIT II** **GEARS: Spur Gears -** Gear Drives, Classification of Gears, Selection of Type of Gears, Law of Gearing, Force Analysis, Gear Tooth Failures, Selection of Material, Number of Teeth, Face Width, Beam Strength of Gear Tooth, Effective Load on Gear Tooth, Estimation of Module Based on Wear Strength, Lewis equation, Gear Design for Maximum Power Transmitting Capacity, Gear Lubrication.

**UNIT III** **Helical Gears:** Helical Gears, Terminology of Helical Gears, Virtual Number of Teeth, Tooth Proportions, Force Analysis, Beam Strength of Helical Gears, Effective Load on Gear Tooth, Wear Strength of Helical Gears.
**Bevel Gears:** Bevel Gears, Terminology of Bevel Gears, Force analysis, Beam strength of Bevel Gears, Wear Strength of Bevel Gears, Effective Load on Gear Tooth.

**UNIT IV** **Bearings: Rolling Contact Bearings -** Types of ball and roller bearings, selection of bearing for radial and axial load, bearing life, Mounting and lubrication, shaft scales – contact type and clearance type.
**Journal Bearings:** Types of lubrication, viscosity, Hydrodynamic theory of lubrication, Sommerfeld number, heat balance, self-contained bearings, bearing materials.

**UNIT V** **Chain Drives:** Chain drives, roller chains, geometric relationships, dimensions of chain components polygonal effect, power rating of roller chains.
**Belt Drives:** Flat and V-belts, belt constructions, geometrical relationships for length of the belt, analysis of belt tensions, condition for maximum power, selection of flat & V-belts, adjustment of belt tensions, Wire ropes, stresses in wire ropes

**TEXT BOOKS:**

1. Design of Machine Elements - V.B. Bhandari, TMH Publications, Delhi
2. Machine Design - Shigley – McGraw Hill, DelhiNoida

**REFERENCE BOOKS:**

1. Machine Design - Movnin – MIR Publishers, Moscow
2. Machine Design - Fundamental & Application – Gope –PHI, New Delhi
3. Machine Design - Sharma & Agrawal – Katson, New Delhi
4. Principles of Mechanical Design - R. Phelan – McGraw Hill, New Delhi.
5. Machine Design – Sundarajamoorthy & Shanmugum– Anuradha, Chainnai

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:52:15 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Energy Systems** | Code: | **337652(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives**

- To understand the construction and operation of various jet and rocket engine
- To analyze jet engine and rocket engine from fluid and thermodynamic principle
- To study important non-conventional energy resources and the technologies for harnessing these.

**Course Outcome:**

- Demonstrate a basic understanding of jet and rocket engine design, function and performance.
- Acquire knowledge and hands-on competence in the design and development of mechanical systems.
- Compare different non-conventional energy resources and choose the most appropriate based on local conditions
- Perform simple techno-economical assessments of non-conventional energy resources
- Perform and compare basic environmental assessments of non-conventional energy resources and conventional fossil fuel systems
- Design renewable/hybrid energy systems that meet specific energy demands, are economically feasible and have a minimal impact on the environment

**UNIT I** **Propulsion Devices:** Types of jet engines, Ram Jet, pulse jet, Turbojet, Turbo propulsion, principle and operation. Energy flow through jet and variation of pressure and temperature, thrust equation, specific thrust and velocity of fluid. Thermodynamics of turbojet, efficiency & performance, parameters affecting performance, after burn, Injection of water & alcohol mixture.

**UNIT II** **Rocket Propulsion:** Basic theory, Physics equations, classifications, types of rocket engines, liquid propellant rockets, efficiency and performance, orbital & escape velocity application of space flight.

**UNIT III** **Non-Conventional Energy Conversion:** Classical sources of energy crisis and search for alternative sources of energy. **Solar energy:** Introduction,, earth sun angles, resolution, solar measurement, collection of solar energy, flat plate and focusing collector analysis, calculations ,design parameters.
Applications of solar energy. Introduction to photovoltaic cell energy conversion techniques.

**UNIT IV** **Bio-Mass:** Introduction, Bio-mass conversion technologies, bio-gas generation, classification of bio-gas plant, Gasifiers, Gobar gas plant, applications. **Wind Energy:** Basic principles of wind energy conversion, wind energy estimation, site selection consideration, basic components of wind energy conversion system, classification, advantages & disadvantages of WECS.

**UNIT V** **Additional Alternate Energy Sources & Improved Energy Utilization:** Fuels cell technology, wave energy conversion, tidal energy conversion, ocean thermal energy conversion (OTEC). Principle of Magneto hydrodynamics (MHD )power system, types of MHD system, advantages, materials for MHD system.
Geothermal energy, nature of geothermal fields, geothermal sources, prime movers for geothermal energy, advantages, disadvantages of geothermal energy over other energy forms, its application.

***TEXT BOOKS***

1. Fundamentals of Compressible Flow with Aircraft and Rocket Propulsion – S.M.Yahya – New Age International Publishers, Delhi
2. Non-Conventional Energy Sources - G.D. Rai – Khanna Publishers

***REFERENCE BOOKS***

1. Gas Dynamics & Space Propulsion – N. Shanmugam, M. Palani – Anuradha Agencies
2. Fundamental of Compressible Fluid Dynamics – P. Balachandran – PHI
3. Gas Turbine Theory & Jet Propulsion – J.K. Jain – Khanna Publishers,Delhi
4. Solar Energy -Fundamentals and Applications– H.P.Garg & J. Prakash – TMH ,Delhi
5. Non Conventional Energy Sources – Saeed, Hasan and DK Sharma, SK Kataria,Delhi
6. Non Conventional Energy Resources- DSChauhan, and Srivastava, New Age,Delhi
7. Biogas Technology-B.T.Nijaguna,- New Age ,Delhi
8. Solar Energy – Principles of Thermal Collection and Storage- R Sukhatme- THM Delhi
9. Non Conventional Energy Resources: Alternative Energy Sources And Systems- R.K.Singhal, Kataria ,Delhi

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:52:29 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Internal Combustion Engine** | Code: | **337653(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives**

- To study classifications of internal combustion engine.
- To understand how and why actual cycles deviate from air standard cycle and fuel-air cycle.
- To understand combustion in spark ignition engine and diesel engines.
- To impart knowledge on fuel and its specifications
- To impart knowledge about carburetion, gasoline injection and diesel injection.
- To impart knowledge about ignition, cooling, lubrication and governing systems.
- To impart knowledge about various engine performance characteristics and its testing

**Course Outcome:**

- Demonstrate a basic understanding of engine design, function and performance.
- Acquire knowledge and hands-on competence in the design and development of mechanical systems.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Demonstrate an understanding of the relationships between the design of the internal combustion engine and environmental issues

**UNIT I** **a) Introduction:** Internal and external combustion engine and their comparison, four stroke cycle S.I. and C.I. engine, two stroke engine, comparison of four stroke and two stroke engines, comparison of S.I. and C.I. engine, classification of I.C. Engine on various basis Valve timing diagram for S.I. and C.I. engines. Effect of valve timing and engine speed on volumetric efficiency.
b) Fuel-air cycles and actual cycle: Reasons for deviation of actual cycle from air standard cycles, fuel air cycles and their analysis, actual cycles and their analysis. Reasons of ignition advance and injection advance

**UNIT II** **a) Combustion:** Combustion in S.I. engine, stages of combustion, factor influencing the flame speed, the phenomenon of knock in S.I. engine, effect of engine variable on knock, effects of detonation, Pre-ignition, effect of preignition. Combustion in C.I. engine: stages of combustion, factor influencing the delay period,, the phenomenon of knock in C.I. engine, effect of engine variable on knock, comparison between knock in S.I. and C.I. engine.
b) Fuels: Basic requirement of I.C. Engine fuels, requirement of an ideal gasoline, structure of petroleum, effect of fuel structure on combustion, volatility of liquid fuels, ASTM distillation curve, effect of volatility on engine performance - cold starting, hot starting, vapour lock, acceleration, carburetor icing, and crank case dilution. Antiknock rating of fuels, CCR, HUCR, Octane number, performance number, Cetane number. Dopes.

**UNIT III** **Carburetion:** Properties of air-petrol mixtures, mixture requirement, simple carburetor, limitation of simple carburetor, Nozzle lip, venturi depression, calculation of fuel jet and venturi throat diameter for given air fuel ratio. Element of complete carburetor, main metering system-compensating jet device, Idling system, power enrichment system, acceleration pump and cold starting system. Gasoline injection system: Disadvantages of carburetor, Type of injection system, components of injection system, Electronic gasoline fuel injection system, multi-point fuel injection system, working, advantages and disadvantages.

**UNIT IV** **Injection System for C.I. Engines:** Requirement, type of injection systems, Bosch fuel injection pump, type of fuel injector, type of nozzle, atomization, spray penetration and spray direction. Electronic diesel injection System.
**Ignition System:** Battery and magneto ignition system and their comparative study, spark plug heat range, electronic ignition system, firing order, Ignition timing, centrifugal and vacuum ignition advance.
**Cooling System:** Cooling requirement, air cooling, liquid cooling, type of liquid cooling system, advantage and disadvantage of air cooling and water cooling system, Antifreeze mixture.
**Lubrication System:** Function of lubricating system, Classification of lubricating system, mist lubrication system, dry sump lubrication, wet sump lubrication-splash, and modified and full pressure system
Governing: Necessity of governing, methods of governing-hit and miss governing, quantity governing and quality governing

**UNIT V** Testing and Performance: Performance parameters, measurements of brake power, indicated power, measurement friction power-Willan's line method, Morse test, motoring test, measurement fuel consumption, and measurements of air consumption, exhaust gas calorimeter. Calculation of various performance parameter, heat balance sheet and heat balance diagram. Performance curves of S.I. and C.I. Engine at full throttle variable speed operation and at constant speed variable load operation.

**TEXT BOOKS:**

1. A Course in Internal Combustion Engines – M.L. Mathur & R.P. Sharma – Dhanpat Rai & Sons,Delhi
2. Internal Combustion Engine – V. Ganeshan – TMH, New Delhi

**REFERENCE BOOKS:**

1. Internal Combustion Engine – R. Yadav – Central Publishing House, Allahabad
2. A Course in Internal Combustion Engine – V.M. Domkundwar – Dhanpat Rai & Sons,Delhi
3. Internal Combustion Engines – R.K.Rajput – Laxmi Publications
4. Internal Combustion Engine Fundamentals-John B. Heywood- McGraw Hill International, Delhi
5. Fundamental of Internal Combustion Engine – Paul W. Gill, James H. Smith, Eugene – Oxford and IBH Publishing Company
6. Fundamental of Internal Combustion Engine- H.N. Gupta-PHI- New Delhi
7. Engineering Fundamentals of the Internal Combustion Engine- Pulkrabek, Willard W-PHI Delhi
8. Elements of Internal Combustion Engines- A R Rogowski- TMH. New Delhi
9. A Textbook of Internal Combustion Engine Dr.R.K.Singhal- Standard Book House, Delhi
10. Automotive Mechanics: Principles And Practices- W.H.Crouse, and D.L. Anglin, TMH ,Delhi

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:52:43 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Heat & Mass Transfer** | Code: | **337654(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives**

- To provide a fundamental understanding of the principles of heat transfer due to conduction, convection and radiation.
- To achieve an understanding of the basic concepts of phase change processes.
- To understand the principles of mass transfer.
- To learn about the design of heat exchangers.

**Course Outcome:**

- Apply knowledge of heat transfer for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts of heat and mass transfer in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

**UNIT I** **Introduction:** Heat transfer, Difference between heat transfer and thermodynamics, Various modes of heat transfer, Fourier's, Newton's and Stefan Boltzman's Law, Combined modes of heat transfer, thermal diffusivity, overall heat transfer coefficient. The thermal conductivity of solids, liquids and gases, factors influencing conductivity
**Conduction :** Heat conduction without heat generation: Derivation of general differential equation of heat conduction in Cartesian co-ordinate. One dimensional steady state conduction, linear heat flow through a plane and composite wall, heat conduction without heat generation in cylinder and sphere, critical thickness of insulation. Conduction with heat generation in flat wall and solid cylinder.

**UNIT II** **Heat transfer from extended surface (Fins):** Types of fins, Fin equation for uniform cross sectional area (rectangular profile), Solution for infinite length, negligible heat loss from fin tip, finite long and heat transfer from fin tip. Fin effectiveness and efficiency. Error in temperature measurement from thermometer.
**Transient/Unsteady State Heat Conduction:** Lumped system analysis, criteria for lumped system analysis, solution of transient heat conduction in large plane wall, long cylinders and sphere through Heisler's chart.

**UNIT III** **Forced Convection:** Physical Mechanism of Forced Convection, Dimensional analysis for forced convection, velocity and Thermal Boundary layer, Flow over plates, Flow across cylinders and spheres, Flow in tubes, Reynold's analogy.
**Natural Convection:** Physical Mechanism of Natural Convection, Dimensional analysis of natural convection; empirical relationship for natural convection.

**UNIT IV** **Two Phase Heat Transfer:** Boiling heat transfer, Pool boiling, boiling regimes and boiling curve, heat transfer correlations in pool boiling. Condensation heat transfer, Film condensation, derivation for the average heat transfer coefficient 'h' for the case of laminar film condensation over vertical plate, Heat transfer correlation for inclined plates, vertical tubes, Horizontal bank tubes.
**Introduction to Mass Transfer :** Mass and mole concentrations, molecular diffusion, eddy diffusion, Molecular diffusion from an evaporating fluid surface, Introduction to mass transfer in laminar and turbulent convection Combined heat and mass transfer, the wet and dry bulb thermometer.

**UNIT V** **Heat Exchangers:** Different types of heat exchangers; Determination of heat exchanger performance, Heat exchanger transfer units, Analysis restricted to parallel and counter flow heat exchanger (LMTD and NTU method)
**Thermal Radiation:** Introduction, absorbtivity, reflectivity & transmissivity. Concept of black body & grey body. Emissive power of surface, Kirchoff's law, emissivity , Concept of shape factor.
Radiat heat exchange between two parallel grey surface and concentric cylinders.
Errors in temperature measurement due to radiation. Concept of irradiation and radiosity.

**TEXT BOOKS:**

1. Heat Transfer – S.P. Sukhatme – TMH,Delhi
2. Heat & Mass Transfer – D.S. Kumar – S.K. Kataria & Sons,Delhi

**REFERENCE BOOKS:**

1. Heat transfer- C P Arora, TMH,Delhi
2. Heat & Mass Transfer – R, Yadav, Central Publishing House, Allahabad
3. Heat & Mass Transfer – R.K. Rajput, S.Chand, Delhi
4. Heat & Mass Transfer – P.K. Nag, TMH, Delhi
5. Heat Transfer – J.P. Holman – TMH, Delhi
6. Heat Transfer – A Practical Approach – Yunus A. Cengel – McGraw Hill ,Delhi
7. Heat Transfer – P.S. Ghoshdastidhar – Oxford University Press
8. Heat And Mass Transfer Fundamentals And Applications- Cengel, Yunus, A and AJ Ghajar, TMH, Delhi
9. A Course In Heat And Mass Transfer- S.C. Arora & S Donkundwar, S- Dhanpat Rai,Delhi
10. Heat and Mass Transfer Data Book- C.P.Kothandaraman C.P. & S. Subramanyan , New Age, Delhi

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:52:58 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Production Management** | Code: | **337655(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**COURSE OBJECTIVES:**

1. To understand the basic concept of production management.
2. To understand the concept of breakeven analysis.
3. To learn the different methods to solve problems in sales forecasting.
4. To understand the concept of planning, organizing & controlling.
5. To understand the various models of inventory control.
6. To understand the methods of purchasing & store keeping.
7. To understand & analyze the various methods of quality control problems.

**COURSE OUTCOMES:**

1. Acquire knowledge recognize and perform the job of a competent production manager.
2. Identify, analyze and solve production engineering related problemsin planning, decision-making, and expense control.
3. Understand the performance to establish setting goals & predicting expenses and planning budgets.
4. Work effectively with engineering and science teams as well as with multidisciplinary designs.
5. Skillfully use modern engineering tools and techniques in various production areas.
6. Additionally, this course will help the student to be a committed to quality, timeliness, and continuous improvement.
7. Pursue higher studies.

**UNIT I** **Production Management:** definition, objectives, scope, benefits, functions of production management, place of production management in an organization, types of production system, Product life cycle, product design and development, production cycle.
**Costing and Cost Analysis:** Elements of costs, Break even analysis, Incremental costs, make or buy decision.

**UNIT II** **Sales Forecasting**: Purposes, methods -Delphi, linear regression, economic indicators, time-series analysis, adjustment for seasonal variations, moving average, exponential smoothing.

**UNIT III** **Production Planning and Control:** Functions, Organization, Master Scheduling, Aggregate planning and strategies ,Materials Requirement Planning, product structure tree, Routing, Loading Scheduling –forward and backward, Dispatching
–priority rules, Sequencing, Johnson's algorithm for n jobs and two machines, Gantt's chart, Bar chart, Flow process chart.
**Materials Handling:** Principles of materials handling, unit load, Types of materials handling equipment, Relation between materials handling and plant layout.

**UNIT IV** **Material Management:** Objectives and functions of materials management, Organization of materials management.
**Procurement:** Objectives of purchase department, purchase responsibilities and organization, types of purchasing, purchase procedures, Import and Export.
**Stores Keeping:** Stores management, functions of stores, classification of materials, standardization of materials, identification and maintenance of layout of stores, physical control of materials, pricing of stores, issuing of stores.
**Inventory Control:** Objective, scope and functions of inventory control, inventory control techniques, economic ordering quantity, periodic ordering quantity, A.B.C. analysis, General idea regarding inventory control under risk and uncertainty.

