SITAM

SATYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

Gajula Rega, Vizianagaram, ANDHRA PRADESH, INDIA-535002

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DEPARTMENT OF CIVIL ENGINEERING

COURSE OBJECTIVE-II Year-I Semester (R16)

1. PROBABILITY AND STATISTICS

Course Objectives:

1. To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering.
2. To introduce numerical techniques to solve the real world applications.

Course Outcomes:

At the end of the Course, Student will be able to:

1. Examine, analyze, and compare various Probability distributions for both discrete and continuous random variables.
2. Describe and compute confidence intervals for the mean of a population.
3. Describe and compute confidence intervals for the proportion and the variance of a population and test the hypothesis concerning mean, proportion and variance and perform ANOVA test.
4. Fit a curve to the numerical data.

2. BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Learning Objectives:

1. To learn the basic principles of electrical law's and analysis of networks.
2. To understand the principle of operation and construction details of DC machines.
3. To understand the principle of operation and construction details of transformer.
4. To understand the principle of operation and construction details of alternator and 3-Phase induction motor.
5. To study the operation of PN junction diode, half wave, full wave rectifiers and OPAMPs.
6. To learn the operation of PNP and NPN transistors and various amplifiers.

Outcomes:

1. Able to analyse the various electrical networks.
2. Able to understand the operation of DC generators,3-point starter and conduct the Swinburne's Test.
3. Able to analyse the performance of transformer.
4. Able to explain the operation of 3-phase alternator and 3-phase induction motors.
5. Able to analyse the operation of half wave, full wave rectifiers and OP-AMPs.
6. Able to explain the single stage CE amplifier and concept of feedback amplifier.

3. STRENGTH OF MATERIALS-I

Course Learning Objectives:

1. To impart preliminary concepts of Strength of Material and Principles of Elasticity and Plasticity Stress strain behavior of materials and their governing laws. Introduce student the moduli of Elasticity and their relations

2. To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw the diagrams of variation across the length.
3. To give concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.
4. The concepts above will be utilized in measuring deflections in beams under various loading and support conditions.
5. To classify cylinders based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure.

Course Outcomes:

1. The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions
2. The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
3. The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
4. The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.

4. BUILDING MATERIALS AND CONSTRUCTION

Objectives of the course:

1. Initiating the student with the knowledge of basic building materials and their properties.
2. Imparting the knowledge of course pattern in masonry construction and flat roofs and techniques of forming foundation, columns, beams, walls, sloped and flat roofs.
3. The student is to be exposed to the various patterns of floors, walls, different types of paints and varnishes.
4. Imparting the students with the techniques of formwork and scaffolding.
5. The students should be exposed to classification of aggregates, moisture content of the aggregate.

Course outcome:

Upon the successful completion of the course:

1. The student should be able to identify different building materials and their importance in building construction.
2. The student is expected to differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions.
3. The student should have learnt the importance of building components and finishings.
4. The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.

5. SURVEYING

Course Learning Objectives:

1. To introduce the students to basic principles of surveying, various methods of linear and angles measuring instruments and enable the students to use surveying equipments.

Course Outcomes:

Upon successful completion of the course, the student will be able:

1. To demonstrate the basic surveying skills.

2. To use various surveying instruments.
3. To perform different methods of surveying
4. To compute various data required for various methods of surveying.
5. To integrate the knowledge and produce topographical map

6. FLUID MECHANICS

Course Learning Objectives:

1. To understand the properties of fluids and fluid statics.
2. To derive the equation of conservation of mass and its application
3. To solve kinematic problems such as finding particle paths and stream lines
4. To use important concepts of continuity equation, Bernoulli's equation and turbulence, and apply the same to problems
5. To analyze laminar and turbulent flows
6. To understand the various flow measuring devices
7. To study in detail about boundary layers theory

Course Outcomes:

Upon successful completion of this course the students will be able to:

1. Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics.
2. Calculate the forces that act on submerged planes and curves.
3. Identify and analyse various types of fluid flows.
4. Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces.
5. Draw simple hydraulic and energy gradient lines.
6. Measure the quantities of fluid flowing in pipes, tanks and channels.

7. PROFESSIONAL ETHICS AND HUMAN VALUES

Course Objectives:

1. To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
2. Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

Outcome:

1. It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.
2. It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.

COURSE OBJECTIVE-III Year-I Semester (R16)

1. MANAGEMENT SCIENCE

Course Objectives:

1. To familiarize with the process of management and to provide basic insight into select contemporary management practices.
2. To provide conceptual knowledge on functional management and strategic management.

2. ENGINEERING GEOLOGY

Course Learning Objectives:

The objective of this course is:

1. To introduce the Engineering Geology as a subject in Civil Engineering.
2. To enable the student to use subject in civil engineering applications.
3. To know the Geological history of India.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Identify and classify the geological minerals.
2. Measure the rock strengths of various rocks.
3. Classify and measure the earthquake prone areas to practice the hazard zonation.
4. Classify, monitor and measure the Landslides and subsidence.
5. Prepares, analyses and interpret the Engineering Geologic maps.
6. Analyses the ground conditions through geophysical surveys.
7. Test the geological material and ground to check the suitability of civil engineering project construction.
8. Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc…

3. STRUCTURAL ANALYSIS – II

Course Learning Objectives:

The objective of this course is:

1. Familiarize Students with Different types of Structures.
2. Equip student with concepts of Arches.
3. Understand Concepts of lateral Load analysis.
4. Familiarize Cables and Suspension Bridges.
5. Understand Analysis methods Moment Distribution, Kanis Method and Matrix methods.

Course Outcomes:

At the end of this course; the student will be able to

1. Differentiate Determinate and Indeterminate Structures.
2. Carryout lateral Load analysis of structures.
3. Analyze Cable and Suspension Bridge structures.
4. Analyze structures using Moment Distribution, Kani's Method and Matrix methods

4. DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES

Course Learning Objectives:

The objective of this course is:

1. Familiarize Students with different types of design philosophies.
2. Equip student with concepts of design of flexural members.
3. Understand Concepts of shear, bond and torsion.

4. Familiarize students with different types of compressions members and Design.
5. Understand different types of footings and their design.

Course Outcomes:

At the end of this course the student will be able to

1. Work on different types of design philosophies.
2. Carryout analysis and design of flexural members and detailing.
3. Design structures subjected to shear, bond and torsion.
4. Design different type of compression members and footings.

5. TRANSPORTATION ENGINEERING – II

Course Learning Objectives:

The objectives of this course are:

1. To know various components and their functions in a railway track.
2. To acquire design principles of geometrics in a railway track.
3. To know various techniques for the effective movement of trains.
4. To acquire design principles of airport geometrics and pavements.
5. To know the planning, construction and maintenance of Docks and Harbours.

Course Outcomes:

At the end of course, Student will be able to

1. Design geometrics in a railway track.
2. Design airport geometrics and airfield pavements.
3. Plan, construct and maintain docks and harbours.

COURSE OBJECTIVE-IV Year-I Semester (R16)

1. ENVIRONMENTAL ENGINEERING –II

Course Learning Objectives:

The objective of this course is:

1. Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city.
2. Provide knowledge of characterisation of wastewater generated in a community.
3. Impart understanding of treatment of sewage and the need for its treatment.
4. Summarize the appurtenance in sewerage systems and their necessity.
5. Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.
6. Effluent disposal method and realise the importance of regulations in the disposal of effluents in rivers.

Course Outcomes:

By the end of successful completion of this course, the students will be able to:

1. Plan and design the sewerage systems.
2. Select the appropriate appurtenances in the sewerage systems.
3. Analyse sewage and suggest and design suitable treatment system for sewage treatment.
4. Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river.
5. Suggest a suitable disposal method with respect to effluent standards.