**UNIT V** **Quality Control:** Difference between inspection and quality control, acceptance sampling, procedure's risk and consumer's risk, operating characteristic curve for single sampling plan, AOQL
Quality of conformance, quality of design, economics of quality, SQC charts for variables and attributes.
Introduction to JIT manufacturing, Kanban system.

**TEXT BOOKS:**

1. Production and operation Management–By P. Ramamurty –New Age International Publication,New Delhi
2. Production and operation Management –By R. Mayer –TMH,New Delhi
3. Quality Planning and Analysis, Juran and Gryna

**REFERENCE BOOKS:**

1. Industrial Engineering & Production Management –Martand Telsang, S.Chand & Co
2. Production and operations Management by –Adam and Ebert –PHI ,New Delhi
3. Production planning and Control –By Samuel Eilon, Navneet Prakashan Ltd., Bombay

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:53:19 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Machine Design - II Laboratory** | Code: | **337661 (37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**Students have to solve at least four design problems out of the below mentioned topics**

- Design of gears of a two stage gear-box (spur, helical or bevel)
- Design of a leaf spring for a given specification
- Design of chain drive for a given specification
- Design of belt drive for a given specification
- Design of rolling element bearing for a given specification
- Design of journal bearing for a given specification

**B. Writing Computer programme for conventional design:** Students are required to write computer program and validate it for the design of machine components done in theory subject

**C. Mini Project:** Each student will be given a real life problem (as below) for the complete design of a subsystem/system using either manual calculation with the help of design handbook or through computer programme, if needed. This will be done as home assignment to be submitted at the end of the semester.

- Design the transmission system for an overhead crane assuming suitable data
- Design the transmission system for a lathe machine assuming suitable data
- Design the transmission system for an automobile assuming suitable data
- Design the transmission system for a shaper machine assuming suitable data
- Design the transmission system for a flour mill assuming suitable data
- Design the transmission system for a crusher machine assuming suitable data

The design must contain design of shafts, keys, couplings, clutch, pulleys/chain/gear drives, and bearings. The results must be plotted in the form of two dimensional drawings (manually/using software) both in component level and assembly level.

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:53:32 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Internal Combustion Engine Laboratory** | Code: | **337662 (37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of Experiments (Minimum Six experiments and Four studies are to be performed by each student)**

1. Study of IC Engine. (Engine components, material used and engine nomenclature)
2. Study of working of four stroke petrol engine and four stroke diesel engine with the help of cut section models.
3. Study of working of two stroke petrol and two stroke diesel engine with the help of cut section models.
4. Study of fuel supply system of a petrol engine (fuel pump and simple carburettor)
5. Study of complete caurburettor
6. Study of Petrol Injection System.
7. Study of fuel supply system of a Diesel engine (fuel pump and fuel injector)
8. Study of Ignition systems of an IC Engine (Battery and Magneto ignition system and Electronic ignition system).
9. Study of Lubrication system of an IC Engine (Mist, Splash and Pressure lubrication)
10. Study of cooling systems of an IC Engine (Air cooling and water cooling)
11. To conduct a performance test on diesel engine to draw heat balance sheet for given load and speed.
12. To determine friction power of diesel engine by Willan's line or fuel rate extrapolation method.
13. To conduct a performance test on the variable compression ratio engine and to draw the heat balance sheet for given compression ratio, speed and load and plot the performance curves.
14. To conduct a performance test on a four cylinder four stroke petrol engine and to draw the heat balance sheet and performance curves.
15. To calculate the indicated power, friction power and mechanical efficiency of four stroke four cylinder petrol engine at full load and rated speed by Morse test.
16. To draw the valve timing diagram of a four-stroke S.I. or C.I. Engine using experimental setup.
17. Analysis of engine exhaust gases using Orsat apparatus / gas analyzer.

**LIST OF EQUIPMENTS/MACHINES REQUIRED**

1. Model of Two & Four Stroke Petrol Engine
2. Model of Two & Four Stroke Diesel Engine
3. Single Cylinder Actual S.I.Engine in Cut Section
4. Single Cylinder Actual C.I..Engine in Cut Section
5. Four Stroke, Four-Cylinder Petrol Engine in Cut Section
6. Carburettors in Cut Section / Without Cut Section.
7. Model of Petrol Injection System
8. Bosch Fuel Pump in Cut Section
9. Nozzles in Cut Section
10. Diesel Injectors in Cut Section
11. Four Stroke Single-Cylinder Diesel Engine Test Rig
12. Variable Compression Ratio Engine Test Rig
13. Four Stroke Multi-Cylinder Petrol Engine Test Rig
14. Experimental Setup for Drawing Valve Timing Diagram Of Four Stroke S.I. or C.I. Engines.
15. Orsat Apparatus / Gas Analyzer for Engine Exhaust Gas Analysis.

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:53:47 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Production Management Laboratory** | Code: | **337663 (37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

The lab work is intended to have exposure and enhance the knowledge of students in production/ operation Management field acquired in the theory class. The basic approach followed is an information decision – making approach using various cases / small projects. These cases / projects deal with the kind of information that is present in the real world of the system and can also be solved using simulation based software. Simulation software provides excellent ease of learning and to rapidly achieve a high degree of self-sufficiency in model building.
Considering any one manufacturing product, the following practical problems are to be solved by the students for the Production Management laboratory.

1. Case study on Sales Forecasting.
2. Product Development process including its major operations, production process etc of a simple product.
3. Study of the Organization and their process layout.
4. Material Requirement Planning of any industrial product.
5. Study of Material handling systems in any manufacturing organization.
6. Analysis of Inventory control in an organization.
7. Production cost study with Break Even Analysis in a manufacturing organization.
8. Quality Analysis of a product carried out in a manufacturing organization.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:54:04 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Heat & mass Transfer Laboratory** | Code: | **337664 (37)** |
| Total Lab Periods: | **24** | Batch Size: | **30** |
| Maximum Marks: | **40** | Minimum Marks: | **20** |

**List of Experiments (At least Ten experiments are to performed by each student):**

1. To Determine Thermal Conductivity of Insulating Powders.
2. To Determine Thermal Conductivity of a Good Conductor of Heat (Metal Rod).
3. To Measure the thermal Conductivity of Liquid.
4. To determine the transfer Rate & Temperature Distribution for a Pin Fin.
5. To Measure the Emmissivity of the Test plate Surface.
6. To Determine Stefan Boltzman Constant of Radiation Heat Transfer.
7. To Determine the Surface Heat Transfer Coefficient For Heated Vertical Cylinder in Natural Convection.
8. Determination of Heat Transfer Coefficient in Drop Wise & Film Wise condensation.
9. To Determine Critical Heat Flux in Saturated Pool Boiling.
10. To Study Performance of Simple Heat Pipes.
11. To Study and Compare LMTD and Effectiveness in Parallel and Counter Flow Heat Exchangers.
12. To Find the Heat transfer Coefficient in Forced Convection in a tube.
13. To determine the total thermal conductivity and thermal resistance of the given compound resistance in series.
14. To find out the thermal conductivity of given slab material.
15. To determine the individual thermal conductivity of different lagging in a lagged pipe.
16. To study the rates of heat transfer for different materials and geometries
17. To understand the importance and validity of engineering assumptions through the lumped heat capacity method.
18. Testing and performance of different heat insulators.

**List of Equipments/Machines required:**

1. Thermal conductivity of insulating powder apparatus
2. Thermal conductivity of metal bar apparatus
3. Thermal conductivity of liquid apparatus
4. Transfer rate and temperature distribution for a pin fin apparatus
5. Emmissivity of the test plate surface apparatus
6. Stefen-Boltzman constant of radiation of heat transfer apparatus
7. Surface heat transfer coefficient for heated vertical cylinder in natural convection apparatus
8. Heat transfer coefficient in drop wise and film wise condensation apparatus
9. Critical heat flux in saturated pool boiling apparatus
10. Performance of different heat pipe apparatus
11. Heat transfer rate through heat exchanger apparatus
12. Heat transfer coefficient in forced convection of air in a tube apparatus
13. Heat transfer through composite wall apparatus
14. Thermal conductivity of insulating slab apparatus
15. Heat transfer through lagged pipe apparatus
16. Unsteady state heat transfer apparatus
17. Testing and performance test rig for heat insulators.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:54:21 -08'00'

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Name of Program: | **Bachelor of Engineering** | | |
| Branch: | **Common to All Branches** | Semester: | **VI** |
| Subject: | **Managerial Skills** | Code: | **300665 (76)** |
| No. of Lectures: | **2/Week** | Tutorial Period: | **NIL** |
| Total Marks in ESE: | **NIL** | Marks in TA: | **40** |

Minimum number of Class Tests to be conducted: **Two**

**Objective:**
The course is introduced to develop managerial skills tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Managerial skills are essential for overall professional development of an individual apart from gaining technical knowledge in the subject.

**Course Objectives**
Upon completion of this course, the student shall be able
- To define and explain the concept of managerial, written and oral communication skill;
- To understand the leadership skill;
- To develop self-appraisal and understand distinction between leader and manager;
- To develop positive attitude and thinking; and
- To understand managerial functions and develop creativity.

**UNIT I** **Managerial Communication Skills:** Importance of Business Writing: writing business letters, memorandum, minutes, and reports- informal and formal, legal aspects of business communication, oral communication- presentation, conversation skills, negotiations, and listening skills, how to structure speech and presentation, body language.

**UNIT II** **Managerial skills - Leadership**: Characteristics of leader, how to develop leadership; ethics and values of leadership, leaders who make difference, conduct of meetings, small group communications and Brain storming, Decision making, How to make right decision, Conflicts and cooperation, Dissatisfaction: Making them productive.

**UNIT III** **Proactive Manager:** How to become the real you: The journey of self-discovery, the path of self-discovery, Assertiveness: A skill to develop, Hero or developer, Difference between manager and leader, Managerial skill check list, team development, How to teach and train, time management, Stress management, Self-assessment.

**UNIT IV** **Attitudinal Change:** Concept of attitude through example, benefits of right attitude, how to develop habit of positive thinking, what is fear? How to win it? How to win over failure? How to overcome criticism? How to become real you? How to Motivate? How to build up self confidence?

**UNIT V** **Creativity**: Creativity as a managerial skill, Trying to get a grip on creativity. Overview of Management Concepts: Function of Management: Planning, organizing, staffing, controlling.

**Course Outcome**
- The students will be able to develop formal and informal, negotiation, written and oral communication skill;
- The students will be able to develop manage groups, resolve conflicts and leadership skill and decision making qualities;
- The students will be able to develop self-appraisal, teaching, training and managing stress and time;
- The students will be able develop positive thinking, motivating team members and winning race; and
- The students will be able to develop creativity and fundamental management functions.

**Text Books:**
1. Basic Managerial Skills for all by E.H. Mc Grawth, Prentice Hall India Pvt Ltd,2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

**Reference Books:**
1. How to develop a pleasing personality by Atul John Rego, Better yourself bools, Mumbai,2006
2. The powerful Personality by Dr. Ujjawal Patni & Dr. Pratap Deshmukh, Fusion Books, 2006

How to Success by Brian Adams, Better Yourself books, Mumbai, 1969

DIPALI SOREN TUDU Digitally signed by DIPALI SOREN TUDU Date: 2023.11.09 01:54:35 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Industrial Hydraulics (Professional Elective – I)** | Code: | **337671(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objective**

- To Learn basic concepts and terminologies of hydraulics
- To understand construction and working of various hydraulic power system
- To understand the constructional details of pumps and actuators
- To understand various valves and auxiliaries & rectification of their problems.
- To understand the hydraulic circuits & develop Hydraulic Circuits
- To understand accumulators and intensifiers

**COURSE OUTCOMES:**

- Acquire knowledge and hands-on competence in applying the concepts of industrial hydraulics in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

**UNIT I** **Fluidics:** Technology, Terminology, types of fluid logic elements, amplifiers, logic states, methods of obtaining input signals and power outputs, application of fluidics, third generation fluidics.

**UNIT II** **Hydraulic Fluid:** Types of hydraulic fluids, properties of fluid, selection of fluids, JIC/ISO symbols for hydraulic circuits.
**Fluid Power System:** Components, advantages, applications in the field of Machine Tools, material handling, presses, mobile and stationary machines, clamping & indexing devices etc., transmission of power at static and dynamic states.

**UNIT III** **Pumps:** Types, classification, principle and working of vane, gear, radial and axial plunger pumps, power and efficiency calculations, selection of pumps for hydraulic transmission.
**Actuators:** Linear and rotary actuators, hydraulic motor types & construction methods of control of acceleration, types of cylinder and mountings, calculation of piston velocity, thrust under static and dynamic application.

**UNIT IV** **Control of Fluid Power:** Principle, working types of the following valves, pressure control, direction control, flow control, relief valves, sequence values etc.

**UNIT V** **Hydraulic Circuits:** Meter in, meter out circuits, Pressure control for cylinders, Flow divider circuits, Circuit illustrating use of pressure reducer valves, sequence valve, counter balance valves, unloading valves with the use of electrical control, accumulators etc.
**Accumulators and Intensifiers:** Types, function, application, selection and design procedure.

**TEXT BOOKS**

1. Hydraulic Machines including fluidics – Dr. Jagdish Lal, Metropolitan Book Company, New Delhi
2. Introduction to Fluid Power – Sahastrabadhe, Nirali Prakashan, Pune

**REFERENCE BOOKS**

1. Industrial Hydraulics manual by Vickers
2. Industrial Hydraulics – Pipenger & Hicks, Mc Graw Hill Company, New York
3. Hydraulics Vol. 1 & 2 by Rexroth
4. Fluid Power – Goodwin

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:54:49 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Control Engineering (Professional Elective – I)** | Code: | **337672(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives:**

- To understand the fundamental and types of control system.
- To know the basic theories of automatic control system.
- To acquire the knowledge of basic control system like hydraulic, pneumatic and electrical control system in detail.
- To understand the concept of logic controllers.
- To know the basic control system particular reference to mechanical system.

**Course Outcomes:**

- Acquire knowledge and hands-on competence in applying the concepts of control engineering in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

**UNIT I** **BASIC CONTROL SYSTEM:** System differential equation of electrical, mechanical, thermal, hydraulic and electromechanical network, analogy.

**UNIT II** **THEORY OF AUTOMATIC CONTROL:** Concept of feedback referred to linear control systems in general, e.g. displacement and speed control, process control, definition and terminology, open loop and closed loop systems and its advantages. Block diagrams and single flow graph representation of a physical system, block diagram algebra, transfer function from a block diagram. Basic control actions and controllers on off. Proportional, derivative and integral controllers, steady – state analysis.

**UNIT III** **HYDRAULIC SYSTEM:** Characteristic of hydraulic components control valves, sources of hydraulic power hydraulic meters, pistons and transmission, elements of circuit design, Accumulation control circuit such as position control and speed control circuit.
Hydraulic Systems: Reciprocating Pump, pressure intensifier, cranes, ram, press, lift, coupling and hydraulic controls. Maintenance of hydraulic system: Fire Foam resistance oxidation and corrosion of hydraulic pipe sealing devices, Filters regulator, problems caused by gas in hydraulic circuit cooling of power pack

**UNIT IV** **PNEUMATIC SYSTEMS:** Pneumatic power supply, Amplifiers with different controlling actions, Pneumatic valves and cylinders, theory of four way and pilot valves.
**ELECTRICAL SYSTEMS:** Speed control of D.C. motors, Remote center positional serve mechanism (including effect of gearing between motor and load).

**UNIT V** **PROGRAMMABLE LOGIC CONTROLLERS:** Introduction, Micro PLC, Programming a PLC, Logic Functions, input & output Modules, PLC Processors, PLC Instructors, Documenting a PLC System, Timer & counter Instructions.
**CONTROL COMPONENTS:** Pneumatic relays, control mechanisms for liquid level, boiler feed control, pressure regulation, throttle valve, temperature regulations and industrial process regulation.

**Text Books:**

1. Modern Control Engineering, By Ogata K, Pearson Education
2. Control Systems Engineering By Nagrath & Gopal, New Age International Publishers
3 Process Control and Instrumentation / Technology – C.D. Johnson – Prentice Hall of India, New Delhi.

**Reference Books:**

1. Automatic Control System By Kuo, Benjamin.C, Prentice Hall
2. Control Systems Engineering By Nise, Norman S John wiley & Sons, New York
3. Control Systems Engineering By S K Bhattacharya , Pearson Education
4. Control Engineering By D.Ganesh Rao, K. Chennavenkatesh ,Pearson Education

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:55:03 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering/Mechatronics Engineering** | Semester: | **VI** |
| Subject: | **Engineering Economics (Professional Elective – I)** | Code: | **337673(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives**

- To prepare engineering student to analyze cost/revenue data and carry out economic analyses in the decision making process to justify or reject alternatives/projects on an economic basis.
- To prepare engineering students to function in the business and management side of professional engineering practice.

**Course Outcome:**

- Be able to make intelligent comparisons of project alternatives during the planning and implementation phases.
- Be able to perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
- Be able to perform and evaluate payback period and capitalized cost on one or more economic alternatives.
- Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.

**UNIT I** **Introduction & Scope:** Engineers and Economics, Utility of its study, Managerial Economics, Nature and scope, basic terms and concept of economics like goods, kinds of goods, utility, value and wealth. Theory of Demand and supply, Elasticity of demand. Meaning, Characteristics, Objectives of Firm, Managerial and behavioral theories of a firm.