2. WATER RESOURCES ENGINEERING–II

Course Learning Objectives:

The course is designed to

1. Introduce the types of irrigation systems.
2. Introduce the concepts of planning and design of irrigation systems.
3. Discuss the relationships between soil, water and plant and their significance in planning an irrigation system.
4. Understand design methods of erodible and non-erodible canals • know the principles of design of hydraulic structures on permeable foundations.
5. Know the concepts for analysis and design principles of storage and diversion head works.
6. Learn design principles of canal structures

Course Outcomes:

At the end of the course the student will be able to

1. Estimate irrigation water requirements.
2. Design irrigation canals and canal network.
3. Plan an irrigation system.
4. Design irrigation canal structures.
5. Pan and design diversion head works.
6. Analyse stability of gravity and earth dams.
7. Design ogee spillways and energy dissipation works.

3. GEOTECHNICAL ENGINEERING – II

Course Learning Objectives:

The objective of this course is:

1. To impart to the student knowledge of types of shallow foundations and theories required for the determination of their bearing capacity.
2. To enable the student to compute immediate and consolidation settlements of shallow foundations.
3. To impart the principles of important field tests such as SPT and Plate bearing test.
4. To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.

Course Outcomes:

Upon the successful completion of this course:

1. The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
2. The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation.
3. The student must be able to use the field test data and arrive at the bearing capacity.
4. The student must be able to design Piles based on the principles of bearing capacity.

4. REMOTE SENSING AND GIS APPLICATIONS

Course Learning Objectives:

The course is designed to

1. Introduce the basic principles of Remote Sensing and GIS techniques.
2. Learn various types of satellite sensors and platforms.
3. Learn concepts of visual and digital image analyses.
4. Understand the principles of spatial analysis.
5. Appreciate application of RS and GIS to Civil engineering

Course outcomes:

At the end of the course the student will be able to

1. Be familiar with ground, air and satellite based sensor platforms.
2. Interpret the aerial photographs and satellite imageries.
3. Create and input spatial data for GIS application.
4. Apply RS and GIS concepts in water resources engineering.
5. Applications of various satellite data.

5. AIR POLLUTION AND CONTROL

Course Learning Objectives:

The course will address the following:

1. To know the analysis of air pollutants.
2. To know the Threshold Limit Values (TLV) of various air pollutants.
3. To acquire the design principles of particulate and gaseous control.
4. To learn plume behaviour in different environmental conditions.
5. To learn carbon credits for various day to day activities

Course Learning Outcomes:

Upon successful completion of this course, the students will be able to:

1. Decide the ambient air quality based on the analysis of air pollutants.
2. Design particulate and gaseous control measures for an industry.
3. Judge the plume behaviour in a prevailing environmental condition.
4. Estimate carbon credits for various day to day activities.

6. ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT

Course Learning Objectives:

The objective of this course is:

1. To impart knowledge on different concepts of Environmental Impact Assessment.
2. To know procedures of risk assessment.
3. To learn the EIA methodologies and the criterion for selection of EIA methods.
4. To pre-requisites for ISO 14001 certification.
5. To know the procedures for environmental clearances and audit.
6. To appreciate the importance of stakeholder participation in EIA

Course Learning Outcomes:

Upon successful completion of this course, the students will be able to:

1. Prepare EMP, EIS, and EIA report.
2. Identify the risks and impacts of a project.
3. Selection of an appropriate EIA methodology.
4. Evaluation the EIA report.
5. Estimate the cost benefit ratio of a project.
6. Know the role of stakeholder and public hearing in the preparation of EIA

7. IPR & PATENTS

Objectives:

1. To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines.
2. Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments.

COURSE OBJECTIVE-IV Year-II Semester (R16)

1. ESTIMATION SPECIFICATION & CONTRACTS

Course Learning Objectives:

The objective of this course is to enable the students to:

1. Understand the quantity calculations of different components of the buildings.
2. Understand the rate analysis of different quantities of the buildings components.
3. Learn various specifications and components of the buildings.

Course Outcomes:

Upon the successful completion of this course:

1. The student should be able to determine the quantities of different components of buildings.
2. The student should be in a position to find the cost of various building components.
3. The student should be capable of finalizing the value of structures.

2. CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Course Learning Objectives:

The objective of this course is:

1. To introduce to the student the concept of project management including network drawing and monitoring.
2. To introduce various equipments like earth moving equipment, trucks and handling equipment, aggregate production and construction equipment and machinery, related to constriction.
3. To introduce the importance of safety in construction projects.

Course Outcomes:

Upon the successful completion of this course, the students will be able to

1. Appreciate the importance of construction planning.
2. Understand the functioning of various earth moving equipment.
3. Know the methods of production of aggregate products and concreting and usage of machinery required for the works.
4. Apply the gained knowledge to project management and construction techniques.

3. PRESTRESSED CONCRETE

Course Learning Objectives:

The objective of this course is:

1. Familiarize Students with concepts of prestressing.
2. Equip student with different systems and devices used in prestressing.
3. Understand the different losses of prestress including short and long term losses.
4. Familiarize students with the analysis and design of prestressed concrete members under flexure, shear and torsion

Course Outcomes:

At the end of this course the student will be able to

1. Understand the different methods of prestressing.
2. Estimate effective prestress including the short and long term losses.
3. Analyze and design prestressed concrete beams under flexure and shear.
4. Understand the relevant IS Codal provisions for prestressed concrete.

4. SOLID AND HAZARDOUS WASTE MANAGEMENT

Course Learning Objectives:

The objective of this course is:

1. To impart the knowledge the methods of collection and optimization of collection routing of municipal solid waste.
2. To acquire the principles of treatment of municipal solid waste.
3. To know the impact of solid waste on the health of the living beings.
4. To learn the criterion for selection of landfill and its design.
5. To plan the methods of processing such as composting the municipal organic waste

Course Learning Outcomes:

Upon successful completion of this course, the students will be able to:

1. Design the collection systems of solid waste of a town.
2. Design treatment of municipal solid waste and landfill.
3. Know the criteria for selection of landfill.
4. Characterise the solid waste and design a composting facility.
5. Know the Method of treatment and disposal of Hazardous wastes.

COURSE OBJECTIVE-III Year-II Semester (R16)

1. DESIGN AND DRAWING OF STEEL STRUCTURES

Course Learning Objectives:

The objective of this course is to:

1. Familiarize Students with different types of Connections and relevant IS codes.
2. Equip student with concepts of design of flexural members.
3. Understand Design Concepts of tension and compression members in trusses.
4. Familiarize students with different types of Columns and column bases and their Design.
5. Familiarize students with Plate girder and Gantry Girder and their Design.

Course Outcomes:

At the end of this course the student will be able to

1. Work with relevant IS codes.
2. Carryout analysis and design of flexural members and detailing.
3. Design compression members of different types with connection detailing.
4. Design Plate Girder and Gantry Girder with connection detailing.
5. Produce the drawings pertaining to different components of steel structures.

2. GEOTECHNICAL ENGINEERING – I

Course Learning Objectives:

The objective of this course is:

1. To enable the student to find out the index properties of the soil and classify it.
2. To impart the concept of seepage of water through soils and determine the seepage discharge.
3. To enable the students to differentiate between compaction and consolidation of soils and to determine the magnitude and the rate of consolidation settlement.
4. To enable the student to understand the concept of shear strength of soils, assessment of the shear parameters of sands and clays and the areas of their application.

Course Outcomes:

Upon the successful completion of this course

1. The student must know the definition of the various parameters related to soil mechanics and establish their inter-relationships.
2. The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.
3. The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.
4. The student should be able to apply the above concepts in day-to-day civil engineering practice.

3. ENVIRONMENTAL ENGINEERING – I

Course Learning Objectives:

The course will address the following:

1. Outline planning and the design of water supply systems for a community/town/city.
2. Provide knowledge of water quality requirement for domestic usage.
3. Impart understanding of importance of protection of water source quality and enlightens the efforts involved in converting raw water into clean potable water.
4. Selection of valves and fixture in water distribution systems.

5. Impart knowledge on design of water distribution network.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Plan and design the water and distribution networks and sewerage systems.
2. Identify the water source and select proper intake structure.
3. Characterisation of water.
4. Select the appropriate appurtenances in the water supply.
5. Selection of suitable treatment flow for raw water treatments.

4. WATER RESOURCES ENGINEERING–I

Course Learning Objectives:

The course is designed to

1. Introduce hydrologic cycle and its relevance to Civil engineering.
2. Make the students understand physical processes in hydrology and, components of the hydrologic cycle.
3. Appreciate concepts and theory of physical processes and interactions.
4. Learn measurement and estimation of the components hydrologic cycle.
5. Provide an overview and understanding of Unit Hydrograph theory and its analysis.
6. Understand flood frequency analysis, design flood, flood routing.
7. Appreciate the concepts of groundwater movements and well hydraulics.

Course Outcomes:

At the end of the course the students are expected to

1. Have a thorough understanding of the theories and principles governing the hydrologic processes.
2. Be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects.
3. Develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures.
4. Be able to develop design storms and carry out frequency analysis.
5. Be able to determine storage capacity and life of reservoirs.
6. Develop unit hydrograph and synthetic hydrograph.
7. Be able to estimate flood magnitude and carry out flood routing.
8. Be able to determine aquifer parameters and yield of wells.
9. Be able to model hydrologic processes.

5. WASTE WATER MANAGEMENT

Learning Objectives:

1. Outline planning and the design of waste water collection, conveyance and treatment systems for a community/town/city.
2. Provide knowledge of characterization of waste water generated in a community.
3. Impart understanding of treatment of sewage and the need for its treatment.
4. Summarize the appurtenance in sewage systems and their necessity.
5. Teach planning and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.
6. Effluent disposal method and realize the importance of regulations in the disposal of effluents in rivers.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course objective-II YR-I Sem (R16)

1. STATISTICS WITH R PROGRAMMING

Course objective: After taking the course, students will be able to

- Use R for statistical programming, computation, graphics, and modeling
- Write functions and use R in an efficient way
- Fit some basic types of statistical models
- Use R in their own research
- Be able to expand their knowledge of R on their own.

COURSE OUTCOMES: At the end of this course, students will be able to: ¬

- List motivation for learning a programming language
- Access online resources for R and import new function packages into the R workspace
- Import, review, manipulate and summarize data-sets in R
- Explore data-sets to create testable hypotheses and identify appropriate statistical tests
- Perform appropriate statistical tests using R Create and edit visualizations with

2. MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

OBJECTIVE:

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

COURSE OUTCOMES:

- Student will be able to demonstrate skills in solving mathematical problems
- Student will be able to comprehend mathematical principles and logic
- Student will be able to demonstrate knowledge of mathematical modeling and proficiency in using mathematical software
- Student will be able to manipulate and analyze data numerically and/or graphically using appropriate Software
- Student will be able to communicate effectively mathematical ideas/results verbally or in writing

3. DIGITAL LOGIC DESIGN

OBJECTIVE:

- To introduce the basic tools for design with combinational and sequential digital logic and state machines.
- To learn simple digital circuits in preparation for computer engineering.

COURSE OUTCOMES:

- A student who successfully fulfills the course requirements will have demonstrated:
- An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
- An ability to understand the different switching algebra theorems and apply them for logic functions.
- An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
- An ability to define the other minimization methods for any number of variables Variable Entered Mapping (VEM) and Quine-MeCluskey (QM) Techniques and perform an algorithmic reduction of logic functions.

4. PYTHON PROGRAMMING

COURSECourse objectiveS:

- Introduction to Scripting Language
- Exposure to various problems solving approaches of computer science

COURSE OUTCOMES:

- Making Software easily right out of the box.
- Experience with an interpreted Language.
- To build software for real needs.
- Prior Introduction to testing software

5. DATA STRUCTURES THROUGH C++

COURSECourse objectiveS:

- To be familiar with basic techniques of object oriented principles and exception handling using C++
- To be familiar with the concepts like Inheritance, Polymorphism
- Solve problems using data structures such as linear lists, stacks, queues, hash tables
- Be familiar with advanced data structures such as balanced search trees, AVLTrees, and B Trees.

COURSE OUTCOMES:

- Distinguish between procedures and object oriented programming.
- Apply advanced data structure strategies for exploring complex data structures.
- Compare and contrast various data structures and design techniques in the area of Performance.
- Implement data structure algorithms through C++.
- Incorporate data structures into the applications such as binary search trees, AVL and B Trees
- Implement all data structures like stacks, queues, trees, lists and graphs and compare their Performance and trade offs

6. COMPUTER GRAPHICS

COURSECourse objectiveS:

- To develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

COURSE OUTCOMES:

- 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 select among models for lighting/shading: Color, ambient light; distant and light with sources; Phong reflection model; and shading (flat, smooth, Gourand, Phong).

CourseCourse objective-III YR-I Sem (R16)

1. Compiler Design

COURSECourse objectiveS:

- Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.

COURSE OUTCOMES:

- Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to use the Compiler tools like LEX, YACC, etc.
- Parser and its types i.e. Top-down and Bottom-up parsers.
- Construction of LL, SLR, CLR and LALR parse table.
- Syntax directed translation, synthesized and inherited attributes.
- Techniques for code optimization.

2.**UNIX PROGRAMMING**

COURSECourse objectiveS:

- Written technical communication and effective use of concepts and terminology.
- Facility with UNIX command syntax and semantics.
- Ability to read and understand specifications, scripts and programs.
- Individual capability in problem solving using the tools presented within the class. Students will demonstrate a mastery of the course materials and concepts within in class discussions.

COURSE OUTCOMES:

- Documentation will demonstrate good organization and readability.

- File processing projects will require data organization, problem solving and research.
- Scripts and programs will demonstrate simple effective user interfaces.
- Scripts and programs will demonstrate effective use of structured programming.
- Scripts and programs will be accompanied by printed output demonstrating completion of a test plan.
- Testing will demonstrate both black and glass box testing strategies.
- Project work will involve group participation.

3. OBJECT ORIENTED ANALYSIS & DESIGN USING UML

Course objective**:**

• To understand how to solve complex problems
• Analyze and design solutions to problems using object oriented approach
• Study the notations of Unified Modeling Language

OUTCOME:

• Ability to find solutions to the complex problems using object oriented approach
• Represent classes, responsibilities and states using UML notation
• Identify classes and responsibilities of the problem domain

5. DATA BASE MANAGEMENT SYSTEMS

COURSECourse objectiveS:

• To learn the principles of systematically designing and using large scale Database Management Systems for various applications.

COURSE OUTCOMES:

• Describe a relational database and object-oriented database.
• Create, maintain and manipulate a relational database using SQL
• Describe ER model and normalization for database design.
• Examine issues in data storage and query processing and can formulate appropriate solutions.
• Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage.
• Design and build database system for a given real world problem

6. OPERATING SYSTEMS

COURSECourse objectiveS:

Study the basic concepts and functions of operating systems.

- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

COURSE OUTCOMES:

- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.
- Perform administrative tasks on Linux Servers
- Introduction to Android Operating System Internals

CourseCourse objective-III YR-II Sem (R16)

1. **COMPUTER NETWORKS**

COURSECourse objectiveS:

• Understand state-of-the-art in network protocols, architectures, and applications.
• Process of networking research
• Constraints and thought processes for networking research
• Problem Formulation—Approach—Analysis—

COURSE OUTCOMES:

• Understand OSI and TCP/IP models
• Analyze MAC layer protocols and LAN technologies
• Design applications using internet protocols
• Understand routing and congestion control algorithms
• Understand how internet works

2. **DATA WARE HOUSING AND DATA MINING**

COURSECourse objectiveS:

- Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
- They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
- They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

COURSE OUTCOMES:

• Understand stages in building a Data Warehouse
• Understand the need and importance of preprocessing techniques
• Understand the need and importance of Similarity and dissimilarity techniques
• Analyze and evaluate performance of algorithms for Association Rules.
• Analyze Classification and Clustering algorithms

3. **DESIGN AND ANALYSIS OF ALGORITHMS**

COURSECourse objectiveS:

Upon completion of this course, students will be able to do the following:
• Analyze the asymptotic performance of algorithms.
• Write rigorous correctness proofs for algorithms.
• Demonstrate a familiarity with major algorithms and data structures.