**UNIT II** **Pricing and Market Competition:** Industrial Establishments, various types of industrial establishments, Sole traders, partnership, joint stock company,types of shares, financial goals of organization. Pricing Perspective approach: Pricing policy and price influencing factors, Basic data for price fixation. Market forms & Competition – Pure and perfect competition, monopoly, monopolistic competition, price determination under perfect and monopolistic competition.

**UNIT III** **Economy, Monetary & Fiscal Policy:** Balance of payments – money and monetary policy, fiscal policy, Inflation, measuring employment and unemployment. Credit policies Concept and measurement of national income. Working Capital, Factors deciding Working capital, Return on investment, Financial Planning.

**UNIT IV** **Cost and Costing Factors:** Cost Analysis – Types and Elements of cost, cost planning and control. Relationship between Average cost & Marginal cost, Short run and long run average cost curves.

**UNIT V** **Depreciation & Capital Budgeting:** Depreciation and its methods of calculation, marginal costing, break – even analysis, profit planning and forecasting, Capital budgeting, cost of capital, Appraising projects profitability.

**TEXT BOOKS:**

1. Managerial Economics – P.L. Mehta – S. Chand and sons
2. Economics Michael Parkin, Addison Wesley Longman Publication, International Edition.
3. Elementary Economics Theory – K.K. Dewett – S. Chand & Company

**REFERENCE BOOKS:**

1. Economics – Samuelson, Pauls & W.D. Nordhan – McGraw Hill
2. Advanced Cost Accounting – Nigam, Sharma – Himalaya Publishing House
3. Managerial Economics – Mote and Paul - TMH
4. Macro Economics for management Students – A. Nag - Macmillan India Ltd
5. Cost Accounting – Jain & Narang - Kalyan Publishers
6. Managerial Economics - G.S. Gupta – TMH
7. Engineering Economics – J.L. Riggs, D.D. Bedforth , Randhawa – TMH
8. Essentials of Managerial Economics – Reddy & Ganesh – Himalaya Publishing Hosue
9. Managerial Economics – Joel Dean - PHI

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:55:19 -08'00'

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering/Mechatronics Engineering** | Semester: | **VI** |
| Subject: | **Composite Materials (Professional Elective – I)** | Code: | **337674(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course objective**

- To be familiar with classification & characteristics of composite material and their application.
- To gain the knowledge about manufacturing methods, testing and environmental issue related with composite material.
- To train students to be able to design composite structures, select composite materials, conduct stress analyses of selected practical applications using laminated plate theories appropriate strength criteria.
- To be familiar with the properties and response of composite structures subjected to mechanical loading under static and cyclic conditions.

**Course outcome**

- Acquire knowledge and hands-on competence in applying the knowledge of composite materials in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components in the field of engineering.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

**UNIT I** **Introduction to Composites:** Definition, classification/ types and characteristics of composite materials; Basic composite constituents – fiber and matrix; Properties of unidirectional long fiber and short fiber composites; Polymeric materials and polymeric composites; Honeycomb and Sandwich Composite Structure; Application areas of composites.

**UNIT II** **Manufacturing, Testing and Environmental Issues:** Moulding, pultrusion, filament winding, other advanced manufacturing techniques; Quality inspection and testing – uniaxial tension test, uniaxial compression test, shear test, fracture toughness testing of composites. Environmental Issues related with composite manufacturing and their applications.

**UNIT III** **Material Properties:** Orthotropic and Anisotropic materials; properties relating stress to strain, properties relating temperature to strain, properties relating moisture to strain, properties relating stress (or strain) to failure, Failure Criterion – Maximum Stress and Maximum Strain; Review of force tensors, stress tensors, strain tensors.

**UNIT IV** **Elastic Response Analysis:** Hooke's law for orthotropic and anisotropic materials; Linear Elasticity for Anisotropic Materials; Unidirectional composite laminates; Rotations of Stresses, Strains; Residual Stresses; Stress and environmental effects on composites behaviour.

**UNIT V** **Composite Laminates:** Thin-plate theory, classical lamination theory; Angle-ply and cross ply laminates; Static, dynamic and stability analysis for simple cases of composite plates; Interlaminar stress behaviour; Composite Joints; Design with Composites.

**TEXT BOOKS**

1. Agarwal, B. D., and Broutman L. J., "Analysis and Performance of Fiber Composites", John Wiley and Sons, New York.
2. Mallick, P. K., "Fiber Reinforced Composites: Materials, Manufacturing and Design", Marcel Dekker Inc.
3. Mukhopadhyay, M., "Mechanics of Composite Materials and Structures", University Press, India.

**REFERENCE BOOKS**

1. Halpin, J. C., "Primer on Composite Materials, Analysis", Techomic Publishing Co.
2. Mallick, P. K. and Newman, S., "Composite Materials Technology: Processes and Properties", Hansen Publisher, Munish.
3. Hyer, M. W., "Stress Analysis of Fiber – Reinforced Composite Materials", McGraw-Hill, New York.
4. Issac M. Daniel and Ori Ishai, "Engineering Mechanics of Composite Materials", Oxford University Press-2006, First Indian Edition – 2007.



DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:55:37 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Power Plant Engineering (Professional Elective – I)** | Code: | **337675(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives**

- To impart knowledge on sources of energy and types of power plants
- To understand construction and working of Steam Power Plants, Hydro Electric power station, diesel power station, and Nuclear Power Station.
- To impart knowledge about various performance characteristics and its analysis
- To impart knowledge about variable load problem
- To impart knowledge about terms and factors associated with power plant economics

**Course Outcome:**

- Demonstrate a basic understanding of various types of power plants.
- Acquire knowledge and hands-on competence in the design and development of mechanical systems associated with power plants.
- Compare different energy resources and choose the most appropriate based on local conditions
- Perform simple techno-economical assessments of energy resources
- Design power plant that meet specific energy demands, that are economically feasible and have a minimal impact on the environment

**UNIT I** **Elements of Power Plant:** General Sources of power, Importance of Central Power Stations, types of power stations – steam, nuclear, diesel and hydro – Elements of modern power stations (Steams only) brief layout and arrangement of elements and complements, sitting of different power stations, foundation. Elements of Electric power systems primary and secondary distribution substations (in brief)

**UNIT II** **Steam Power Plant:** Steam power plants, selection of working medium, Heat Balance in steam cycles, Heat rates, comparison of efficiencies gas loop, fuels and fuel handling. Equipments, fuel gas cleaning and ash handling. Air pre-heater, feed water pre-heaters, steam re-heaters, deaerators, feed water treatment, pumping and regulation water walls, modern developments in steam boilers, Important instrumentation and piping of gas and water loop. Factors to be controlled from maximum efficiency and variable output.

**UNIT III** **Hydro Electric power station** – Potential power with reference to rainfall and catchments area, Water storage, equipment used in hydro electric power stations. Characteristics of hydraulic turbines. Comparison of the factors governing the cost of hydro steam and diesel power stations.
**Diesel power station** – Suitability of diesel engines for bulk power, advantages and limitations of diesel, power stations, efficiency and heat balance.

**UNIT IV** **Nuclear Power Station:** Evolution of nuclear energy from atoms by fission and fusion. Chain reactions, fission materials, types of reactors, gas cooled, boiling water liquid, metal cooled and fast reactor, arrangements of various elements in a nuclear power station, stem cycles and boilers coolant heat exchangers, Reactor control, Reactor shielding and safety methods.

**UNIT V** **Variable load problems** – Idealized and realized load curves, effect of variable load on plant design and operation variable load operation and load dispatch.
**Power station Economics** – Source of income, cost of plant and production, elements of cost, depreciation and replacement theory of rates.

**TEXT BOOKS:**

1. Power Plant Engineering – P.K. Nag – Tata McGraw-Hill Pub. Com., New Delhi
2. A Course in Power Plant Engineering – S.C. Arora, S.Domkundwar – Dhanpat Rai & Co.

**REFERENCE BOOKS:**

1. Text Book of Power Plant Engineering – R.K. Rajput – Laxmi Publications
2. Power Plant Engineering – P.C. Sharma – S.K. Kataria & Sons
3. Power Plant Engineering – G.R. Nagpal – Khanna Publishers
4. Steam and gas turbine and power plant engineering- R. Yadav-CPH Allahabad

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:55:51 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Maintenance & Reliability Engineering (Professional Elective – I)** | Code: | **337676(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Course Objectives**

- To enable the student to understand the principles, functions and practices adapted in industry for the successful management of maintenance activities.
- To provide the concept of various types of maintenance system used in industries.
- To impart knowledge on reasons for failure and the corrective and preventive measure adopted to reduce them.
- To make the students to be familiar with the concept of reliability engineering
- To make the students to understand the various maintenance and logistics means or the execution of various services.
- To impart knowledge on creating various tools for maintainability of mechanical system.

**Course outcome**

Application of concepts of the course leads to the optimization of equipment, procedures, and departmental budgets to achieve better maintainability, reliability, and availability of equipment.

**UNIT I** **Maintenance Engineering:** Objective and functions, organization and administration, economics and maintenance policies. Types of maintenance systems-planned, unplanned, preventive, predictive, conditional monitoring, total predictive maintenance.

**UNIT II** **Failure Analysis:** Analysis of source, identification, classification and selectivity of failures, catastrophic, wearout and cumulative failures, failure rate Mortality distribution, statistical and reliability concept of failure analysis, equipment replacement policy.

**UNIT III** **Reliability Engineering:** Concept, bath tub curve, elements, Hazard Models- constant, linearly increasing, weibull. System Reliability - Series configuration, parallel configuration, mixed configuration, reliability improvement – Improvement of components, Redundancy – element, unit, standby, repairable and non repairable systems, reliability, availability, maintainability, MTBF, MTTR, reliability allocation for simple series system.

**UNIT IV** **Maintenance Management:** Maintenance planning, maintenance scheduling, work orders, work measurement, maintenance cost budgeting, store and spare control, maintenance planning and control techniques, Incentives for maintenance work.

**UNIT V** **Maintenance of Mechanical System:** Introduction, Bearings, Friction Clutches, Couplings, Fastening Devices, Chains, Gear Drives, Support Equipment, Cooling Towers.

**TEXT BOOKS:**

1. Maintenance Engineering & Management – R.C Mishra, K. Pathak – Prentice Hall of India, New Delhi
2. Maintenance Engineering – S. Shrivastava – S. Chand & Sons – New Delhi

**REFERENCE BOOKS:**

1. Industrial Maintenance – H.P. Garg – S. Chand Publication, New Delhi
2. Maintenance Planning & Control – A. Kelly – TMH, New Delhi
3. Concept in Reliability – LS. Srinath – Affiliated East-West Press, New Delhi

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:56:06 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Mechanical Engineering** | Semester: | **VI** |
| Subject: | **Computer Graphics (Professional Elective – I)** | Code: | **337677(37)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **10** |
| No. of class Tests to be conducted: | **2 (Minimum)** | No. of assignments to be submitted: | **2 (Minimum)** |
| ESE Duration: | **Three Hours** | Maximum Marks in ESE: **80** | Minimum Marks in ESE: **28** |

**Note: All the algorithms are to be practiced in the computer Programming Laboratory and practice any computer aided drafting software.**

**Course Objective:**

- To get familiar with Computer input and Output devices
- To introduce fundamental techniques and methods for two-dimensional and three-dimensional computer graphics.
- To recognize geometric and graphical elements of engineering design problems
- To understand the algorithms and models for geometric projections, transformations, coordinate systems, parametric curves, hidden surface determination, colour theory, texture mapping, shading and lighting.

**Course Outcome:**

- students will learn how to develop interactive programs that use effectively the graphics functionalities available in contemporary personal computers,
- students will learn the fundamental principles and technologies upon which these functionalities, and possibly their future evolutions, are based
- The skills for designing and implementing practical graphic solutions to challenging problems in different application domains.
- Proficiency in engineering design and ability to conduct an engineering project.
- Understanding of the business environment & Ability to manage information and documentation.
- Capacity for creativity and innovation & ability to demonstrate professional attitudes.

**UNIT I** **Input and Output Devices:** Keyboard, Mouse, Z mouse Trackball, Joysticks, Data Glove, Digitizers, Light pen, Touch Panels, Image scanners, Printers and Plotters. **Video Display device:** Refresh Cathode ray Tubes, Random Scan and Raster Scan monitors, Colour CRT Monitors, Flat panel display: LED and LCD Monitors & plasma display, Direct view Storage Tubes, Continuous Refresh and Storage display.

**UNIT II** **Output Characteristics:** Aspect ratio; Aliasing and Anti-aliasing. **Graphic primitives:** Points & Lines, Line drawing Algorithm, DDA and Bresenham's Algorithm. Circle Generation Algorithm: Midpoint circle algorithm. Ellipse Generation Algorithm: Mid-point ellipse algorithm. **Attributes of primitives:** Line style, Type, Width, Colour, Character Attributes, Area Filling: Inside-outside test; **Fill Algorithm:** Scan-Line Polygon Fill algorithm, Boundary Fill Algorithm - 4 and 8 connected area; Flood Fill Algorithm.

**UNIT III** **Analytical & Synthetic curve:** C0, C1 & C2 Continuity, Convex hull, Parametric & non Parametric representation of curves. **Analytic curves:** Parabola, Hyperbola, **Splines:** linear, quadratic, cubic, hermite, Bezier curves: single and multiple segments, Parametric forms of cubic splines, **Synthetic Curves:** Circle and ellipse drawing,

**UNIT IV** **2D Geometric Transformation**: **Window and View port:** Window definitions, View port definitions, Window and View port relationship; World co-ordinates; Normalized device co-ordinates and Homogenous co-ordinates. **Basic transformation**- Translation, Scaling, Rotation, Reflection, Twist, Matrix Representation, Composite Transformations. **3D Geometric Transformation**: Basic Transformations, 3D Display parallel & perspective projection.

**UNIT V** **Viewing:** Viewing, Device co-ordination system, Image co-ordination system, Viewing transformation. **Clipping:** Point clipping, Line clipping, Cohen- Sutherland clipping, Mid point clipping method, Sutherland and Hodgeman Clipping.

**Text Books:**

1. Computer Graphics-Donald hearn and M.Pauline Baker-Prentice Hall of India Pvt Ltd.
2. Introduction to Computer Graphics – N. Krishnamurhy - TMII Publication.

**Reference Books:**

1. Computer Graphics –Harrington S. – TMH Publication.
2. CAD-CAM Theory and Practice-Ibrahim Zeid- TMH Publication.
3. Xiang and Plastok - Schaum's Outlines Computer Graphics - TMH, 2nd Edition, 2002.
4. Rogers, "Procedural Elements for Computer Graphics – TMH

**Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years**

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:56:21 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

SCHEME OF TEACHING & EXAMINATION

## B.E. VII SEMESTER MECHANICAL ENGINEERING

| S. No. | Board of Study | Sub. Code | SUBJECT | PERIODS PER WEEK | | | SCHEME OF EXAM Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1. | Mech. Engg | 337731(37) | Automobile Engineering | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 2. | Mech. Engg | 337732(37) | Refrigeration & Air-conditioning | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 3. | Mech. Engg | 337733(37) | Computer Aided Design & Manufacturing | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4 | Mech. Engg | 337734(37) | Machine Tool Technology | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 5 | Refer Table - II | | Professional Elective-II | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 6 | Mech. Engg | 337761(37) | Automobile Engineering Lab | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 7 | Mech. Engg | 337762(37) | Refrigeration & Air-conditioning Lab | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 8 | Mech. Engg | 337763(37) | Computer Aided Design and Manufacturing Lab | - | - | 3 | 40 | - | 20 | 60 | 2 |
| 9 | Mech. Engg | 337764(37) | Minor Project | - | - | 3 | 100 | - | 40 | 140 | 2 |
| 10 | Management | 337765(76) | Innovative & Entrepreneurial Skills | - | - | 2 | - | - | 40 | 40 | 1 |
| 11 | Mech. Engg | 337766(37) | ** Practical Training Evolution/ Library | - | - | 1 | - | - | 40 | 40 | 1 |
| | | | Total | 19 | 5 | 15 | 620 | 100 | 280 | 1000 | 34 |

L – Lecture, T – Tutorial, P – Practical,
ESE – End Semester Exam, CT – Class Test, TA – Teacher's Assessment

**To be completed after VI semester and before the commencement of VII Semester.

**Table – II**

**Professional Elective - II**

| S.No. | Branch | Subject Code | Subject |
|---|---|---|---|
| 1 | Mechanical | 337741(37) | Quality Control & Total Quality Management |
| 2 | Mechanical | 337742(37) | Energy Management & Audit |
| 3 | Mechanical | 337743(37) | Applied Elasticity & Plasticity |
| 4 | Mechanical | 337744(37) | Product Design & Development |
| 5 | Mechanical | 337745(37) | Numerical Control of Machines Tools |
| 6 | Mechanical | 337746(37) | Thermal System Design |
| 7 | Mechanical | 337747(37) | Cyber Security/Information Security |

Note: (1) 1/4th of total strength of students subject to minimum of 20 students is required to offer and elective in the college in a particular academic session.