• Apply important algorithmic design paradigms and methods of analysis.
• Synthesize efficient algorithms in common engineering design situations

COURSE OUTCOMES:

• Argue the correctness of algorithms using inductive proofs and invariants.
• Analyze worst-case running times of algorithms using asymptotic analysis.
• Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-andconquer algorithms. Derive and solve recurrences describing the performance of divideand-conquer algorithms.
• Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamicprogramming algorithms, and analyze them.
• Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.

4. SOFTWARE TESTING METHODOLOGIES

OBJECTIVE:

Fundamentals for various testing methodologies.
• Describe the principles and procedures for designing test cases.
• Provide supports to debugging methods.
• Acts as the reference for software testing techniques and strategies.

OUTCOME:

• Understand the basic testing procedures.
• Able to support in generating test cases and test suites.
• Able to test the applications manually by applying different testing methods and automation tools.
• Apply tools to resolve the problems in Real time environment.

5. INTERNET OF THINGS

COURSECourse objectiveS:

• Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
• Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
• Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
• Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

COURSE OUTCOMES:

• Demonstrate knowledge and understanding of the security and ethical issues of the Internet of Things
• Conceptually identify vulnerabilities, including recent attacks, involving the Internet of Things
• Develop critical thinking skills
• Compare and contrast the threat environment based on industry and/or device type

CourseCourse objective-IV YR-I Sem (R16)

1. CRYPTOGRAPHY AND NETWORK SECURITY

COURSECourse objectiveS:

• In this course the following principles and practice of cryptography and network security are covered:
• Classical systems, symmetric block ciphers (DES, AES, other contemporary symmetric ciphers)
• Public-key cryptography (RSA, discrete logarithms),
• Algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes,
• Email and web security, viruses, firewalls, digital right management, and other topics.

COURSE OUTCOMES:

• To be familiarity with information security awareness and a clear understanding of its importance.
• To master fundamentals of secret and public cryptography
• To master protocols for security services
• To be familiar with network security threats and countermeasures
• To be familiar with network security designs using available secure solutions (such asPGP,
• SSL, IPSec, etc)

2. SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

COURSECourse objectiveS:

The course should enable the student:
• To understand interrelationships, principles and guidelines governing architecture and evolution over time.
• To understand various architectural styles of software systems.
• To understand design patterns and their underlying object oriented concepts.

COURSE OUTCOMES:

• To understand implementation of design patterns and providing solutions to real world software design problems.
• To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.

3. **WEB TECHNOLOGIES**

Course CourseCourse objectives:

- This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web.
- The course will introduce web-based media-rich programming tools for creating interactive web pages.

Course Outcome:

• Analyze a web page and identify its elements and attributes. • Create web pages using XHTML and Cascading Styles sheets. • Build dynamic web pages. • Build web applications using PHP. • Programming through PERL and Ruby • Write simple client-side scripts using AJAX

4. MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course CourseCourse objectives:

• The Learning courseCourse objectives of this paper is to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting, Production function, Input Output relationship, CostOutput relationship and Cost-Volume-Profit Analysis.

• To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.

• To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation. Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

Course Outcome:

- The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
- One is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

SIGNATURE OF HOD

SITAM

SATYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, VIZIANAGARAM

Gajula Rega, Vizianagaram , ANDHRA PRADESH, INDIA-535002.

Accredited by NAAC, Approved by AICTE & Affiliated to JNTUK, KAKINADA

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course objectives and Course Outcomes

II Year-I Sem (R19)

ELECTRONIC DEVICES AND CIRCUITS

Course Objectives:

The main objectives of this course are

- To learn and understand the basic concepts of semiconductor physics.
- Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
- To learn and understand the application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
- Acquire knowledge about the principle of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics.
- To learn and understand the purpose of transistor biasing and its significance.
- Small signal equivalent circuit analysis of BJT and FET transistor amplifiers and compare different configurations.

Course Outcomes:

At the end of this course the student will be able to

- Apply the basic concepts of semiconductor physics.
- Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
- Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.

- Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
- Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
- Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

SWITCHING THEORY and LOGIC DESIGN

Course Objectives:

- To solve a typical number base conversion and analyze new error coding techniques.
- Theorems and functions of Boolean algebra and behavior of logic gates.
- To optimize logic gates for digital circuits using various techniques.
- Boolean function simplification using Karnaugh maps and Quine -Mc Cluskey methods.
- To understand concepts of combinational circuits.
- To develop advanced sequential circuits.

Course Outcomes:

- Classify different number systems and apply to generate various codes.
- Use the concept of Boolean algebra in minimization of switching functions
- Design different types of combinational logic circuits.
- Apply knowledge of flip-flops in designing of Registers and counters
- The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
- Produce innovative designs by modifying the traditional design techniques.

SIGNALS and SYSTEMS

Course Objectives:

The main objectives of this course are given below:

- To study about signals and systems.
- To analyze the spectral characteristics of signal using Fourier series and Fourier transforms.
- To understand the characteristics of systems.

- To introduce the concept of sampling process
- To know various transform techniques to analyze the signals and systems.

Course Outcomes:

At the end of this course the student will able to:

- Differentiate the various classifications of signals and systems
- Analyze the frequency domain representation of signals using Fourier concepts
- Classify the systems based on their properties and determine the response of LTI Systems.
- Know the sampling process and various types of sampling techniques.
- Apply Laplace and z-transforms to analyze signals and Systems (continuous &discrete).

RANDOM VARIABLES and STOCHASTIC PROCESSES

Course Objectives:

- To give students an introduction to elementary probability theory, in preparation to learn the concepts of statistical analysis, random variables and stochastic processes.
- To mathematically model the random phenomena with the help of probability theory Concepts.
- To introduce the important concepts of random variables and stochastic processes.
- To analyze the LTI systems with stationary random process as input.

Course Outcomes:

After completion of the course, the student will be able to

- Mathematically model the random phenomena and solve simple probabilistic problems.
- Identify different types of random variables and compute statistical averages of these random variables.
- Characterize the random processes in the time and frequency domains.
- Analyze the LTI systems with random inputs.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives:

This subject will help to improve

- the analytical skills of object oriented programming
- Overall development of problem solving and critical analysis.
- Formal introduction to Java programming language

Course Outcomes:

On successful completion of this course, the student should be able to:

- Show competence in the use of the Java programming language in the development of small to medium- sized application programs that demonstrate professionally acceptable coding and performance standard
- Illustrate the basic principles of the object-oriented programming
- Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

Course Objectives:

- The Learning objectives of this paper are to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting.
- To familiarize about the Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
- To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
- To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation.
- Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

Course Outcomes:

- The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.

- The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
- The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
- The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

CONSTITUTION OF INDIA

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative.

Course Outcomes:

At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
    1. Know the sources, features and principles of Indian Constitution.
    2. Learn about Union Government, State government and its administration.
    3. Get acquainted with Local administration and Pachayati Raj.

4. Be aware of basic concepts and developments of Human Rights.
Gain knowledge on roles and functioning of Election Commission

II Year-II Semester (R19)

ELECTRONIC CIRCUIT ANALYSIS

Course Objectives:

The main objectives of this course are:

- To learn hybrid-pi parameters at high frequency and compare with low frequency parameters.
- Learn and understand the purpose of cascading of single stage amplifiers and derive the overall voltage gain.
- Analyze the effect of negative feedback on amplifier characteristics and derive the characteristics.
- Learn and understand the basic principle of oscillator circuits and perform the analysis of different oscillator circuits.
- Compare and analyze different Power amplifiers like Class A, Class B, Class C, Class AB and other types of amplifiers.
- Analyze different types of tuned amplifier circuits.

Course Outcomes:

At the end of this course the student can able to

- Design and analysis of small signal high frequency transistor amplifier using BJT and FET.
- Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT.
- Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
- Know the classification of the power and tuned amplifiers and their analysis with performance comparison.

LINEAR CONTROL SYSTEMS

Course objectives:

- To introduce the concepts of open loop and closed loop systems, mathematical models of mechanical and electrical systems, and

concepts of feedback

- To study the characteristics of the given system in terms of the transfer function and introducing various approaches to reduce the overall system for necessary analysis
- To develop the acquaintance in analyzing the system response in time-domain and frequency domain in terms of various performance indices
- To analyze the system in terms of absolute stability and relative stability by different approaches
- To design different control systems for different applications as per given specifications
- To introduce the concepts of state variable analysis, design and also the concepts of controllability and observability.

Course Outcomes:

- This course introduces the concepts of feedback and its advantages to various control systems
- The performance metrics to design the control system in time-domain and frequency domain are introduced.
- Control systems for various applications can be designed using time-domain and frequency domain analysis.
- In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.

ELECTROMAGNETIC WAVES and TRANSMISSION LINES

Course objectives:

The main objectives of this course are to understand

- Fundamentals of steady electric and magnetic fields using various laws
- Apply the concept of static and time varying Maxwell equations and power flow using pointing theorem
- Wave characteristics in different media for normal and oblique incidence
- Implement various concepts of transmission lines and impedance measurements

Course Outcomes:

At the end of this course the student can able to

- Determine E and H using various laws and applications of electric & magnetic fields
- Apply the Maxwell equations to analyze the time varying behavior of EM waves

- Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various media
- Calculate Brewster angle, critical angle and total internal reflection
- Derive and Calculate the expressions for input impedance of transmission lines, reflection coefficient, VSWR etc. using smith chart

ANALOG COMMUNICATIONS

Course Objectives:

Students undergoing this course are expected to

- Familiarize with the fundamentals of analog communication systems.
- Familiarize with various techniques for analog modulation and demodulation of signals.
- Distinguish the figure of merits of various analog modulation methods.
- Develop the ability to classify and understand various functional blocks of radio transmitters and receivers.
- Familiarize with basic techniques for generating and demodulating various pulse modulated signals.

Course Outcomes:

After undergoing the course, students will be able to

- Differentiate various Analog modulation and demodulation schemes and their spectral characteristics
- Analyze noise characteristics of various analog modulation methods
- Analyze various functional blocks of radio transmitters and receivers
- Design simple analog systems for various modulation techniques

COMPUTER ARCHITECTURE and ORGANIZATION

Course objectives:

- To understand the architecture of a modern computer with its various processing units. Also the Performance measurement of the computer system.
- To understand the memory management system of computer.
- To Understand the various instructions, addressing modes
- To Understand the concept of I/O organization

Course Outcomes:

- Students can understand the architecture of modern computer.
- They can analyze the Performance of a computer using performance equation
- Understanding of different instruction types.

- Students can calculate the effective address of an operand by addressing modes
- They can understand how computer stores positive and negative numbers. Understand the concepts of I/O Organization and Memory systems

MANAGEMENT and ORGANISATIONAL BEHAVIOUR

Course Objectives:

- To familiarize with the process of management, principles, leadership styles and basic concepts on Organization.
- To provide conceptual knowledge on functional management that is on Human resource management and Marketing management.
- To provide basic insight into select contemporary management practices and Strategic Management.
- To learn theories of motivation and also deals with individual behavior, their personality and perception of individuals.
- To understand about organizations groups that affect the climate of an entire organizations which helps employees in stress management.

Course Outcomes:

- After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure.
- Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments.
- The learner is able to think in strategically through contemporary management practices.
- The learner can develop positive attitude through personality development and can equip with motivational theories.
- The student can attain the group performance and grievance handling in managing the organizational culture.

Course objective and Course Outcomes III Year - I Sem (R16)

COMPUTER ARCHITECTURE AND ORGANIZATION

OBJECTIVES:

- Understand the architecture of a modern computer with its various processing units. Also the Performance measurement of the computer system.
- In addition to this the memory management system of computer.

OUTCOMES:

- Students can understand the architecture of modern computer.
- They can analyze the Performance of a computer using performance equation
- Understanding of different instruction types.
- Students can calculate the effective address of an operand by addressing modes
- They can understand how computer stores positive and negative numbers.
- Understanding of how a computer performs arithmetic operation of positive and negative numbers.

LINEAR IC APPLICATIONS

OBJECTIVES

- To understand the basic operation &performance parameters of differential amplifiers.
- To understand & learn the measuring techniques of performance parameters of OP-AMP
- To learn the linear and non-linear applications of operational amplifiers.
- To understand the analysis & design of different types of active filters using opamps
- To learn the internal structure, operation and applications of different analog ICs
- To Acquire skills required for designing and testing integrated circuits

OUTCOMES

- Design circuits using operational amplifiers for various applications.
- Analyze and design amplifiers and active filters using Op-amp.
- Diagnose and trouble-shoot linear electronic circuits.
- Understand the gain-bandwidth concept and frequency response of the amplifier configurations.
- Understand thoroughly the operational amplifiers with linear integrated circuits.

DIGITAL IC APPLICATIONS

OBJECTIVES

The main objectives of this course are:

- Introduction of digital logic families and interfacing concepts for digital design is considered.

- VHDL fundamentals were discussed to modeling the digital system design blocks.
- VHDL compilers, simulators and synthesis tools are described, which are used to verify digital systems in a technology-independent fashion.
- Design and implementation of combinational and sequential digital logic circuits is explained.

Outcomes:

At the end of this course the student can able to:

- Understand the structure of commercially available digital integrated circuit families.
- Learn the IEEE Standard 1076 Hardware Description Language (VHDL).
- Model complex digital systems at several levels of abstractions, behavioral, structural, simulation, synthesis and rapid system prototyping.
- Analyze and design basic digital circuits with combinatorial and sequential logic circuits using VHDL.

DIGITAL COMMUNICATIONS

Course Objectives:

- Understand different pulse digital modulation techniques and their comparision
- Familiarize various digital modulation techniques and calculation of their error probabilities
- Understand the concept of entropy and different source coding techniques
- Familirize with block codes, cyclic codes and convolutional codes

Course Outcomes:

After undergoing the course students will be able to:

- Determine the performance of different waveform coding techniques for the generation and digital representation of the signals.
- Determine the probability of error for various digital modulation schemes
- Analyze different source coding techniques
- Compute and analyze different error control coding schemes for the reliable transmission of digital information over the channel.

ANTENNA AND WAVE PROPAGATION

OBJECTIVES

The student will be able to

- understand the applications of the electromagnetic waves in free space.
- introduce the working principles of various types of antennas
- discuss the major applications of antennas with an emphasis on how antennas are employed to meet electronic system requirements.
- understand the concepts of radio wave propagation in the atmosphere.

OUTCOMES

After going through this course the student will be able to

- Identify basic antenna parameters.
- Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and microstrip antennas
- Quantify the fields radiated by various types of antennas
- Design and analyze antenna arrays
- Analyze antenna measurements to assess antenna's performance
- Identify the characteristics of radio wave propagation

PROFESSIONAL ETHICSAND HUMAN VALUES

Objectives:

- To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
- Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

Outcome:

- It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.
- It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively

III Year II Sem (R16)

MICROWAVE ENGINEERING

OBJECTIVES:

The student will

- Understand fundamental characteristics of waveguides and Microstrip lines through electromagnetic field analysis.
- Understand the basic properties of waveguide components and Ferrite materials composition
- Understand the function, design, and integration of the major microwave components.
- Understand a Microwave test bench setup for measurements.

OUTCOMES:

After going through this course the student will be able to

- Design different modes in waveguide structures
- Calculate S-matrix for various waveguide components and splitting the microwave energy in a desired direction
- Distinguish between Microwave tubes and Solid State Devices, calculation of efficiency of devices.
- Measure various microwave parameters using a Microwave test bench

VLSI DESIGN

Objectives:

The main objectives of this course are:

- Basic characteristics of MOS transistor and examines various possibilities for configuring inverter circuits and aspects of latch-up are considered.
- Design processes are aided by simple concepts such as stick and symbolic diagrams but the key element is a set of design rules, which are explained clearly.
- Basic circuit concepts are introduced for MOS processes we can set out approximate circuit parameters which greatly ease the design process.