Note: (2) Choice of elective course once made for an examination cannot be changed in future examinations.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:56:36 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Automomile Engineeing** Code: **337731(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives**

- Understand the basic structure of an automobile
- Understand construction of suspension system
- Understand transmission system and its elements
- Understand braking system, steering system and electrical system

**UNIT-I**
**Vehicle structure :**Type of automotive vehicles, general layout, vehicle construction-chassis, frame and body, types of frames, frameless and unitary construction, position of power unit.
**Suspension system :**Objects & principles of suspension, system, types, rigid axle suspension & Independent suspension for front & rear ends, simple & double arm parallel & perpendicular type of suspension system. Gas filled suspension system.
Springs - Purpose, types viz. leaf, coiled, rubber, air, suspension system, torsion bar, stabilizer, telescopic damper.
**UNIT – II**
**Clutches :**Characteristics, functions, principles of operation of clutch, friction clutch, single-plate, multi-plate, centrifugal clutch, positive clutch, friction plate clutch lining materials. Torque transmitted and related problems.
**Fluid flywheel :**Construction, working principles & characteristics.
**UNIT – III**
**Gear Box** - Object of Gear Box, air, rolling & gradient resistance, tractive effort variation with speed, performance curve.
**Types of Gear Boxes** - Sliding mesh, constant mesh, synchromesh device, automatic transmission, overdrive,lubrication of gear box.
**Torque Converter** - Principles of working, characteristics, Torque converter with direct drive.
**Testing of Automobiles**
**UNIT – IV**
**Universal Joint** - Types, propeller shaft, slip joint.
**Differential** – Functions, single & double reduction differential, limited slip differential.
**Front Axle** - Live & dead axle, stub axle.
**Back Axle** – Hotchkiss drive, torque tube drive.
**Tyres** - Types specification, causes of tyre wear & rim.
**Brakes & Braking system** - Purpose, principles, layout of braking system. Classification, mechanical, hydraulic, master cylinder, Tandem master cylinder, wheel cylinder, self energizing & self adjusting brakes, disc brakes, antiskid brakes, power operated brakes.
**UNIT – V**
**Steering system**:- Gear & links, types of steering gears, reversibility of steering, center point steering, steering geometry viz. castor, camber, king pin inclination toe in, toe out, cornering power, under-over steer; power steering, effect of shimmy, condition of true rolling, calculation of turning radius. Correct steering equation and related problems.
**Electrical System**: Battery: construction, maintenance, testing and charging. Cut-out, lighting circuit, horn, signals etc.
**TEXT BOOKS**
1. Automobile Engineering – Kripal Singh – Standard Publications,New Delhi
2. Automobile Mechanics - N. K. Giri – Khanna Publishers,New Delhi
**REFERENCE BOOKS**
1. Automobile Engineering – G.B.S. Narang – Khanna Publishers,New Delhi
2. Automotive Mechanics: Principles and Practices- W.H.Crouse, and D.L. Anglin, TMH
3. Automobile Engineering – K. R. Govindan – Anuradha Agencies
4. The Automobile-Harbans, Reyat Singh- S.Chand , New Delhi
5. Automotive Mechanics – Joseph Heitner-CBS Pub., New Delhi
6. Motor Vehicle – Newton & Steeds – Life & Sons Limited.
**Course Objectives**

- Graduates will gain a strong foundation in core automobile engineering, both in theoretical and applied concepts.
- Acquire knowledge and hands-on competence in the design and development of automobile.
- Graduates will demonstrate the ability to identify and solve automobile engineering maintenance problems.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:56:50 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Refrigeration And Air Conditioning** Code: **337732(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80**
**Minimum Marks: 28**

**Course Objectives**

- Analyze vapour compression cycles
- Analyze alternative systems such as gas cycle refrigeration and vapour absorption etc.
- Understand psychrometry and psychrometric processes
- Select/ design equipment for refrigeration and air-conditioning systems.
- Carry out air conditioning calculations

**UNIT – I**

**Introduction :**Refrigeration and second law of Thermodynamics, Refrigeration effect and unit of Refrigeration, Heat pump, reversed Carnot cycle. Vapour Compression Refrigeration System, Analysis of simple vapour compression Refrigeration cycle by p-h and T-S diagram. Effect of operating conditions, liquid vapour heat exchangers, actual refrigeration cycle.
Introduction to Multiple Evaporator and compound compression systems.

**UNIT – II**

**Gas cycle Refrigeration :** Limitation of Carnot cycle with gas, reversed Brayton cycle, Brayton cycle with regenerative H.E.
Air cycle for aircraft. Necessity of cooling of aircraft, Basic cycle, boot strap, regenerative type air craft refrigeration cycle.

**UNIT – III**

**Vapour Absorption System :**Simple vapour absorption system, Electrolux Refrigerator, Analysis of Ammonia absorption refrigeration system, Lithium Bromide Absorption Refrigeration System.
**Refrigerants :** Classification, Nomenclature, selection of Refrigerants, global warming potential of CFC Refrigerants.
**Refrigeration Equipments :**Compressor, condenser, evaporator, expansion devices – types & working.

**UNIT – IV**

**Psychrometry :**Psychrometric properties, psychometric relations, pyschrormetric charts, psychrometric processes,cooling coils, By-pass factor and air washers. Human Comfort Mechanism of body heat losses, factors affecting human comfort, effective temperature, comfort chart.

**UNIT – V**

**Cooling load calculations :**Internal heat gain, system heat gain, RSHF, ERSHF, GSHF, cooling load estimation, heating load estimation, psychrometric calculation for cooling, selection of air conditioning, apparatus for cooling and dehumidification,
**Air conditioning system :**Central, split and window air conditioning system.

**TEXT BOOKS**

1. Refrigeration and Air Conditioning –C. P. Arora – TMH,Delhi
2. Refrigeration and Air Conditioning – Manohar Prasad – New Age - Delhi

**REFERENCE BOOKS**

1. Refrigeration and Air Conditioning – Arora & Domkundwar – Dhanpat Rai, Delhi
2. Refrigeration & Air Conditioning-R.K.Rajput-S.K. Kataria, Delhi
3. Refrigeration and Air Conditioning – P.L. Ballaney – Khanna Pub.,Delhi
4. Refrigeration & Air Conditioning – Ahmadul Ameen - PHI, Delhi
5. Refrigeration and Air Conditioning- Stocker & Jones, McGraw Hill, Delhi
6. Basic Refrigeration and Air-Conditioning- P.N.Ananthanarayanan, TMH, Delhi
7. Principles of Refrigeration-Roy J.Dossat , -Pearson,Delhi
8. Refrigeration and Air Conditioning –R.C.Arora -PHI, Delhi

**Course Outcomes**

- Apply knowledge of Refrigeration and Air-Conditioning for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in analysis and design of refrigeration and air-conditioning systems.
- Demonstrate creativeness in designing new systems, components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analyse, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:57:04 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Computer Aided Design and Manufacturing** Code: **337733(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80**
**Minimum Marks: 28**

**Course Objective:**

- To introduce the student to be familiar with CAD/CAM terminology & its capabilities.
- To become familiar with CAD/CAM software, Graphical user interface & basic tools.
- To recognize geometric and graphical elements of engineering design problems
- To apply a "hands-on" understanding of the basic concepts of computer-aided manufacturing and prototyping through group and individual projects
- To study Basic features of CAM so as to be capable of accepting professional responsibilities and to understand the associativity between design and manufacturing.
- Integrate the CAD system and the CAM system by using the CAD system for modeling design information and converting the CAD model into a CAM model for modeling the manufacturing information.

**UNIT-I**

**Introduction:** Introduction of CAD/CAM, Definition of CAD & CAM tools, the influence of computers on manufacturing environment, Benefits of CAD/CAM. The product cycle, product engineering, concurrent engineering.
**Window and View port:** Window definitions, View port definitions, Window and View port relationship; World co-ordinates; Normalized device co-ordinates and Homogenous co-ordinates.

**UNIT – II**

**Geometric Modeling:** Requirement of Geometric Modeling, Geometric models, Geometric construction Methods, other modeling methods, 2D & 3D Transformations, Perspective and Parallel Projection, Viewing transformation.
**Geometric Modeling of Curves:** Parametric and Non parametric, Explicit and Implicit, Representation of curves. *Analytical Curve*: Line, Circle, Conics. *Synthetic curve:* Hermite Cubic Splines, Bezier Curves, B-Spline Curves. C0, C1 & C2 Continuity, Convex hull.

**UNIT –III**

**Representation of Surface:** Parametric Representation of surfaces, Equation of surface, Tangent vector, Normal vector, Twist vector, parametric patches and surfaces, Analytical surfaces: Ruled surface, surface of revolution, Tabulated cylinder. Synthetic surface: Hermit bi-cubic surface, Bezier bi-cubic surface, B spline bicubic surface, Coon's surface.
**Solid Modeling:** Solid modeling techniques, Geometric and Topology, Valid solid, Types of solid modeling, Algorithms, Basic set theory, Solid Representation Schemes. CSG representation, 3D base primitives, Unary Operation, Boolean Operation, Sweeping Operation and CSG tree.

**UNIT – IV**

**Numerical Control**

Introduction to Numerical Control, Basic components of an NC system, the NC procedure, NC coordinate systems, NC motion control systems, applications of Numerical Control, Introduction to Computer Control in NC, problems with conventional NC, Computer Numerical Control, Direct Numerical Control, Combined DNC/CNC system, Adaptive control machining system,

**NC Part Programming**

Introduction to NC Part Programming, Manual part programming, Computer assisted part programming, the APT (Automatically Programming Tool) language, MACRO statement in APT, Advantages of CAD/CAM in NC programming.

**UNIT –V**

**Group Technology**

Introduction to group technology, part families, parts classification & coding, three parts classification & coding system, group technology machine cells, benefits and Limitation of group technology

**Computer integrated manufacturing (CIM) system**

Introduction of CAPP, Flexible Manufacturing System, Benefits.

**Text Books:**

1. CAD/CAM Theory and Practice- Zeid, Ibrahim & Sivasubramanian,TMH, Delhi
2. CAM/CAD principle & Applications-P.N.Rao- TMH, New Delhi

**Reference Books:**

1. CAD/CAM-Milkell P. Groover, Emory W. Zimmer-Pearson Education, Delhi
2. Computer Aided Design & Manuacturing – Lalitnarayan – PHI,Delhi
3. Introduction to Computer Graphics- N. Krishnamoorty, TMH, Delhi
4. Computer Numeric Control-T.Jeyapoovan, Robert Quesada-Pearson Education
5. CAD/CAM – Surendra Kumar & A.K. Jha – Dhanpat Rai , New Delhi

**Course Outcome:**

- Understand the various CAD/CAM and CNC processes.
- Generate and verify the tool path and NC programs for milling and drilling manufacturing processes.
- Recognize various types of Curves, surface and Solid and their application as used in geometric modeling.
- Appreciate the concept of parametric modeling which is the mainstay of most of the 3D modeling system.
- Write and prove sample part programs for CNC machining centres in planar milling operations using the word address format.
- Understand the needs of master production schedule and methods to develop it.
- Plan and execute the production activity control, which actually deals with operations in the shop floor.
- Skillfully use modern engineering tools and techniques for mechanical engineering design, analysis and application.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:57:19 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering**
Subject: **Machine Tool Technology**
Total Theory Periods: **40**
Class Tests: **Two (Minimum)**
ESE Duration: **Three Hours**

Semester: **VII**
Code: **337734(37)**
Total Tutorial Periods: **10**
Assignments: **Two (Minimum)**
**Maximum Marks: 80**
**Minimum Marks: 28**

**Course objectives:**

- To impart knowledge about cutting tool geometry, tool material, mechanics of metal cutting, machinability and importance of cutting fluid.
- To understand the kinematics drive of machine tool.
- To design speed gear box and feed gear box
- To understand the procedure of acceptance test of machine tool

**UNIT - I**
**Cutting Tool –** Types, requirements, specification & application
**Geometry of Single Point Cutting Tool -** tool angle, Tool angle specification system, ASA, ORS and NRS and inter-relationship.
**Mechanics of Metal Cutting**
Theories of metal cutting, chip formation, types of chips, chip breakers, Orthogonal and Oblique cutting, stress and strain in the chip, velocity relations, power and energy requirement in metal cutting.

**UNIT - II**
**Machinability :**Concept and evaluation of Machinability, Mechanism of Tool failure, Tool wear mechanism, Tool life, Tool life equation, Machinability index, factors affecting machinability.
**Thermal Aspects in Machining and Cutting Fluid**
Source of heat in metal cutting and its distributions, temp measurement in metal cutting, function of cutting fluid, types of cutting fluid.

**UNIT – III**
**Design of Machine Tool Elements :**Design of Lathe bed - Material and construction feature, various bed section, analysis of force under headstock, tail stock and saddle, torque analysis of lathe bed, bending of lathe bed, designing for torsional rigidity, use of reinforcing stiffener in lathe bed.
Design of Guide ways, Material and construction features, over turning diagram, Antifriction guide ways.

**UNIT – IV**
**Design of Speed Gear Box :**Drives in Machine Tool, classification, selecting maximum and minimum cutting speeds, speed loss, kinematic advantage of Geometric progression, kinematic diagrams, design of Gear Box of 6,9,12 and 18 speed.

**UNIT – V**
**Design of Feed Gear Box :**Elements of feed gear box, classification-Norton drive, draw key drive, Meander's drive, Design of feed gear box for longitudinal and cross feed and for thread cutting.
**Acceptance Test of Machine tool :**Testing, Geometrical checks, measuring equipment for testing, acceptance test for Lathe and Radial drilling machines.

**TEXT BOOKS**
1. Machine Tool Engineering – G.R. Nagpal – Khanna Publishers, New Delhi
2. Fundamentals of Metal Cutting & Machine Tool – B.L. Juneja, G.S. Sekhan, Nitin Sethi – New Age Publishers – New Delhi

**REFERENCE BOOKS**
1. Production Engineering – P. C. Sharma – S. Chand & Company – New Delhi
2. Production Technology – R.K. Jain – Khanna Publisher – New Delhi
3. Principle of Metal Cutting -Sen, Bhattacharya – New Central Book Agency, Calcutta
4. Machine Tool Practices – Kibbe Richard R – PHI, New Delhi
5. Manuacturing Technology Vol.-II – P. N. Rao - TMH Delhi
6. Manufacturing Engineering & Technolgy – Serope Kalpakjian- Pearson, Delhi

**Course Outcomes:**

1. Graduates will gain a strong foundation in machine tool engineering
2. Acquire knowledge and hands-on competence in design and development of machine tool.
3. Develop an ability to identify, analyze and solve technical problems related to machine tools.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:57:33 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Quality Control & Total Quality Management** Code: **337741(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives**

- Define and understand various terms associated with quality control
- Enhance the students understanding of the complexity of statistical analysis and interpretation.
- Provide an introduction to the fundamental concept of SPC, total quality management, six sigma, quality function deployment and applications of these concepts.
- Understanding the philosophies of TQM in order to better evaluate the TQM implementation proposals.
- Assess exactly where an organization stands on quality management with respect to ISO 9000 quality management.

**UNIT-I Basic Concept of Quality**
Quality and quality control, concept of quality, quality characteristics, Quality of design and quality of conformance ,History of quality control, Quality policy and objectives, Economics of quality.
**Statistical Concept of Variation**
Concept of variation frequency distribution, continuous and discrete, probability distributions viz. Normal, Exponential and Weibull distribution, pattern of variation, significance tests, Analysis of variance, statistical aids in limits and tolerances.

**UNIT-II Quality Assurance**
Concept, advantages, field complaints, quality rating, quality audit, inspection planning, quality mindness, quality budget, vendor quality rating (VQR), vendor rating (VR), manufacturing planning for quality, Quality function deployment (QFD).
**Statistical Quality Control**
Objectives, Growth and applications of S.Q.C., S.O.C, Techniques in manufacturing planning. Process capability analysis, Control charts for variables and attributes and their analysis, process capability, concept of six sigma.

**UNIT III ACCEPTANCE SAMPLING**
Fundamental concept in acceptance sampling, operating characteristics curve. Acceptance plans, single, double and introduction of multiple plans.

**UNIT -IV Total Quality Management**
Total Quality Control (TQC), Concept of Total Quality Management (TQM), TQM philosophies, Deming approach to TQM, Juran ten steps to Quality Management, Taguchi Philosophy, Crosby fourteen steps, TQM models, Tools and techniques of TQM,

**UNIT V Quality system**
Quality system, need for quality system, ISO 9000 Quality Managmeent Standards, ISO 9000:2000 requirement, Quality Auditing, ISO 14000, Benefits of ISO 14000.

**TEXT BOOKS**
1. Quality Planning and Analysis - Juran & Gryana – McGraw Hill, New York
2. Statistical Quality Control – R.C. Gupta – Khanna Publishers, Delhi

**REFERENCE BOOKS**
1. Statistical quality control – Grant and Leavenworth – McGraw Hill, New York
2. Engineering Statistics and Quality Control – I. W. Burr- McGraw Hill, New York
3. Managing for Total Quality - Logothetis – PHI Delhi
4. Statistical Quality Control – M. Mahajan – Dhanpat Rai – New Delhi
5. Total Quality Management – Suganthi & Samuel - PHI, Delhi
6. Total Quality Management - Charantimath, Poornima – Pearson, Delhi
7. Total Quality Management – K.C. Arora - S.K. Kataria- New Delhi

**Course Outcomes**

- Explain the importance of quality & role of statistical quality control
- Apply methods and techniques of statistical quality control, to studies and interpret the results in business.
- Demonstrate motivation and responsibility to advocate for quality in business
- Develop an understanding on quality management philosophies and frameworks
- Develop in-depth knowledge on various tools and techniques of quality management

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:58:44 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Energy Management and Audit** Code: **337742(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

To impart knowledge on Sources of Energy, Energy Utilization and Energy Conversion System, energy balance, energy action planning to identify and evaluate opportunities to reduce client operating cost through energy conservation and planning

**UNIT – I : Energy Sources**

Introduction, Sources of energy – conventional and non-conventional, elasticity of demand and application, concepts to energy, Indian energy scene, energy storage, solar energy, water, battery and mechanical storage Systems.