Outcomes:

At the end of this course the student can able to:

- Understand the properties of MOS active devices and simple circuits configured when using them and the reason for such encumbrances as ratio rules by which circuits can be interconnected in silicon.
- Know three sets of design rules with which nMOS and CMOS designs may be fabricated.
- Understand the scaling factors determining the characteristics and performance of MOS circuits in silicon.

DIGITAL SIGNAL PROCESSING

OBJECTIVES

The student will be able to

- Analyze the Discrete Time Signals and Systems
- Know the importance of FFT algorithm for computation of Discrete Fourier Transform
- Understand the various implementations of digital filter structures
- Learn the FIR and IIR Filter design procedures
- Know the need of Multirate Processing
- Learn the concepts of DSP Processors

OUTCOMES

After going through this course the student will be able to

- Apply the difference equations concept in the anayziation of Discrete time systems
- Use the FFT algorithm for solving the DFT of a given signal
- Design a Digital filter (FIR&IIR) from the given specifications
- Realize the FIR and IIR structures from the designed digital filter.
- Use the Multirate Processing concepts in various applications(eg: Design of phase shifters, Interfacing of digital systems…)
- Apply the signal processing concepts on DSP Processor.

OOPS THROUGH JAVA

OBJECTIVES:

- Understanding the OOP's concepts, classes and objects, threads, files, applets, swings and act.
- This course introduces computer programming using the JAVA programming language with object- oriented programming principles.
- Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using Java for network level programming and middleware development

OUTCOMES:

- Understand Java programming concepts and utilize Java Graphical User Interface in Program writing.
- Write, compile, execute and troubleshoot Java programming for networking concepts.
- Build Java Application for distributed environment.
- Design and Develop multi-tier applications
- Identify and Analyze Enterprise applications.

DATA MINING

OBJECTIVES:

- Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.
- They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
- They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

OUTCOMES:

- Understand stages in building a Data Warehouse
- Understand the need and importance of preprocessing techniques
- Understand the need and importance of Similarity and dissimilarity techniques
- Analyze and evaluate performance of algorithms for Association Rules.
- Analyze Classification and Clustering algorithms

INDUSTRIAL ROBOTICS

Objectives:

- To give students practice in applying their knowledge of mathematics, science, and Engineering and to expand this knowledge into the vast area of robotics.
- The students will be exposed to the concepts of robot kinematics, Dynamics, Trajectory planning.
- Mathematical approach to explain how the robotic arm motion can be described.
- The students will understand the functioning of sensors and actuators.

Course outcomes:

Upon successful completion of this course you should be able to:

- Identify various robot configuration and components,
- Select appropriate actuators and sensors for a robot based on specific application
- Carry out kinematic and dynamic analysis for simple serial kinematic chains
- Perform trajectory planning for a manipulator by avoiding obstacles.
-

POWER ELECTRONICS

Learning Objectives:

- To study the characteristics of various power semiconductor devices and to design firing circuits for SCR.
- To understand the operation of single phase half wave and full–wave converters
- To understand the operation of different types of DC-DC converters.
- To understand the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.
- To understand the operation of AC-AC converters and switch mode power supplies operation.

Learning Outcomes:

Student should be able to

- Explain the characteristics of various power semiconductor devices and analyse the static and dynamic characteristics of SCR's.
- Design firing circuits for SCR.
- Able to explain the operation of single phase half wave and full–wave converters
- Analyse the operation of different types of DC-DC converters.
- Explain the operation of inverters and application of PWM techniques for voltage

control and harmonic mitigation.

- Analyse the operation of AC-AC converters.
- Able to explain switch mode power supplies operation and control

BIO-MEDICAL ENGINEERING

Objectives:

The student will be made

- Learn about physiological system of the body and study different types of Potentials.
- Understand the working of transducers in different applications.
- Examine the measurements in the respiratory systems.
- Observe the monitoring Instruments in the lab.
- Understand different diagnostic techniques.
- To provide aid and shocking hazards.

Outcomes:

After completion of this course the student will be able to

- Memorize the physiological system of the body and distinguish different potentials.
- Choose the type of transducer for biomedical application.
- Examine and apply the blood flow measurement using sphygmomanometer.
- Choose suitable monitoring system for patient caring.
- Plan to organize the telemetry procedure using diagnostic techniques.
- Prepare to perform aid for the injured patients.

ARTIFICIAL NEURAL NETWORKS

Course Objectives:

- To Introduce the concept of Artificial Neural Networks , Characteristics, Models of Neuron, Learning Rules, Learning Methods, Stability and Convergence
- To study the basics of Pattern Recognition and Feed forward Neural Networks
- To study the basics of Feedback neural networks and Boltzmann machine
- To introduce the Analysis of Feedback layer for different output functions, Pattern Clustering and Mapping networks
- To study the Stability, Plasticity, Neocognitron and Different applications of Neural Networks

Course Outcomes

- This Course introduces Artificial Neural Networks and Learning Rules and Learning methods
- Feed forward and Feedback Neural Networks are introduced
- Applications of Neural Networks in different areas are introduced

IV YEAR – I SEMESTER (R16)

RADAR SYSTEMS

OBJECTIVES

The student will be introduced to:

- The Basic Principle of radar and radar range equation.
- Different types of radars; CW, FM-CW, MTI and pulse Doppler radars.
- Understand the different tracking techniques for radar.
- Understand the characteristics of a matched filter receiver and its performance.
- Understand the different types of displays, duplexers and antennas used in radar systems.

OUTCOMES

After going through this course the student will be able to:

- Derive the radar range equation and to solve some analytical problems.
- Understand the different types of radars and its applications.
- Understand the concept of tracking and different tracking techniques.
- Understand the various components of radar receiver and its performance.

DIGITAL IMAGE PROCESSING

Course Objectives:

Students undergoing this course are expected to:

- Familiarize with basic concepts of digital image processing and different image transforms
- Learn various image processing techniques like image enhancement, restoration, segmentation and compression
- Understand color fundamentals and different color models
- Understand wavelets and morphological image processing

Course Outcomes:

After undergoing the course students will be able to

- Perform image manipulations and different digital image processing techniques
- Perform basic operations like – Enhancement, segmentation, compression, Image transforms and restoration techniques on image.
- Analyze pseudo and full color image processing techniques.
- Apply various morphological operators on images

COMPUTER NETWORKS

OBJECTIVES:

- Understand state-of-the-art in network protocols, architectures, and applications.
- Process of networking research
- Constraints and thought processes for networking research
- Problem Formulation—Approach—Analysis—

OUTCOMES:

- Understand OSI and TCP/IP models
- Analyze MAC layer protocols and LAN technologies
- Design applications using internet protocols
- Understand routing and congestion control algorithms
- Understand how internet works

OPTICAL COMMUNICATIONS

OBJECTIVES

The student will be introduced to the functionality of each of the components that comprise a fiber-optic communication system

- the properties of optical fiber that affect the performance of a communication link and types of fiber materials with their properties and the losses occur in fibers.
- the principles of single and multi-mode optical fibers and their characteristics
- working of semiconductor lasers, and differentiate between direct modulation and external electro-optic modulation.
- Analyze the operation of LEDs, laser diodes, and PIN photo detectors (spectral properties, bandwidth, and circuits) and apply in optical systems.

- Analyze and design optical communication and fiber optic sensor systems.
- the models of analog and digital receivers.

OUTCOMES

After going through this course the student will be able to

- Choose necessary components required in modern optical communications systems .
- Design and build optical fiber experiments in the laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers.
- Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems.
- Choose the optical cables for better communication with minimum losses Design, build, and demonstrate optical fiber experiments in the laboratory.

TELEVISION ENGINEERING

Course Objectives:

- To introduce the basics of picture transmission and reception, analysis and synthesis of composite video signal, receiver and picture tubes and television camera tubes.
- To study various colour television systems with greater emphasis on television standards.
- To become well conversant with new development in digital video engineering.
- To introduce advanced TV systems, MAC signals and direct to home TV technology.
- To introduce most latest and revolutionary ideas in the field of digital TV, HDTV, WDTV.
- To study various display system and its application.