**UNIT – II :Energy Utilization and Conversion System**

Classification of furnaces, controlled atmosphere in furnaces, furnace fuels, efficient use of energy in furnaces, thermal efficiency, reducing heat losses.

**Combined Power and Heating System**

Characteristics of prime movers, heat and Power requirements, economics of a CHP System.

**UNIT – III : Material and Energy balance**

Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

**Energy Action Planning**

Key elements, force field analysis, energy policy purpose, perspective, contents, formulation, ratification, organizing –location of energy management, top management support, managerial function, roles and responsibilities of energy manager, accountability, motivation, Information system – design barriers, strategies, marketing and communicating-training and planning.

**UNIT – IV : Energy Audit**

Energy Management information system, thirty nine steps for energy management, types of energy audit, preliminary energy audits, technical assistance in energy audit, energy accounting and analysis, Instruments used in Energy auditing.

**UNIT – V :Economics and Finance**

Introduction, economics, discounted cash flow, loans, investments, option identification and analysis, optimization, conflict correction, constructing the optimal target investment schedule, project management, monitoring against the target financial schedule.

**TEXT BOOKS**

1. Engineering Economics & Engineering Management – R. Raju – Anuradha Agencies.
2. Energy Engineering & Management - Chakrabarti – PHI, Delhi.

**REFERENCE BOOKS**

1. Energy Management – W.R. Murphy, G. Mckay – Elesvier, Gudgaon.
2. Energy Management – Paul O'Callaghan – McGraw Hill – New Delhi.
3. Principles of Energy Conversion – Archie W. Culp — McGraw Hill,Delhi.
4. Energy Management in illuminating System – Kao Chen – CRC Publishers.
5. Industrial Energy Recovery - D.A. Reay – Wiley Publishers.
6. Thermal Energy Recovery – T.L. Boyer – Wiley Publishers.
7. Energy Conservation through Control – E.G. Shinskey – Academic Press.
8. Economics of Solar Energy & Conservation Systems, Vol-I & II – F. Kreith & R.E. West – CRC Press

**Course Outcomes:**

- Application of concepts of the course leads to achieve and maintain optimum energy procurement and utilization, throughout the organization
- Minimize energy costs / waste without affecting production & quality
- Minimize environmental effects.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:59:00 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Applied Elasticity and Plasticity** Code: **337743(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objective**

- To study the classical theory of linear elasticity for two and three dimensional state of stress and obtain solutions for selected problems.
- To understand the plastic stress strain relations, criteria of yielding and elasto- plastic problems.

**Unit-I :Theory of Elasticity**
Introduction: Definition of stress and strain at a point, components of stress and strain at a point in cartesian and polar co-ordinates, constitutive relations, equilibrium equations, compatibility equations and boundary conditions in 2-D and 3-D cases.
Transformation of stress and strain at a point, principal Stresses and principal strains, invariants of stress and strain, hydrostatic and deviatoric stress, spherical and deviatoric strains, maximum shear stress, maximum shear strain.

**Unit-II : Plain stress and plain strain**
Airy's stress function approach to 2-D problems of elasticity, simple problems of bending of beams, solution of axis-symmetric problems, stress concentration due to the presence of a circular hole in planes.

**Unit-III :** Elementary problems of elasticity in three dimensions, stretching of a prismatic bar by its own weight, twist of circular shafts, torsion of non-circular sections, membrane analogy, Propagation of waves in solid media. Applications of finite difference equations in elasticity

**Unit-IV :Theory of Plasticity:**
Stress-strain diagram in simple tension, Perfectly elastic, Rigid - Perfectly plastic, Linear work - hardening, Elastic Perfectly plastic, Elastic Linear work hardening materials, Failure theories, yield conditions, stress - space representation of yield criteria through Westergard stress space, Tresca and Von-Mises criteria of yielding.

**Unit-V :Plastic stress-strain relations**
Saint Venant's Theory of Plastic flow, Elastic plastic Deformations, Prandtl's stress equations, Levy - Mises equation, Reuss theory of elastic - plastic deformation, Hencky's theory of small plastic deformations, Plastic potential, Flow Rule.

**TEXT BOOKS:**

1. Theory of elasticity – Sadhu Singh – Khanna Publisher, New Delhi
2. Theory of Plasticity – Sadhu Singh - Khanna Publisher, New Delhi

**REFERENCE BOOKS**

1. Theory of elasticity -Timoshenko and Goodier - McGraw Hill
2. Theory of Plasticity - J. Chakrabarthy - McGraw Hill
3. Plastic Analysis of Structures-P. S. Hodge-John Wiley and Sons.
4. Plastic Methods of Structural Analysis-Neal B. G.-Chapmen and Hall, 1977, III Edition.
5. Plasticity for Mechanical Engineers-W. Johnson and P. B. Mellor-D.Van Nostrand
6. Introduction to the Theory of Plasticity for Engineers-Haffman & Sachs-Mc,Graw Hill.
7. Theory of Inelastic structures-T. H. Lin-John Wiley and sons.
8. Plastic Analysis and Design of Plates, Shells and Discs- Massonnet-North Holland.
9. Plastic Design of Steel Frames-Beedle L. S.-John wiley.
10. Foundations of Solid Mechanics- Y. C. Fung- Prentice-Hall.
11. Continuum Mechanics fundamentals- S. Vallappan-Oxford and IBH.
12. Theory of Plasticity-M. Kachanov-Mir publishers, Moscow.

**Course outcomes:**

- Apply knowledge of applied elasticity and plasticity for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:59:14 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** — **Semester: VII**
Subject: **Product Design and Development** — Code: **337744(37)**
Total Theory Periods: **40** — Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** — Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** — **Maximum Marks: 80 Minimum Marks: 28**

**COURSE OBJECTIVES**

- To introduce design concepts and techniques to develop design ability in a product design.
- To provide knowledge about estimating and evaluating the feasible manufacturing design.
- To make aware of legal issue pertaining to product design.
- To provide knowledge of management of product development projects

**UNIT-I :Product Development Process**

Background for design, design theory, design materials, human factors in design applied ergonomics, product development processes and organization, identifying customer needs, establishing product specifications, concept generation and selecting product architecture.

**UNIT-II :Product Design Methods**

Generating concepts, selection of a concept, Testing of concept, product architecture, Creative and rational clarifying objectives- the objective trees methods, establishing functions – the function analysis methods, setting requirement- requirements specification methods determining characteristics – the QFD method, generating alternatives-the morphological chart method, evaluating alternatives-the weighted objectives methods, improving details-the value engineering method and design strategies.

**UNIT –III : Design for Manufacture**

Estimating manufacturing costs, reducing component, assembly and support cost design for assembly, design for disassembly, design for environment, design for graphics and packaging, effective prototyping – principle and planning.

**UNIT –IV :Industrial Design**

Its need - Ergonomic needs, Aesthetic needs, impact, accessing the quality, steps involved in Industrial design process, Management of Technology & user driven products.

**UNIT – V :Patents, Product Development & Project Management**

Legal issues in product design, trademarks, trade-secret, copy rights, patents – types, steps for disclosure, design resources, economics – quantitative & qualitative analysis, management of product development projects, Design Structure Matrix, Gantt Chart, Project schedule, budget, risk plan, accelerating project, execution, assessing and correction, Intellectual property rights.

**TEXT BOOKS**

1. Product Design & Development - Karl. T. Ulrich and Steven D. Eppinger – TMH,Delhi.
2. Product Design – Kevin Otto and Kristin wood - Pearson Education.

**REFERENCE BOOKS**

1. Product Development - Chitale & Gupta - Tata McGraw Hill.
2. Product Design and Manufacturing – Chitale & Gupta – PHI, Delhi.
3. Product Design: Creativity, Concepts and Usability – Kumar – PHI, Delhi .
4. Concurrent Engineering in Product Design and Development- Imad Moustapha – New Age.
5. Operations Management- Monks, J.G - McGraw Hill.
6. Product Design and Development - Ulrich & Eppinger – TMH Delhi.
7. Facility Layout and Location - Francis, R. L., and White, J. A. - Prentice Hall of India

**Course Outcomes**

- The course enhance students understanding of new product development processes as well as useful tools, techniques and organizational structures that support new product development practice.
- Understands the legal issue pertaining to patent of product design.
- Understand professional, ethical and social responsibilities resulting in a commitment to quality, timeliness, and continuous improvement.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:59:29 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Numerical Control of Machine Tools** Code: **337745(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives**

- Understand the emergence and development of numerical control machine, characteristics and application areas.
- Master basic knowledge of transmission of machine, numerical control machine tool working principle and composition.
- Master CNC machinery structure and NC machining system technology and equipment.
- Understand all kinds of typical numerically-controlled machine tool, in order to adapt to the needs of the development of the modern industry.

**UNIT - I : Introduction**
Fundamentals of numerical control, advantages limitations of N.C systems -classification of N.C systems.
**Computer Numerical Control**
Nomenclature, types and features of CNC machine tools, machine control unit, position control and its significance, engineering analysis of NC positioning systems, open loop and closed loop systems, precision in NC positioning systems-control resolution, accuracy and repeatability. Actuators: servomotors, stepper motors, transducers and feedback elements.

**UNIT - II :Features of N.C. Machine tools**
Design consideration of N.C machine tools - increasing productivity with N.C machines, tooling for CNC machine.
**System Device**
Feed back system-counting devices digital analog converters
**Interpolations**
DDA integrators, simple and symmetrical DD reference word CNC interpolators.

**UNIT - III : Part Programming**
Process planning and flow chart for part programming, systems nomenclature and tool geometries, Tool presetting & modular tooling. Selection of tools based on machining capacity, accuracy and surface finish, elements of programming for turning and milling, part programming. Preparatory codes G, miscellaneous functions M, Interpolation, tool compensations, cycles for simplifying programming, typical part programming
**Control Loops for N C Systems**
Introduction-control loops for point and counting systems.

**UNIT - IV :Computerized Numerical Control**
CNC concepts-advantage of CNC reference planes, sampled data techniques, microcomputers in CNC.
**Adaptive Control Systems**
Adaptive control with optimization and constraints-variable gains AC systems.

**UNIT - V : Modern CNC machines**
CNC lathes, turning centers, machining centres, automatic pallet changers, automatic tool changers, direct numerical control and applications, CNC machine design features.

**TEXT BOOKS**

1. Numerical control of machine tool – Koren & Ben Uri – Khanna Publisher,Delhi
2. Automation, Production Systems and Computer Integrated Manufacturing - Groover – PHI.

**REFERENCE BOOKS**

1. CNC Programming - S.K. Sinha - Galgotia
2. Mechatronics - HMT –TMH,Delhi
3. Numerical Control and Computer Aided Manufacturing -Tewari, Rao, Kundra- TMH, Delhi
4. Machine Tool Design and Numerical Control – N.K.Mehta – TMH Delhi
5. Fundamentals of Computer Numerical Control – NIIT – Prentice Hall, Delhi

**Course Outcomes:**

- Acquire knowledge and hands-on competence in applying the concepts in the design and development of machine tool.
- Demonstrate creativeness in designing efficient processes in the field metal cutting.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 01:59:46 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Thermal System Design** Code: **337746(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives**

- To enable the students to understand the concepts of thermal system design
- To provide knowledge about economics of thermal system
- Be familiar with modeling, simulation optimization techniques of thermal systems

**UNIT-I**

**Introduction to Thermal System Design** - Thermal system design, concept and major applications, categories of thermal system design.

**Designing A Workable Thermal System** - Introduction, Workable vs. Optimum system, various design basis, design of a food freezing plant and several other examples.

**UNIT–II**

**Economics of Thermal Systems** - Introduction, Major and minor costs, Interest, present and future worth, economic evaluation of thermal system design, Life cycle costing (LCC)method of economic evaluation, Effect of inflation, Present worth of yearly installment taking inflation into account, Preliminary cost estimation, equipment cost estimating parameter, effect of time factor on costs, energy costs, Taxes, Depreciation.

**UNIT– III**

**Modeling of Thermal Systems** - Introduction, curve fitting or equation fitting for one, two and polynomial independent variable, Example of curve fitting for thermal systems, Best fit equation, least square method with example, Some example of mathematical modeling of thermal systems.

**UNIT-IV**

**Thermal System Simulation** - Introduction, classes of systems, information flow diagrams, Sequential and simultaneous calculations, Formulation of information flow diagram of thermal systems some example like water pumping systems, waste heat utilization systems.

**Methods of Simultaneous Calculations**- Successive substitution method and Newton-Raphson method, Newton-Raphson method for multiple functions, Simulation of Gas turbine system.

**UNIT – V**

**Optimization of Thermal Systems** - Introduction, Mathematical representation of optimization problem with example of water chilling system, Lagrange multipliers, Heat exchanger optimization with Lagrange multipliers

***TEXT BOOKS:***

1. Design of Thermal Systems - Stoecker W.F. - McGraw Hill
2. Advanced Thermodynamic for Engineers - Wark K. - John Wiley

***REFERENCE BOOKS:***

1. Advanced Engineering Thermodynamics - Bejan A. - John Wiley
2. Advanced Engineering Thermodynamics - Annamalai K. & Puri - CRC Press
3. Thermal Design & Optimization - Bejan A., Tsatsarones G. & Moran M - John Wiley
4. Fundamentals of Engineering Thermodynamics - Moran M.J. & Shapiro H.N - John Wiley

**Course Outcomes**

- Demonstrate a basic understanding of concepts of thermal system design.
- Acquire knowledge and hands-on competence in the design and development of thermal systems that meet specific energy demands, are economically feasible and have a minimal impact on the environment.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:00:01 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch**: Mechanical Engineering**
Subject: **Cyber Security /Information security**
Total Theory Periods: **40**
Class Tests: **Two (Minimum)**
ESE Duration: **Three Hours**

Semester: **VII**
Code: **337747(37)**
Total Tutorial Periods: **10**
Assignments: **Two (Minimum)**
**Maximum Marks: 80**
**Minimum Marks: 28**

**Course objectives**
Introduce students to cyber security concepts and techniques and foster their abilities in designing and implementing solutions for real-world problems, As in today's networked world, most of the organizations and enterprises depend on different kinds of Information Technology solutions, say e-commerce, e-governance, e-learning, e-banking etc. All communications must be secured and under control since the information stored and conveyed is ultimately an invaluable resource of the business.

**UNIT-I :Security Policies and Management**
Security Policy Design, Designing Security Procedures, Risk Assessment Techniques, Security standards. Security Models - Biba Model, Chinese Wall, Bell La Pedula Model, Physical and Environmental Security, Server Room Design, Firefighting equipment, Temperature/humidity Control etc

**UNIT-II :Application Security**
Databases, Email and Internet etc, Communications and Operations Management: Network Architecture, Network Operations Security Devices (Firewalls, IDS/IPS, Antivirus etc), Routers/Switches.

**UNIT-III :**Business Continuity Planning and Management - Business Impact Analysis, Business Continuity/Disaster Recovery Plans, Access Control - Logical and physical access Control

**UNIT-IV :Software development, maintenance and support**
Security in development methodology ,Security testing, Segregation of duties

**UNIT-V : Cyber Forensics**
Introduction to forensic tools, Evaluation of crime scene and evidence collection, Usage of tools for disk imaging and recovery processes. Introduction to Information Security Standards - ISO 27001, PCI DSS .Compliance - IT Act, Copy Right Act, Patents etc

**Bibliography:**
1. *Security Engineering: A Guide to Building Dependable Distributed Systems* - Ross J. Anderson - John Wiley, New York, NY, 2001. ISBN: 0471389226.
2. *Computer Security: Art and Science* - Matt Bishop - Addison Wesley, Boston, MA,2003. ISBN: 0-201-44099-7.
3. *Security for Ubiquitous Computing* - Frank Stajano - John Wiley, 2002. ISBN: 0470844930.

**Internet Web Sites:**
1. Online Textbook Materials www.securityplusolc.com

**Course outcomes:**

Acquire knowledge and hands-on competence in applying cyber security solutions to work professionally in the areas of information security.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:00:16 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Automobile Engineering Lab** Code: **337761(37)**
Total Lab Periods: **24** Batch Size: **30**
Maximum Marks: **40** Minimum Marks: **20**

**STUDIES TO BE CARRIED OUT (MINIMUM TEN EXPERIMENTS)**

1. Study of frame and chassis.
2. Study of clutches – single plate, multi plate and centrifugal
3. Study of gear boxes – sliding mesh, constant mesh, synchro-mesh.
4. Study of differential, universal joints, axles and slip joints.
5. Study of brakes – mechanical, hydraulic, air brake and disc brake.
6. Study of steering system used with rigid axle suspension and independent suspension system, power steering
7. Study of different types of springs used in automobiles.
8. Study of rigid axle suspension system.
9. Study of front independent suspension system.
10. Study of independent suspension system.
11. Study of battery, starting and generating system and battery charging system.
12. Study of automotive electrical system.
13. Study of educational car model.