Course Outcomes:

- Understand the fundamental concepts of television transmitter and receiver systems, the
- transmission of video signals and importance of television standards to effectively work with
- broadcasting applications, trouble shooting of television systems.
- Understand different colour television systems used worldwide and its compatibility.
- Understand principles of digital video and component video signal.

- Understand advanced TV technology and DTH technology.
- Describe and differentiate working principles of latest digital TV, HDTV.

ELECTRONIC SWITCHING SYSTEMS

OBJECTIVES :

The student will

- Understand the means of measuring traffic.
- Understand the implication of the traffic level on system design.

Outcomes

The student will be able to

- Evaluate the time and space parameters of a switched signal
- Establish the digital signal path in time and space, between two terminals
- Evaluate the inherent facilities within the system to test some of the SLIC, CODEC and digital switch functions.
- Investigate the traffic capacity of the system.
- Evaluate methods of collecting traffic data.
- Evaluate the method of interconnecting two separate digital switches

EMBEDDED SYSTEMS

Objectives:

The main objectives of this course are given below:

- The basic concepts of an embedded system are introduced.
- The various elements of embedded hardware and their design principles are explained.
- Different steps involved in the design and development of firmware for embedded systems is elaborated.
- Internals of Real-Time operating system and the fundamentals of RTOS based embedded firmware design is discussed.
- Fundamental issues in hardware software co-design were presented and explained.
- Familiarise with the different IDEs for firmware development for different family of processors/controllers and embedded operating systems.
- Embedded system implementation and testing tools are introduced and discussed.

Outcomes:

At the end of this course the student can able to:

- Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function.
- The hardware components required for an embedded system and the design approach of an embedded hardware.
- The various embedded firmware design approaches on embedded environment.
- Understand how to integrate hardware and firmware of an embedded system using real time operating system.

ANALOG IC DESIGN

OBJECTIVES

The student will be introduced to

- The student will be able to understand the behavior of MOS Devices and Small-Signal & Large-Signal Modeling of MOS Transistor and Analog Sub-Circuits.
- In this course, students can study CMOS Amplifiers like Differential Amplifiers, Cascode Amplifiers, Output Amplifiers, and Operational Amplifiers.
- Another main object of this course is to motivate the graduate students to design and to develop the Analog CMOS Circuits for different Analog operations.
- The concepts of Open-Loop Comparators and Different Types of Oscillators like Ring Oscillator, LC Oscillator etc.

OUTCOMES

After going through this course the student will be able to

- Understand the concepts of MOS Devices and Modeling.
- Design and analyze any Analog Circuits in real time applications.
- Extend the Analog Circuit Design to Different Applications in Real Time.
- Understand of Open-Loop Comparators and Different Types of Oscillators.

NETWORK SECURITY AND CRYPTOGRAPHY

Objectives:

- In this course the following principles and practice of cryptography and network security are covered:

- Classical systems, symmetric block ciphers (DES, AES, other contemporary symmetric ciphers)
- Public-key cryptography (RSA, discrete logarithms),
- Algorithms for factoring and discrete logarithms, cryptographic protocols,hash functions, authentication, key management, key exchange, signature schemes, Email and web security, viruses, firewalls, digital right management, and other topics

OUTCOMES:

- To be familiarity with information security awareness and a clear understanding of its importance.
- To master fundamentals of secret and public cryptography
- To master protocols for security services
- To be familiar with network security threats and countermeasures
- To be familiar with network security designs using available secure solutions (such asPGP,
- SSL, IPSec, etc)

IV YEAR – II SEMESTER (R16)

CELLULAR AND MOBILE COMMUNICATIONS

OBJECTIVES

The student will be introduced to:

- Understand the basic cellular concepts like frequency reuse, cell splitting, cell sectoring etc., and various cellular systems.
- Understand the different types of interference s influencing cellular and mobile communications.
- Understand the frequency management, channel assignment and various propagation effects in cellular environment.
- Understand the different types antennas used at cell site and mobile.
- Understand the concepts of handoff and types of handoffs.
- Understand the architectures of GSM and 3G cellular systems.

Outcomes:

At the end of this course the student can able to:

- Identify the limitations of conventional mobile telephone systems; understand the concepts

of cellular systems.

- Understand the frequency management, channel assignment strategies and antennas in cellular systems.
- Understand the concepts of handoff and architectures of various cellular systems.

ELECTRONIC MEASUREMENTSAND INSTRUMENTATION

OUTCOMES

The student will be able to

- Select the instrument to be used based on the requirements.
- Understand and analyze different signal generators and analyzers.
- Understand the design of oscilloscopes for different applications.
- Design different transducers for measurement of different parameters.

SATELLITE COMMUNICATIONS

OBJECTIVES

The student will be introduced to:

- Understand the basic concepts, applications, frequencies used and types of satellite communications.
- Understand the concept of look angles, launches and launch vehicles and orbital effects in satellite communications.
- Understand the various satellite subsystems and its functionality.
- Understand the concepts of satellite link design and calculation of C/N ratio.
- Understand the concepts of multiple access and various types of multiple access techniques in satellite systems.

Understand the concepts of satellite navigation, architecture and applications of GPS.

Outcomes:

At the end of this course the student can able to:

- Understand the concepts, applications and subsystems of Satellite communications.

- Derive the expression for G/T ratio and to solve some analytical problems on satellite link design.
- Understand the various types of multiple access techniques and architecture of earth station design.
- Understand the concepts of GPS and its architecture.

DIGITAL IC DESIGN

OBJECTIVES

- The student will be able to understand the MOS Design.
- In this course, students can study Combinational MOS Logic Circuits and Sequential MOS Logic Circuits.
- Another main object of this course is to motivate the graduate students to design and to develop the Digital Integreated Circuits for different Applications.
- The concepts of Semiconductor Memories, Flash Memory, RAM array organization.

OUTCOMES

After going through this course the student will be able to

- Understand the concepts of MOS Design.
- Design and analysis of Combinational and Sequential MOS Circuits.
- Extend the Digital IC Design to Different Applications.
- Understand the Concepts of Semiconductor Memories, Flash Memory, RAM array organization.

OPERATING SYSTEMS:

OBJECTIVES:

- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.

- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

OUTCOMES:

- Design various Scheduling algorithms.
- Apply the principles of concurrency.
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Design and Implement a prototype file systems.
- Perform administrative tasks on Linux Servers
- Introduction to Android Operating System Internals

SITAM

SATYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, VIZIANAGARAM

Gajula Rega, Vizianagaram , ANDHRA PRADESH, INDIA-535002.

Accredited by NAAC,Approved by AICTE & Affiliated to JNTUK, KAKINADA

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course objective-II YR-I Sem (R19)

1. ELECTRICAL CIRCUIT ANALYSIS-II

Course objective: After taking the course, students will be able to

- To study the concepts of balancedand unbalanced three-phase circuits.
- To study the transient behaviour of electrical networks with DC, pulse and AC excitations.
- To study the performance of a network based on input and output excitation/response.
- To understand the realization of electrical network function into electrical equivalent passive elements.
- To understand the application of fourier series and fourier transforms for analysis of electrical circuits.

COURSE OUTCOMES: At the end of this course, students will be able to:

- Students are able to solve three- phase circuits under balanced and unbalanced condition
- Students are able find the transient response of electrical networks for different types of excitations.
- Students are able to find parameters for different types of network.
- Students are able to realize electrical equivalent network for a given network transfer function.
- Students are able to extract different harmonics components from the response of a electrical network.

2. ELECTRICAL MACHINES – I

OBJECTIVE:

- Understand the unifying principles of electromagnetic energy conversion.
- Understand the construction, principle of operation and performance of DC machines.
- Learn the characteristics, performance,methods of speed control and testing methods of DC motors.
- To predetermine the performance of single phase transformers with equivalent circuit models.
- Understand the methods of testing of single-phase transformer.
- Analyze the three phase transformers and achieve three phase to two phase conversion.