**LIST OF EQUIPMENTS/MACHINES REQUIRED**

1. Working model of single plate, multi-plate & centrifugal clutch
2. Working model of actual differential system
3. Working model of universal joint, axles & slip joints
4. Working model of mechanical, hydraulic and air brake
5. Working model of steering system used with rigid axle suspension system
6. Working model of steering system used with independent suspension system
7. Different types of springs used in automobiles
8. Working model of rigid axle suspension system
9. Working model of front independent suspension system
10. Working model of rear independent suspension system
11. Working model of battery, staring and generating system along with charging unit
12. Working model of electrical system
13. Cut section of actual master cylinder of hydraulic brake system
14. Educational car model

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:00:36 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VI**
Subject: **Refrigeration & Air Conditioning Lab** Code: **337762(37)**
Total Lab Periods: **24** Batch Size: **30**
Maximum Marks: **40** Minimum Marks: **20**

**EXPERIMENTS TO BE PERFORMED (MINIMUM SEVEN NUMBERS)**

1. To study Domestic Refrigerator.
2. To study the Hermetically Sealed Compressor.
3. To study Refrigeration Tutor and to determine the following:-
    a. Theoretical coefficient of Performance
    b. Actual Coefficient of Performance.
    c. Theoretical capacity of the plant
    d. Actual capacity of the plant.
4. To Study the Mechanical Heat Pump and to determine the following:-
    a. Theoretical coefficient of Performance
    b. Actual Coefficient of Performance.
    c. Theoretical capacity of the plant
    d. Actual capacity of the plant
5. To study the Air and Water Heat Pump and to determine the following:-
    a. Theoretical coefficient of Performance of the system as a refrigerator and as a heat pump.
    b. Actual Coefficient of Performance of the system as a refrigerator and as a heat pump.
    c. Capacity of the system in tons as a refrigerator.
    d. Capacity of the system in kW as a heat pump under the following conditions of operation:-
        i. Water cooled condenser and water-cooled evaporator.
        ii. Water-cooled condenser and air-cooled evaporator.
        iii. Air-cooled condenser and air-cooled evaporator.
        iv. Air-cooled condenser and water-cooled evaporator.
6. To study the following processes on the Air Conditioning Test Rig.
    a. Sensible Heating
    b. Sensible Cooling
    c. Sensible Cooling/cooling dehumidification
    d. Humidification and cooling
7. To Find the Efficiency of Cooling Tower Test Rig.
8. To Study the Simple Vapor Absorption System.
9. To study the AC Simulator and to determine the following:-
    a. Sensible Heating
    b. Sensible Cooling
    c. COP of R-22
    d. Air Washer Efficiency
    e. Sensible heat load applied
    f. Latent heat load applied
    g. RSHF
    h. ESHF
    i. Creation of different climatic conditions in AC simulator

**LIST OF EQUIPMENTS/MACHINES REQUIRED**

1. Domestic Refrigerator
2. Cut Section of Hermitically Sealed Compressor
3. Refrigeration Tutor Test Rig
4. Mechanical Heat Pump Test Rig
5. Air & Water Heat Pump Test Rig
6. Air Conditioning Test Rig
7. Simple Absorption System Test Rig
8. Cooling Tower Test Rig
9. Air Conditioning Simulator Test Rig

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:00:55 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VII**
Subject: **Computer aided design and manufacturing Lab** Code: **337763(37)**
Total Lab Periods: **2 4** Batch Size: **30**
Maximum Marks: **40** Minimum Marks: **20**

**Total TEN Experiments are to be carried out. FIVE Experiments each from CAD and CAM.**

**A. CAD Experiments**

1. Line Drawing or Circle Drawing experiment: Writing and validation of computer program.
2. Geometric Transformation algorithm experiment for translation/rotation/scaling: Writing and validation of computer program.
3. Design of machine component or other system experiment: Writing and validation of computer program.
4. Understanding and use of any 3-D Modeling Software commands.
5. Experiment: Solid modeling of a machine component using Advanced-modeling software.
6. Root findings or curve fitting experiment: Writing and validation of computer program.
7. Numerical differentiation or numerical integration experiment: Writing and validation of computer program.

**B. CAM Experiments**

1. To study the characteristic features of CNC machine
2. Part Programming (in word address format) experiment for turning operation (including operations such as grooving and threading) and running on CNC machine
3. Part Programming (in word address format or ATP) experiment for drilling operation (point to point) and running on CNC machine
4. Part Programming (in word address format or ATP) experiment for milling operation (contouring) and running on CNC machine

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:01:12 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelor of Engineering**
Branch: **Common to All Branches** Semester: **VII**
Subject: **Innovative and Entrepreneurial skills** Code: **337765(76)**
Total Lab Periods: **24** Batch Size: **30**
Maximum Marks: **40** Minimum Marks: **24**

**Unit I**
**Innovation**
Innovation- an abstract concept; creativity, innovation and imagination; types of innovation - classified according to products, processes or business organizations.

**Unit II**
**Entrepreneurship**
Who is an entrepreneur? Entrepreneurship- A state of Mind, Emergence of entrepreneur; Role of Entrepreneur; A Doer not a Dreamer- Characteristics of an entrepreneur; Factors affecting entrepreneurial growth – Social, cultural, personality factors, psychological and Social Factors. Impact of entrepreneurship for sustainable development.

**Unit III**
**Difference between entrepreneur and entrepreneurship**
Difference between entrepreneur and entrepreneur, Common Entrepreneurial competencies/Traits; Entrepreneurship stimulants, Obstacles inhibiting entrepreneurship; Types of entrepreneurs, Functions of an entrepreneur.

**Unit IV**
**Identification of Business Opportunities**
Introduction, Sources of Business of Product Ideas, Steps in Identification of Business opportunity and its SWOT Analysis.

**UNIT-V**
**Techno-Economic Feasibility of the project**
Introduction, Techno- Economic feasibility of the Project, Feasibility Report, Considerations while preparing a Feasibility Report, Proforma of Feasibility Report, Role of Institutions and entrepreneurship.

**Text and Reference Books:**
1. Competing through Innovation-Bellon & Whittington - Prentice Hall of India
2. A Guide to Entrepreneurship – David Oates- JAICO Publishing House.
3. Entrepreneurship- Robert D Hisrich, Peters, Shepherd- TMH
4. Entrepreneurship in Action- Coulter - Prentice Hall of India
5. Entrepreneurship Management and Development – Ajith Kumar - HPH
6. Fundamentals of entrepreneurship- Mohanty - PHI
7. Patterns of Entrepreneurship- Jack M Kaplan – Wiley
8. Innovation and Entrepreneurship Practice And Principles- Drucker, Petere- East West Press

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:01:26 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

## SCHEME OF TEACHING AND EXAMINATION

## B.E. VIII SEMESTER MECHANICAL ENGINEERING

| S. No. | Board of Study | Sub. Code | SUBJECT | PERIODS PER WEEK | | | SCHEME OF EXAM Theory/Practical | | | Total Marks | Credit L+(T+P)/2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | ESE | CT | TA | | |
| 1. | Mech. Engg | 337831(37) | Robotics | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 2. | Mech. Engg | 337832(37) | Finite Element Methods | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 3. | Mech. Engg | 337833(37) | Industrial Engineering & Management | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4 | Refer Table - III | | Professional Elective-III | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 5 | Refer Table - IV | | Open Elective-IV | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 6 | Mech. Engg | 337861(37) | Robotics Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 7 | Mech. Engg | 337862(37) | Finite Element Methods Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8 | Mech. Engg | 337863(37) | Industrial Engineering & Management Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 9 | Mech. Engg | 337864(37) | Major Project | - | - | 6 | 100 | - | 80 | 180 | 3 |
| 10 | Mech. Engg | 337865(37) | Report Writing & Seminar | - | - | 2 | - | - | 40 | 40 | 1 |
| 11 | | | Library | - | - | 1 | - | - | - | - | - |
| Total | | | | 20 | 5 | 15 | 620 | 100 | 280 | 1000 | 32 |

L – Lecture, T – Tutorial, P – Practical,
ESE – End Semester Exam, CT – Class Test, TA – Teacher's Assessment

**Table – III**
**Professional Elective - II**

| S.No. | Branch | Subject Code | Subject |
|---|---|---|---|
| 1 | Mechanical | 337841(37) | Mechatronics |
| 2 | Mechanical | 337842(37) | Vibration & noise control |
| 3 | Mechanical | 337843(37) | Optimization Techniques |
| 4 | Mechanical | 337844(37) | Computational Fluid Dynamics |
| 5 | Mechanical | 337845(37) | Soft Computing Techniques |
| 6 | Mechanical | 337846(37) | Environment Pollution & Control |
| 7 | Mechanical | 337847(37) | Mechanical Handling System & Equipments |

Note: (1) 1/4th of total strength of students subject to minimum strength of 20 students is required to offer and elective in the college in a particular academic session.

Note: (2) Choice of elective course once made for an examination cannot be changed in future examinations.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:01:44 -08'00'

Table - IV

| Open Elective –IV | | |
|---|---|---|
| S.No. Board of Studies | Code | Name of Subject |
| 1 Management | 300851(76) | Enterprise Resource Planning |
| 2 Information Technology | 300852(33) | E-Commerce & strategic IT |
| 3 Management | 300853(76) | Technology Management |
| 4 Information Technology | 300854(33) | Decision Support & Executive Information system |
| 5 Computer Science & Engg. | 300855(22) | Software Technology |
| 6 Management | 300856(76) | Knowledge Entrepreneurship |
| 7 Management | 300857(76) | Finance Management |
| 8 Management | 300858(76) | Project Planning, Management & Evaluation |
| 9 Mechanical Engg. | 300859(37) | Safety Engineering |
| 10 Computer Science & Engg. | 300801(22) | Bio Informatics |
| 11 Mechanical Engg. | 300802(37) | Energy Conservation & Management |
| 12 Nanotechnology | 300803(47) | Nanotechnology |
| 13 Management | 300804(76) | Intellectual Property Rights |
| 14 Mechanical Engg. | 300805(37) | Value Engineering |
| 15 Civil Engg. | 300806(20) | Disaster Management |
| 16 Civil Engg. | 300807(20) | Construction Management |
| 17 Civil Engg. | 300808(20) | Ecology and Sustainable Development |
| 18 Chem. Engg. | 300809(19) | Non Conventional Energy Sources |
| 19 Electrical Engg. | 300810(24) | Energy Auditing and Management |
| 20 Mechanical Engg. | 300811(37) | Managing Innovation & Entrepreneurship |
| 21 Information Technology | 300812(33) | Biometrics |
| 22 Information Technolgy | 300813(33) | Information Theory & Control |
| 23 Computer Science & Engg. | 300814(22) | Supply Chain Management |
| 24 Computer Science & Engg. | 300815(22) | Internet & Web Technology |
| 25 Electrical Engg. | 300816(24) | Electrical Estimation and Costing |
| 26 Electrical& Electronics Engg. | 300817(25) | Non Conventional Energy Sources |

Note (1)-1/4th of total strength of students subject to minimum

Note -1/4th of total strength of students is required to offer an elective in thecollege in a particular academic session.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:02:01 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Robotics** Code: **337831(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

- To acquire the knowledge of basics of robotics and their importance.
- Understand fundamental theory of robot design.
- To acquire the knowledge on advanced algebraic tools for the description of motion.
- To develop the ability to analyze and design the motion for articulated systems.
- To acquire the knowledge of sensors, actuators and vision system used in robotics.

**UNIT – I : Introduction**
Fixed & flexible automation, evolution of robots and robotics, laws of robotics, progressive, advancement in robots, manipulator anatomy, arm configuration & work space, human arm characteristics, design and control issues, manipulation and control, actuators, sensors and vision, programming of robots, applications – material handling, processing applications, assembly applications, inspection applications etc, the future prospects, notations.

**UNIT – II : Coordinate Frames, Mapping and Transforms**
Coordinate frames, description of objects in space, transformation of vectors, inverting a homogeneous transform, fundamental rotation matrices. mechanical structure and notations, description of links and joints, kinematic modeling of the manipulator, Denavit – Hartenberg notation, kinematic relationship between adjacent links, manipulator transformation matrix.

**UNIT – III : Kinematic Modeling of Robots**
Position analysis - direct and inverse kinematic models of robotic manipulators, various examples. velocity analysis – Jacobian matrix, introduction to inverse kinematic model.

**UNIT – IV : Robotic Sensors and Vision**
Introduction regarding sensing technologies, sensors in robotics, classification, characteristics, internal sensors – position, velocity, acceleration sensors, force sensors, external sensors – proximity, touch and slip sensors. robotic vision, process of imaging, architecture of robotic vision systems, image acquisition, components of vision system, image representation, image processing.

**UNIT – V : Motion Planning and Control of Robot Manipulators**
Trajectory planning of robotic manipulator: joint space and Cartesian space techniques. open and close loop control, linear control schemes, examples of control models.
**Robot applications**
Industrial applications, material handling, processing applications, assembly applications, inspection application, principles for robot application and application planning, justification of robots, robot safety, non-industrial applications, robotic application for sustainable development.

**Text Books:**
1. Robotics & Control – R.K. Mittal & I.J. Nagrath – TMH Publications.
2. Introduction to Robotics Analysis, Systems Applications - Saced B. Niku, Pearson

**Reference Books:**
1. Principle of Robot Motion- Choset – PHI, Delhi
2. Kinematics and Synthesis of linkages – Hartenberg and Denavit – McGraw Hill.
3. Robotics Control Sensing - Vision and Intellgence – K.S. Fu, McGraw Hill.
4. Robotic Engineering – An Integrated Approach - R.D. Klafter – PHI. Delhi.
5. Introduction to Robotics - S.K. Saha – Mc Graw Hill.
6. Introduction to Robotics – Mechanics and Control - John J. Craig

**Course Outcomes:**

- Apply knowledge of robotics for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development robots
- Demonstrate creativeness in designing and development of robotics.
- Identify, analyze and design of robots useful to the society.
- Work effectively with multidisciplinary robots.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:02:17 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Finite element methods** Code: **337832(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course objective**

- Understand the fundamental concepts of FEM.
- Understanding the use and knowledge of fundamental stiffness matrix.
- Know the behaviour and usage of each type of elements covered in this course.
- Be able to prepare a suitable FE model for structural mechanical analysis problems.
- Can interpret and evaluate the quality of the results
- Be aware of the limitations of the FEM.

**Unit-I :** Formulation of Finite Element Equation starting from governing differential equation, Domain residual and minimization, Weighted residual method, Weak form of weighted residual method, solution of weak form using trial function, piecewise continuous trial function solution, formulation of one dimensional bar element using weak form of weighted residual element
Minimization of potential energy, Rayleigh-Ritz method, Piece-wise continuous trail function, finite element form of Rayleigh-Ritz method, finite element formulation derived from a functional, formulation of bar element and heat transfer element using Rayleigh-Ritz method

**Unit-II :** One dimensional finite element analysis, generic form of total potential for one dimensional case, determination of shape functions for linear bar finite element and quadratic bar finite element, stiffness matrix, one dimensional problems of structure mechanics and heat conduction

**Unit-III :** Stiffness matrix formulation for beam and frame element, Determination of shape functions and element matrices, Application problems

**Unit-IV :** Two dimensional finite element analysis, simple three node triangular elements, four node rectangular element, six node triangular element, natural coordinates, coordinate transformation, simple two dimensional problems, Gauss Quadrature Technique

**Unit-V :** Finite element analysis for plane stress and plane strain problem, Strain displacement matrix for 2-D elements, two-dimensional integrals. Application problems, Scalar field problems including heat conduction and flow problems.

**TEXT BOOKS**

1. Textbook of Finite Element Analysis – Seshu P – Prentice Hall of India.
2. Fundamentals of Finite Element Analysis - David Hutton – TMH, Delhi

**REFERENCE BOOKS**

1. Finite Element Method: Basic concepts & Applications- Alavala – PHI, Delhi
2. Finite Element in Engineering - T.R. Chandrupatla and Belegundu, Pearson,Singapore
3. Concepts and Applications of Finite element analysis - Cook, Robert – John Wiley
4. The Finite Element Method, A Practical Course - Liu and Quek. – McGraw Hill
5. The Finite Element Method in Engineering - S.S. Rao.
6. An Introduction to the Finite Element Method – J.N. Reddy – TMH, Delhi
7. Finite Element Method – Zienkiewicz. O C - TMH, Delhi
8. Finite Element Analysis: Theory And Programming – Krishnamoorthy C.S.- TMH, Delhi
9. Finite Element Procedure – K.J.Bathe – Prentice Hall of India
10. A First Course in The Finite Element Method – Logan – Cenegage Learning

**Course Outcome**

- Apply knowledge of finite element method for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts finite element method in the analysis of structural and thermal systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary problems.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:02:32 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Industrial Engineering & Management** Code: **337833(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

1. To impart capability of successfully planning, controlling, and implementing projects.
2. Understand and apply the principles of maths, science, technology and engineering, involving industry-relevant problems.
3. Contribute to the profitable growth of industrial economic sectors by using IE analytical tools, effective computational approaches, and systems thinking methodologies.
4. Maintain high standards of professional and ethical responsibility.
5. Flourish and work effectively in diverse, multicultural environments emphasizing the application of teamwork and communication skills.
6. Practice life-long learning to sustain technical currency and excellence throughout one's career.

**Unit-I : Introduction**
History & development, objective, place of Industrial Engineering in an organization, relation with other department, system approach
**Plant Location**
Need for a suitable location, Plant location problems factors affecting location, quantitative method for evaluation of plant location.
**Plant Layout**
Objective & Principles, factors affecting layout, types of layout.
**Unit-II : Work Study**
Purpose, objectives and applications of work study, Productivity and work study.
**Method Study**
Introduction, procedure, flow process charts, Multiple activity chart, motion economy principles, Therbligs, cycle graph and chronocyclegraph.
**Work Measurement**
Definition, types, Time Study- selection & timing the job, rating, allowances, Numerical on Normal and standard time calculation.
**Unit-III : Job Evaluation and Merit Rating**
Definition, objectives, methods.
**Wages and Incentives**
Terminology, characteristics, factors, types of incentives, wage incentive plan, Rowan plan, Taylor's differential piece rate system, Emerson's efficiency plan, Halsey's 50-50 plan, Bedaux plan, Group task & Bonus system.
**Unit-IV : Basic concepts and Functions of management**
Nature, Purpose and Objectives of basic functions of management, Authority and Responsibility, social responsibility of manager, ethics and management.
**Human Resource Management**
Nature and Scope of Human Resource Planning, Recruitment and Selection, Training and Development, Career Growth, Grievances, Motivation – needs and types, Maslow hierarchy of needs theory, Herzberg two factor theory, Need-want-satisfaction chain, Quality of working life, job enrichment and job enlargement.
**Unit-V :**
**Marketing Management**
Marketing Environment, Marketing Mix, Advertising and Sales Promotion, Channels of Distribution.
**Financial Management**
Book keeping, financial statement Analysis, Financial Ratios, Capital Budgeting, Break-Even Analysis.

**TEXT BOOKS**

1. Industrial Engineering and Production Management -Martand Telsang - S.Chand.
2. Industrial Engineering & Management - S. Dalele & Mansoor Ali - Standard Publishers.

**REFERENCE BOOKS**

1. Industrial Engineering & Management ,A new perspective- Philip E Hicks - Mcgraw Hill
2. Company Essential of Management - H. Koonz and H. Weihrich – Mcgraw Hill
3. Marketing Management- Kotler Philip- Prentice Hall of India
4. Flexibilty in Management - Sushil, Vikas publication - New Delhi
5. Human Resource Management - Luthans Fred - McGraw Hill, Inc.
6. Financial Management - M.Y. Khan and P.K. Jain - Tata Mc-Graw Hill
7. Fundamentals of Business Organizations and Management -Y.K. Bhusan - S. Chand
8. Industrial Management - K.K. Ahuja - Khanna Publishers
9. Introduction of work study - ILO, Geneva - Universal Publishing Corporation, Bombay
10. Motion and Time Study - Ralph M. Bannes - John Wiley & Sons
11. Work Study and Ergonomics - H.S. Shan - Dhanpat Rai & Sons

**Course Outcomes:**

- Ability to apply mathematics and science in Industrial engineering.
- Ability to design and conduct experiments, as well as to analyze and interpret data
- Ability to identify, formulate, and solve engineering problems
- Ability to use the techniques, skills, and modern engineering tools necessary for industrial engineering practice
- Ability to design, develop, implement and improve integrated systems that include people, materials, information, equipment, and people

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:02:45 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Mechatronics** Code: **337841(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

- To acquire the knowledge of basics of mechatronics and their scope.
- To acquire the knowledge of sensors and transducers.
- Understand fundamental of hydraulic and electrical actuators.
- To acquire the knowledge of data acquisition system and control system.
- To develop the ability to analyze and design mechatronics system.

**UNIT – I :** Introduction about Mechatronics, scope of Mechatronics, application, process control automation and N/c Machines.

**UNIT – II : Sensors and Transducers**

Introduction, classification, specification, characteristics of transducers, type of transducers displacement, strain, vibration pressure, flow, temperature, force & torque, tactile.

**UNIT – III : Hydraulic Pneumatic & Electrical actuators**

Pumps & Compressors, control valves & accessories, actuators, fluid power symbols, fluid power systems, switching devices, solenoids, motors.

**UNIT – IV : Data Acquisition and Control System**

Introduction, Quantitizing theory, Analog to Digital Conversion, Digital to Analog (D/A) conversation, transfer function, transient response & frequency response & frequency response, stability criteria.

**UNIT – V : Design of Mechatronics systems**

Introduction, Automatic front and book and cutting in steel rolling mill, lift control system, CNC lathe, temperature control of a heat treatment furnace, EOT crane control panel, Grey grain separators, electrode arm control in electric arc furnace.

**TEXT BOOKS**

1. Mechatronics – N. Shanmugam – Anuradha Agencies
2. Mechatronics – HMT Limited – Tata McGraw hill,New Delhi

**REFERENCE BOOKS**

1. Mechatronics - Singh and Joshi – PHI New Delhi
2. Mechatronics :A Multi Disciplinary Approach– W. Bolton – Pearson Education - Singapore
3. Mechatronics System Design - Shetty D, Kolk Ra – PWS Publications, Boston
4. Mechatronics - Kamm, Lawrence J – Prentice Hall Of India
5. Mechatronics & Measurement Systems – Alciator David & Histand Michael – TMH Dehi
6. Mechatronics - Necsulescu D – Pearson, Singapore
7. Mechatronics Source Book – N.C.Braga – Cenegage Learning, Delhi
8. Mechatronics System Design – Devdas Setty & Richrd Kolk - Cenegage Learning, Delhi
9. Analytical Robotics and Mechatronics - Stadler W – Mcgraw Hill,New Delhi
10. Mechatronics: Electronics in Products & Processes- Bradley, D A; Dawson, D And Burd, N C Loader, A J - Taylor And Francies - Boca Raton

**Course outcomes:**

- Apply knowledge of mechatronics for understanding and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts of mechatronics in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analyze and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:02:59 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Vibration & Noise Control** Code: **337842(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objective:**

- Introduce students to the Fundamentals of vibrations.
- Introduce students how to mathematical model the vibration and acoustics system.
- Introduce students to vibration system with single degree of freedom
- Introduce students to vibration system with multi-degree of freedom
- Enable students to analisis and measurements of sound.
- Introduce students to the noise and noise control.

**UNIT- I : Fundamentals of vibrations**
Simple harmonic motion, combination of two simple harmonic motions, beats, Fourier analysis Single degree of freedom system: Free un-damped vibrations: Equivalent systems linear and torsional, natural frequency estimation, energy methods
**Damped vibrations :** Damping models, structural, coulomb, and viscous damping, critically, under and over-damped system, logarithmic decrement
**Forced vibrations :** Harmonic excitation, support motion, vibration isolation, critical speeds of shafts in bending

**UNIT- II : Two degree of freedom system**
Free vibrations of spring coupled system, general solution, torsional vibrations, two degree of freedom mass coupled system, bending vibrations in two degree of freedom system, forced vibrations of an undamped two degree of freedom system, dynamic vibration absorber, forced damped vibrations

**UNIT- III : Multi-degree of freedom system**
Free un-damped analysis.
**Numerical methods:** Dunkerley's, Rayleigh, Holzer methods.

**Experimental methods in vibration analysis:**
Vibration measurement devices and analyzers, balancing of rigid rotors

**UNIT- IV :Analysis and measurement of sound**
One dimensional wave in a gas, sound perception and the decibel scale, the ear, combining sound levels in decibels, octave bands, loudness, weightings, directionality of acoustic sources and receivers, directivity index

**UNIT- V : Noise control**
Noise criteria, sound absorption and insulation, noise barriers, acoustic enclosures, silencers

**TEXT BOOKS**
1. Mechanical Vibrations –Thomson W T- Prentice Hill of India
2. Theory & Practice of Mechanical Vibrations – J.S. Rao, Gupta - New Age International.
**REFERENCE BOOKS**
1. Mechanical Vibrations and Noise Engineering – A G Ambekar – PHI, Delhi
2. Mechanical Vibrations – G.K. Grover - S. Chand & CO.
3. Acoustics for Engineers - Turner & Pretlove - Macmillan
4. Acoustics and Noise Control - Smith, Peters & Owen - Addison-Wesley-Longman.
5. Industrial Noise Control: Fundamentals and Applications - Bell and Bell, Marcel-Dekker
6. Vibration And Noise For Engineers – Kewal Pujara – Dhanpat Rai,Delhi
7. Environmental Noise Pollution and its Control – G R Chhatwal – Anmol Publications,Delhi
8. Noise Pollution and Control – Singal S P – Narosa Publications, Delhi
9. Mechanical Vibrations and Noise Controls – Sadhu Singh – Khanna Publisher, New Delhi
10. Fundamentals of Noise and Vibration - Fahy FJ, Walker JG - E&Fnspon – New York
**Course Objectives:**

- Apply knowledge of Vibration & Noise Control for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary problems.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:03:14 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Optimization Techniques** Code: **337843(37)**
Total Theory Periods: **4 0** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**
This course aims to introduce students to use advanced quantitative methods and techniques for effective decisions–making; model formulation and applications that are used in solving business decision problems.

**UNIT – I : Optimization Technique**
Classification of optimization, problems, single variable and multivariable optimization with equality constraints and Inequality constraints. Convex programming problem.

**UNIT – II : Linear Programming - II**
Duality in Linear programming, dual simplex method, decomposition principle, sensitivity analysis, quadratic programming, changes in cost coefficient, golden section method.

**UNIT – III : Non-Linear Programming – I**
Rate of convergence, Design variables, Random search methods, Chrivariate methods, Powell's method, Newton's method, Marquard Method, Test function.

**UNIT – IV : Geometric Programming**
Unconstrained minimization problem, primal dual relationship, geometric programming with mixed Erie quality, application and complementary function.

**UNIT- V : Dynamic Programming**
Multistage Decision processes. principles of optimality, continuous dynamic programming.

**TEXT BOOKS**
1. Optimization Techniques – C.S. Rao – Dhanpat Rai & Sons, New Delhi
2. Optimization methods for Engineering Design – R.L. Fox - Addison Wesley

**REFERENCE BOOKS**
1. Engineering Optimization Theory and Practice – S.S. Rao – New Age Publishers.
2. Introduction to optimum Design – J.S. Arora – Mc. Grawhill publishers
3. Optimization Methods for Engineering – Raju – PHI,Delhi
4. Foundation of Mathematical optimization – Pallaschke – Kluwer Academic Publishers
5. Optimization Methods in Operations Research and System Analysis–K V Mittal–Wiley,Delhi
6. Engineering Optimization: Theory And Practice - Singiresu S Rao – New Age
7. Optimization For Engineering Design- Deb, Kalyanmoy-Prentice Hall
8. Optimization Methods – Mohan & Deep- New Age, Delhi
9. An Introduction to Optimization- Chang, Edwin& Zak Stanislaw -John Wiley, New York
10. Optimization Concepts And Applications In Engineering – Belegundu & Chandrupatla-Pearson,Singapore

**Course Objectives:**
- Ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively.
- Knowledge of formulating mathematical models for quantitative analysis of managerial problems in industry.
- Skills in the use of Operations Research approaches and computer tools in solving real problems in industry.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:03:30 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Computational Fluid Dynamics** Code: **337844(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objective:**

1. To introduce the student to widely used techniques in the numerical solution of fluid equations, issues that arise in the solution of such equations, and modern trends in CFD.
2. To acquire core knowledge of the fundamentals of CFD for engineers, and an introduction to the methods and analysis techniques used in CFD.
3. By studying a variety of flow situations students will develop a better intuition of fluid mechanics more quickly than is possible with traditional analytical approaches.
4. Quantify and analyze the numerical error in CFD discetization schemes.
5. Develop finite difference and finite volume forms of the CFD equations and important model systems
6. Formulate explicit and implicit algorithms for solving the Navier-Stokes equations..
7. Understand and apply verification strategies for evaluating CFD code.

**UNIT I**

**Fundamental Concepts**

Introduction- Governing Equations of Fluid Dynamics. Mathematical Behavior of Partial Differential Equations - Elliptic, Parabolic and Hyperbolic equations. Physical Classification of fluid dynamics problems, Well-posed problems.

**UNIT II**

**Finite Element and Finite Difference Method**

Overview of Finite Element and Finite difference Techniques in Computational Fluid Dynamics. Strong and Weak Formulations of a Boundary Value Problem.

**UNIT III**

**Finite Volume Schemes**

General Discretisation Methodologies: Cell Centered Formulation- Lax-Vendoroff Time Stepping, Runge-Kutta Time Stepping, Multi-stage Time Stepping. Cell Vertex Formulation - Multistage Time Stepping. Discretisation of convective fluxes: Flux-vector splitting formulation, Flux-difference splitting formulation. Up-wind formulation.

**UNIT IV**

**Discretization**

Boundary layer Equations and methods of solution -Implicit time dependent methods for inviscid and viscous compressible flows - Concept of numerical dissipation --Stability properties of explicit and implicit methods - Conservative up-wind discretization for Hyperbolic systems - Further advantages of upwind differencing.

**UNIT V**

**Principles of Grid Generation**

*Structured grid*: C-, H- and O-Grid topology. Algebraic, Elliptical and Hyperbolic Grid Generation, *Unstructured grid:* Delaunay Triangulation, Advancing-Front Method, Generation of Anisotropic Grids, Mixed-Element/Hybrid Grids, Assessment and Improvement of Grid Quality,

**TEXT BOOKS**

1. Introduction to computational fluid dynamics: the finite volume method - Versteeg, & Malalasekera - Addison-Wesley.
2. Introduction to Computational Fluid Dynamics – Niyog & Chakraborty – Pearson ,Singapore

**REFERENCES**

1. Computational Techniques for Fluid Dynamics, - Vols. I and II - Fletcher C.A.J. – Springer, Verlag, Berlin, 1988.
2. Computational Fluid Dynamics:An Introduction - John F. Wendt (Editor) – Springer, Verlag, Berlin.
3. Numerical Computation of Internal and External Flows, Vols. I and II - Charles Hirsch - John Wiley & Sons, New York.
4. Computational Fluid Dynamics for Engineers, Vols. I & II - . Klaus A Hoffmann and Steve T. Chiang - Engineering Education System, W. Wichita, K.S., 67208 – 1078 USA.
5. Fundamentals of Aerodynamics - Anderson, Jr.D - McGraw Hill.

**Contribution to Outcome:**

- Develop an understanding for the major theories, approaches and methodologies used in CFD.
- Build up the skills in the actual implementation of CFD methods for mechanical engineering design, analysis and application.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:03:46 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Soft computing techniques** Code: **337845(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

- To familiarize with concepts of soft computing
- To introduce the ideas of neural networks, fuzzy logic and use of heuristics based on human experience.
- To introduce the concepts of Genetic algorithm and its applications to soft computing using some applications.

**UNIT – I :** Introduction - Introduction to soft computing; introduction to biological and artificial neural network, introduction to fuzzy sets and fizzy logic systems.

**UNIT – II :** Artificial neural networks and applications - Different artificial neural network models, learning in artificial neural networks, neural network applications in control systems.

**UNIT – III :** Fuzzy systems and applications - Fuzzy sets; fuzzy reasoning, fuzzy inference systems, fuzzy control, fuzzy clustering, applications of fuzzy systems.

**UNIT – IV :** Neuro-fuzzy systems - Neuro-fuzzy modeling, Neuro-fuzzy control.
Genetic Algorithms- Simple GA, crossover and mutation, genetic algorithms in search and optimization.

**UNIT – V :** Applications- Pattern Recognitions, Image Processing, Biological Sequence Alignment and Drug Design, Robotics and Sensors, Information Retrieval Systems, Share Market Analysis, Analysis language processing.

**TEXT BOOKS**

1. Fuzzy Logic And Soft Computing – Chen, Guoging, Ving, Mingsheng & Cai, Kai Yuan Ed - Kluwar Academic Publications,Usa
2. Soft Computing and Intelligent Systems Design Theory Tools and Applications – Karray F O & Desilva C – Pearson, New Delhi

**REFERENCE BOOK**

1. A Computational intelligence: principles, techniques, and applications - Konar - Springer.
2. Introduction to pattern recognition: statistical, structural, neural, and fuzzy logic approaches: Friedman, M & Kandel, A. - World Scientific.
3. Neuro-fuzzy and soft computing: a computational approach to learning and machine intelligence - Jang, J S R, Sun, C T, & Mizutani E - Prentice Hall.
4. An introduction to genetic algorithms- Mitchell M - MIT press.
5. Fuzzy Logic with Engineering Applications - Ross T J - John Wiley & Sons

**Course Outcomes:**

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Recognize the feasibility of applying a soft computing methodology for a particular problem
- Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems
- Apply genetic algorithms to combinatorial optimization problems
- Apply neural networks to pattern classification and regression problems
- Effectively use existing software tools to solve real problems using a soft computing approach
- Evaluate and compare solutions by various soft computing approaches for a given problem.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:03:59 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Environmental Pollution & Control** Code: **337846(37)**
Total Theory Periods: **4 0** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

- To provide an introduction to Environmental Pollution.
- To develop an understanding of the causes, chemistry and effects of pollution.
- To build awareness of the strategies used to control and manage pollution.
- To make aware of Environmental Laws & Acts

**UNIT-I**

**Environmental Pollution – Introduction & Classification**

Sources and classification of air pollutants, aerosols, primary and secondary air pollutants, effect of air pollution on human health, effect of SO2, CO2, NO2 H2S and lead, economic effect of air pollution, mechanism of deterioration in polluted atmosphere. Factors influencing atmospheric deterioration, effect of air pollution on building materials, paints, textiles, rubber, leather, paper and electronic industry.

**UNIT – II**

**Environmental Pollution - Sources**

Air pollution due to automobiles, exhaust, Crankcase and evaporative emissions and their control, effect of various parameters of I.C. engines on air pollution, photochemical air pollution, air pollution from ferrous metallurgical operations and thermal power plants.

**UNIT – III**

**Chemistry of Pollution**

Definition of pollutant concentrations, mass concentration, volume concentration, mass-volume concentration and relationship between these concentrations, smoke and its control. Ningalmam smoke chart, smoke prevention and control of air pollution by process change, elementary ideas of control of gaseous contaminants for combustion and absorption.

**UNIT – IV**

**Pollution Control**

Control of air pollution by equipment, objectives of using control equipment, objectives of using control equipment, settling chambers, inertial separators, cyclones, principle of electroscopic precipitators, descriptive study of the above equipment only, merits and demerits of the equipment, choice of equipment.

**UNIT – V**

**Environmental Laws & Acts**

Air pollution indices, definition of air pollution index, type and use of air pollution indices, criteria for a standardized index, acid rain, causes of acid rain and its remedy, green house and its effect, air pollution legislation and regulations, constitution of the Board, functions of the central board and state boards, classification of pollution sources under Air Act 1981 and 1986.

**TEXT BOOKS**

1. Environmental Chemistry and Pollution Control - S S Dara – S Chand , New Delhi
2. Air Pollution - M.N. Rao and H.V.N. Rao – TMH, New Delhi.

**REFERENCE BOOKS**

1. Air Pollution Control Theory - Martin Crawford.- TMH, New Delhi
2. Encyclopaedia of Environment Control Technology & Air Pollution Control – Cheremisinott P N – Gulf Publication, London
3. Pollution Control Hand Book - Utility Publication,Securndarabad
4. Environmental Pollution Conservation And Planning - Pashupatinath & Siddh Nath - Chugh Publications, Allahabad
5. Environmental Air Pollution and Its Control - Chhatwal, Mehra & Katyal - Anmol Publications, New Delhi
6. Environmental Pollution Control Engineering – Rao C S –Wiley, New Delhi
7. Environmental Pollution Analysis – Khopkar S M- Wiley, New Delhi
8. Air Pollution Control Technology - R.W. Bethewaven - Van Nostrans.
9. Air Pollution & Control – KVSG Murali Krishnan – Kaushal & Company
10. Air Pollution & Control Technologies – Y. Anjaneyulu – Allied Publishers
11. Water & Air Pollution & Environmental Protection Laws, Vol. - II – M C Mehta – Delhi Law House

**Course Outcomes**

- Understand contemporary pollution issues.
- Have insight into specific examples of environmental pollution.
- Understand the causes and effects of key types of environmental pollution.
- Appreciate different pollution control strategies.
- Awareness of Environmental Laws & Acts

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:04:16 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Mechanical Handling System and Equipments** Code: **337847(37)**
Total Theory Periods: **4 0** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

- To introduce to the importance of proper material handling and storage techniques.
- To introduce to selection of material handling equipment
- To introduce to design considerations of mechanical handling equipment and load lifting attachments

**UNIT – I**

**Elements of Material Handling System**

Importance, Terminology, objectives and benefits of better Material Handling, Principles and features of Material Handling System, Interrelationships between material handling and plant layout, physical facilities and other or organizational functions, Classification of Material Handling Equipment.

**UNIT – II**

**Selection of Material Handling Equipment**

Factors affecting for selection, Material Handling Equation, Choices of Material Handling Equipment, General analysis Procedures, Basic Analytical techniques, the unit load concept Selection of suitable types of systems for applications, Activity cost data and economic analysis for design of components of Material Handling Systems, functions and parameters affecting service, packing and storage of materials.

**UNIT – III**

**Design of Mechanical Handling Equipment**

Design of Hoists, Drives for hoisting, components, and hoisting mechanisms, rail traveling components and mechanisms, hoisting gear operation during transient motion, selecting the motor rating and determining breaking torque for hoisting mechanisms. Design of Cranes, Hand-propelled and electrically driven E.O.T overheat traveling cranes, Traveling mechanisms of cantilever and monorail cranes, design considerations for structures of rotary and cranes with fixed radius, fixed post and overhead traveling cranes, Stability of stationary rotary and traveling rotary cranes.

**UNIT – IV**

**Design of load lifting attachments**

Load chains and types of ropes used in Material Handling System, Forged, Standard and Ramshorn Hooks, Crane Grabs and Clamps, Grab Buckets, Electromagnetic Design consideration for conveyor belts, Application of attachments.

**UNIT – V**

**Study of systems and Equipment used for Material Storage**

objectives of storage, Bulk material handling, Gravity flow of solid through slides and chutes, Storage in bins and hoppers, Belt conveyors, Bucket-elevators, Screw Conveyors, cabin vibratory Mobile racks etc.

**Text Books:**

1. Material Handling Equipments - N. Rudenko - Peace Publishers, Moscow.
2. Material handling System Design - James M. Apple, John-Wiley Publication, New York.

**Reference Books:**

1. Materials Handling Principals and Practice - Allegri T H - CBS Publication, New Delhi
2. Material Handling - John R. Immer - McGraw Hill Co. Ltd., New York.
3. Material Handling in Machine shops - Machinery Publication Co. Ltd., London.
4. Material Handling Equipment - M. P. Nexandrn - MIR Publication, Moscow.
5. Bulk Solid Handling - C. R. Cock and J. Mason - Leonard Hill Publication Co. Ltd. U.S.A.
6. Material Handling Hand Book - Kulwiac R. A - John Willy Publication, New York.

**Course outcomes**

- The students will be able to identify material handling equipment requirements for a specific process and for various locations and working conditions
- The students will be able to understand the benefit of an efficient material handling system
- The students will be able to recognize the importance of material storage equipments.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:04:30 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Safety Engineering** Code: **300859(37)**
Total Theory Periods: **4 0** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

- To Know safety philosophy and principles of accident prevention
- To know the safety rules, regulations, standards and codes
- To achieve an understanding of principles of safety management.
- To learn about various functions and activities of safety department.
- To study various mechanical machines and their safety importance.

**UNIT – I**

**Safety philosophy and principles of accident prevention**

Introduction, accident, injury, unsafe act, unsafe condition, reportable accidents, need for safety, break down of accidents, hazardous industries. Theories & principle of accidents casualty, cost of accident, computation of cost, utility of cost data. Accident reporting & Investigation, Identification of the key facts, corrective actions, classification of facts. Regulation- American (OSHA) and Indian Regulation.

**UNIT – II**

**Safety Management**

Division of responsibility, location of Safety function, size of safety department, qualification, for safety specialist, safety committee – structure and functions.

**UNIT – III**

**Safe working condition and their development**

Standard Operating Procedure (SOP) for various mechanical equipments, incidental safety devices and methods, statutory of provisions related to safeguarding of Machinery and working condition.

**UNIT – IV**

**Safety in Operation and Maintenance**

Operational activities and hazards, starting and shut down procedures, safe operation of pumps, compressor, heaters, reactors, work permit system, entry into continued spaces.

**UNIT – V**

**Safety in Storage and Emergency Planning**

Safety in storage, handling of chemicals and gases, storage layout, ventilation, safety in chemical laboratories, emergency preparedness on site plan, off site plan, toxic hazard control.

**TEXT BOOKS**

1. Safety Management : Strategy And Practice - Pybus R - Butterworth Heinmann, Oxford
2. Safety and Accident Prevention in Chemical Operation – H.H. Fawcett and Wood

**REFERENCE BOOKS**

1. Industrial Safety Management- Trafdar N K, Tarafdar K J – Dhapat Rai, New Delhi
2. Safety Management In Industry- Krishna, N V- Jaico Publication House; New Delhi
3. Industrial Safety And Pollution Control Hand Book - Nagraj, J N & Rameshchandar, R V - Associate Publisher, Securndabad
4. Fire and Safety Manual Refineries and Petrochemical Panel - National Safety Counsil, Bombay
5. Safety in Use of Compressed Gas Cylinders - National Safety Counsil, Bombay
6. Encyclopaedia of Occupational Health and Safety - Stallman I M, Mccann M, Warshaw L, Brabant C - International Labour Office,Geneva
7. Industrial Safety Environmental Pollution Health Hazard And Nuclear Accidents - A Chand - Mittal Publication, New Delhi
8. Personal Protective Equipment – National Safety Counsil, Bombay
9. Accident Prevention Manual for Business and Industrial Administration and Programs - Krieger, G R Montgomerji - National Safety Council, Ittenois.
10. Major Hazard Control A Practical Manual – ILO - National Safety Counsil, Bombay

**Course Outcomes:**

- Ability to understand the functions and activities of safety engineering department.
- Apply knowledge of safety engineering specialization for hazard identification, risk assessment and control of occupational hazards.
- Communicate effectively on health and safety matters among the employees and with society at large.

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:04:47 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Value Engineering** Code: **300805(37)**
Total Theory Periods: **4 0** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objectives:**

- The objective of this course is to introduce students with the methodology of Value Engineering and its decision-making process.
- To familiarize students with procedures that provides standards for Value Engineering applications.
- To teach value engineering in a practical, project-based manner.
- During the course student will be engaged in decision-making using Value Engineering tools to ensure quality and value while reducing the cost of projects.
- Student will know about a number of case study applications of the Value Engineering to gain practical experience.

**UNIT – I : Basic Concepts**

Meaning of the term value, basic kind, reasons for poor value, value addition, origin and history.
Benefits, relevance in Indian scenario.

**UNIT – II : Techniques**

Different techniques, organizing value engineering study, value engineering and quality.

**UNIT – III : Job Plan**

Different phases, General phase, Information phase, Functional Phase, Creation Phase, Evaluation Phase, Investigation Phase, Implementation Phase, Audit.

**UNIT – IV : Selection of evaluation of VE Projects**

Project selection, method selection, value standard, application of methodology.

**UNIT – V : Value Engineering Program**

VE operations in maintenance and repair activities, VE Cost, life cycle, cost model, training for VE, general value engineering, case studies.

**TEXT BOOKS**

1. Value Engineering a How to Manul– S.S. Iyer – New Age International Publishers, New Delhi
2. Industrial Engineering & Management – O.P. Khanna – Dhanpat Rai & Sons

**REFERENCES**

1. Techniques of Value Analysis and Engineering – L.D. Miles – McGraw Hill, New York
2. Value Engineering: A Systematic Approach – A.E. Mudge – McGraw Hill, New York
3. Getting More at Less Cost: The Value Engineering Way - Jagannathan G - TMH,New Delhi
4. Value Engineering a Practical Approach for Owners Designers & Constructions – Zimmerman LW & Gilen HD – CBS, New Delhi.
5. Compendium on Value Engineering – H.G. Tufty – Indo-American Society.

**Course Outcome:**

- Understand the basics of Value Engineering (VE) to ensure that a standardized method is used for VE applications to projects
- Learn to perform function analysis for projects
- Understand the appropriate time to apply VE for projects

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:05:01 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Managing Innovation & Entrepreneurship** Code: **300811(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

**Course Objective**

1. The course will provide a thorough coverage of conceptual framework on Entrepreneurship development.
2. Enhances student's innovation skill.
3. Helps to provide a quick understanding of essential concepts and issues.
4. Enhance the students to have an understanding about international entrepreneurship.
5. Understand the problems and prospects related to setting up of any type of business.

**UNIT – I**
**Introduction to Entrepreneurship**
Evolution of entrepreneurship from economic theory Managerial and entrepreneurial growth and development.

**UNIT – II**
**Creativity and Innovation**
Creativity and Innovation: Concepts shifting composition of the Economy purposeful innovation and the seven sources of innovative opportunity the innovation process. Innovative strategies: Strategies that aim at introducing an innovation. Innovation and entrepreneurship: Can they together? Planning – innovation and entrepreneurship.

**UNIT – III**
**Entrepreneurial Motivation**
Need for continuous learning & relearning Acquiring technological Innovation Entrepreneurial motivation (nAch story) Achievement Motivation in Real life. Case Study.

**UNIT – IV**
**International Entrepreneurship**
Concepts and nature of international entrepreneurship. The changing international environment. Ethics and international entrepreneurship. Strategic issues in international entrepreneurship.

**UNIT – V**
**Problem identification and problem solving**
Problem identification. Problem solving. Innovation and diversification.

**TEXT BOOK**
1. Managing innovation and entrepreneurship in technology based firm-Martin M J-John Willey
2. Managing technology innovation- Ettlite I E - John Willey & Sons.
**REFERENCE BOOKS**
1. discipline of innovation - Drucker P F -The Harvard business school press , May-June1985.
2. The innovator's solution: Creating and sustaining successful growth - Christensen, C. M. and Raynor, M.E. (2003) - Boston, M. A.: Harvard Business School Press.
3. Innovation(Collection of articles) - Drucker, P. F. (1985) - Harvard Business School Press(2001).
4. Harvard Business Review on entrepreneurship(Collection of articles) - Harvard Business School Press
5) Diffusion of innovations, 5th edition - Rogers, E. M. (2003) - New York: Simon and Schuster.
**Course Outcomes**
Work effectively with engineering and science teams

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:05:15 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering**
Subject: **Robotics Lab**
Total Lab Periods: **24**
Maximum Marks: **40**

Semester: **VIII**
Code: **337861(37)**
Batch Size: **30**
Minimum Marks: **20**

**List of Experiments:**

1. Demonstration of Cartesian/ cylindrical/ spherical robot.
2. Demonstration of Articulated/ SCARA robot.
3. Virtual modeling for kinematics and dynamic verification any one robotic structure using suitable software.
4. Design, modeling and analysis of two different types of grippers.
5. Study of sensor integration.
6. Two program for linear and non-linear path.
7. Study of robotic system design.
8. Programming for forward kinematics problems.
9. Dynamic analysis of manipulators using software.
10. Study and demonstration of actuators and vision system.
11. Study of various robotic applications.
12. Setting robot for any one industrial application after industrial visit.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:05:31 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Finite Element Methods Lab** Code: **337862(37)**
Total Lab Periods: **2 4** Batch Size: **30**
Maximum Marks: **40** Minimum Marks: **20**

**Minimum eight assignments are to be completed on following area using appropriate Software.**

1. Structural Analysis
2. Thermal Analysis
3. Fluid Flow Analysis
4. Coupled Field Analysis
5. Modal Analysis

Minimum four problems shall be solved with Manual calculations in any of area specified above.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:05:49 -08'00'

## Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Industrial Engineering & Management Lab** Code: **337863(37)**
Total Lab Periods: **24** Batch Size: **30**
Maximum Marks: **40** Minimum Marks: **20**

**EXPERIMENTS TO BE PERFORMED (MINIMUM TEN EXPERIMENTS)**

1. To prepare the charts & diagrams for a selected problem according to the existing method and an improved method -men type flow process chart.
2. To prepare the charts & diagrams for a selected problem according to the existing method and an improved method -material type flow process chart
3. To prepare the charts & diagrams for a selected problem according to the existing method and an improved method -machine type flow process chart
4. To prepare the charts & diagrams for a selected problem according to the existing method and an improved method – multiple activity chart.
5. Study of principles of fundamentals of hand motion.
6. Study & applications of principles of motion economy.
7. Performance of micro motion study of a job.
8. Problems in assignment of men & machines.
9. Training for a performance rating using walking exercises / audio visual aids.
10. Calculation of allowance for a job.
11. Standard time calculation problems.
12. Problems of wage incentive.
13. Case study of an industrial/service organization using a method study techniques.
14. Stop watch time study of a job.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:06:02 -08'00'

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Common to all branches** Semester: **VIII**
Subject: **Report Writing & Seminar** Code: **337865(37)**
Total Lab Periods: **24** Batch Size: **30**
Maximum Marks**: 40** Minimum Marks: **24**

**Unit -I**
**Introduction to Technical Writing**
How differs from other types of written communication Purpose of technical writing, Correspondence: prewriting, writing and rewriting Objectives of Technical Writing. Audience Recognition: High-tech audience, Low tech audience, Lay audience, Multiple Audience.

**Unit - II**
**Correspondence**
Memos, Letters, E-mails, Its differentiation, types of letters, Document Design, its importance, Electronic Communication: Internet, Intranet, extranet, Writing effective e-mail.

**Unit - III**
**Summary**
Report Strategies, Effective style of technical report writing: Structures: content, introduction, conclusions, references, etc., Presentation, Writing first draft, revising first draft, diagrams,
graphs, tables, etc. report lay-out.

**Unit -IV**
**Report Writing**
Criteria for report writing, Types of Report: Trip report, Progress report, lab report, Feasibility report, project report, incident report, etc. Case studies.

**Unit -V**
**Proposals & Presentation**
Title page, Cover letter, Table of Content, list of illustrations, summary, discussion, conclusion, references, glossary, appendix, Case Studies. Oral Presentation/ Seminar:

**Text Books:**
1. Technical Writing – Process & Product - Sharon J.Gerson & Steven M. Gerson - Pearson.
2. Business Correspondence & Report Writing – Sharma R C & Krishnamohan – TMH
**Reference Books:**
1. Communication Skills for Engineers - Sunita Mishra - Pearson Education
2. Communication for engineering students - Longman
3. Effective Technical Communication – Eisenbergm- McGraw Hill.
4. Technical Writing & Professional Communication for Non Native Speakers of English – Huckin T N & Olsen L A – Mcgraw Hill
5. Academic Writing: A Guide For Management Students And Researchers - Monippally M M and Pawar B S – Response Books,New Delhi.

DIPALI SOREN TUDU
Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:06:17 -08'00'

DIPALI SOREN TUDU

Digitally signed by DIPALI SOREN TUDU
Date: 2023.11.09 02:06:32 -08'00'

# Criterion 1

## Curricular Planning and Implementation QlM 1.1.1