COURSE OUTCOMES:

- Able to assimilate the concepts of electromechanical energy conversion.
- Able to mitigate the ill-effects of armature reaction and improve commutation in dc machines.
- Able to understand the torque production mechanism and control the speed of dc motors.
- Able to analyze the performance of single phase transformers.
- Able to predetermine regulation, losses and efficiency of single phase transformers.
- Able to parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation.

3.BASIC ELECTRONICS AND DEVICES

OBJECTIVE:

- To learn the basics of semiconductor physics.
- To study the construction details, operation and characteristics of various semiconductor diodes.
- To understand the operation and analysis of rectifiers with and without filters. Further study the operation of series and shunt regulators using zener diodes.
- To study the characteristics of different bipolar junction transistors and their biasing stabilization and compensation techniques. To analyze transistor amplifiers using hparameters.
- To understand the basics of FET,Thyristors, Power IGBTs and Power MOSFETs.
- To understand the concepts of positive and negative feedbacks and their role in amplifiers and oscillators.

COURSE OUTCOMES:

- Students are able to understand the basic concepts of semiconductor physics, which are useful
- Students are able to explain the operation and characteristics of PN junction diode and special diodes.
- Ability to understand operation and design aspects of rectifiers and regulators.
- Students are able to understand the characteristics of various transistor configurations. They become familiar with different biasing, stabilization and compensation techniques used in transistor circuits.
- Students are able to understand the operation and characteristics of FET, Thyristors, Power IGBTs and Power MOSFETs.
- Students are able to understand the merits and demerits of positive and negative feedback and the role of feedback in oscillators and amplifiers.

4.ELECTROMAGNETIC FIELDS

Course objectives:

- To study the production of electric field and potentials due to different configurations of static charges.
- To study the properties of conductors and dielectrics, calculate the capacitance of various configurations and understand the concept of conduction and convection current densities.
- To study the magnetic fields produced by currents in different configurations, application of ampere's law and the Maxwell's second and third equations.
- To study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops.
- To develop the concept of self and mutual inductances and the energy stored.
- To study time varying and Maxwell's equations in different forms and Maxwell's fourth equation for the induced e.m.f.

COURSE OUTCOMES:

- To Determine electric fields and potentialsusing guass's lawor solving Laplace's or Possion's equations, for various electric charge distributions.
- To Calculate and design capacitance, energy stored in dielectrics.
- To Calculate the magnetic field intensity due to current, the application of ampere's law and the Maxwell's second and third equations.
- To determine the magnetic forces and torque produced by currents in magnetic field
- To determine self and mutual inductances and the energy stored in the magnetic field.
- To calculate induced e.m.f., understand the concepts of displacement current and Poynting vector.

5. THERMAL AND HYDRO PRIME MOVERS

Course objectives:

- To make the student learn about the constructional features, operationaldetails of various types of internal combustion engines through the details of several engine systems and the basic air standard cycles, that govern the engines. Further, the student shall be able to calculate the performance of different types of internal combustion engines.
- To train the student in the aspects of steam formation and its utilities through the standard steam data tables and charts. To make the student correlate between the air standard cycles and the actual cycles that govern the steam turbines. To train the student to calculate the performance of steam turbines using velocity diagrams**.**
- To impart the knowledge of gas turbine fundamentals, the governing cycles and the methods to improve the efficiency of gas turbines.
- To teach the student about the fundamental of fluid dynamic equations andits applications fluid jets. To impart the knowledge of various types of pumps, their constructional features, working and performance.
- To make the student learn about the constructional features, operational details of various types of hydraulic turbines. Further, the student shall be able to calculate the performance of hydraulic turbines.

- To train the student in the areas of types of hydro electric power plants, estimation and calculation of different loads by considering various factors.

6. MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course objectives:

- The Learning objectives of this paper is to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting, Production function, Input Outputn relationship, Cost-Output relationship and Cost-Volume-Profi Analysis.
- To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
- To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation. Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

COURSE OUTCOMES:

- The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
- One is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

Course objective-II YR-II Sem (R19)

1.ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

Course objectives:

- To study the principle of operation and working of different types of instruments for measurement of Electrical Quantities.
- To study the working principle of operation of different types of instruments for measurement of power and power factor.
- To understand the principle of operation and working of various types of bridges for measurement of parameters –resistance, inductance, capacitance and frequency.
- To understand the principle of operation and working of transducers.
- To study the principle of operation and working of DVMS, Power analyser and applications of CRO.

COURSE OUTCOMES: After the completion of the course the student should be able to:

- choose right type of instrument for measurement of ac and dc Electrical quantities.
- choose right type of instrument for measurement of power and power factor.
- select right type for measurement of R, L,C.
- understand the effectiveness of Transducer.
- able to understand Digital Meters.

2.ELECTRICAL MACHINES – II

Course objectives:

- Understand the principle of operation and performance of 3-phase induction motor.
- Quantify the performance of induction motor and induction generator in terms of torque and slip.
- To understand the torque producing mechanism of a single phase induction motor.
- To understand the principle of emf generation, the effect of armature reaction and predetermination of voltage regulation in synchronous generators.
- To study parallel operation and control of real and reactive powers for synchronous generators.
- To understand the operation, performance and starting methods of synchronous motors.

COURSE OUTCOMES: After the completion of the course the student should be able to:

- explain the operation and performance of three phase induction motor.
- analyze the torque-speed relation, performance of induction motor and induction generator.
- explain design procedure for transformers and three phase induction motors.
- implement the starting of single phase induction motors.
- perform winding design and predetermine the regulation of synchronous generators.
- avoid hunting phenomenon, implement methods of staring and correction of power factor with synchronous motor.

3.DIGITAL ELECTRONICS

Course objectives:

- To solve a typical number base conversion and analyze new error coding techniques.
- Theorems and functions of Boolean algebra and behavior of logic gates.
- To optimize logic gates for digital circuits using various techniques.
- To understand concepts of combinational circuits.
- To develop advanced sequential circuits.

COURSE OUTCOMES: After the completion of the course the student should be able to:

- classify different number systems and apply to generate various codes.
- use the concept of Boolean algebra in minimization of switching functions
- design different types of combinational logic circuits.
- apply knowledge of flip-flops in designing of Registers and counters

- the operation and design methodology for synchronous sequential circuits and algorithmic state machines.
- produce innovative designs by modifying the traditional design techniques.

4.CONTROL SYSTEMS

Course objectives:

- To learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function
- To analyze the time response of first and second order systems and improvement of performance by proportional plus derivative and proportional plus integral controllers
- To investigate the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.
- To discuss basic aspects of design and compensation of linear control system using Bode plot.
- To present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots and Nyquist stability criterion.
- Ability to formulate state models and analyze the systems. To learn the concepts of Controllability and Observability.

COURSE OUTCOMES: After the completion of the course the student should be able to:

- derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
- determine time response specifications of second order systems and to determine error constants.
- analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.
- analyze the stability of LTI systems using frequency response methods.
- design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams.
- represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.

5.POWER SYSTEMS-I

Course objectives:

- To study the principle of operation of different components of a thermal power stations.
- To study the principle of operation of different components of a Nuclear power stations.
- To study the constructional and operation of different components of an Air and Gas Insulated substations.

- To study the constructional details of different types of cables.
- To study different types of load curves and tariffs applicable to consumers.

COURSE OUTCOMES: After the completion of the course the student should be able to:

- identify the different components of thermal power plants.
- identify the different components of nuclear Power plants.
- identify the different components of air and gas insulated substations.
- identify single core and three core cables with different insulating materials.
- analyse the different economic factors of power generation and tariffs.

6.SIGNALS AND SYSTEMS

Course objectives:

- To introduce the terminology of signals and systems.
- To introduce Fourier tools through the analogy between vectors and signals.
- To introduce the concept of sampling and reconstruction of signals.
- To analyze the linear systems in time and frequency domains.
- To study z-transform as mathematical tool to analyze discrete-time signals and systems.

COURSE OUTCOMES: After the completion of the course the student should be able to:

- characterize the signals and systems and principles of vector spaces, Concept of orthgonality.
- analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.
- apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
- understand the relationships among the various representations of LTI systems
- understand the Concepts of convolution, correlation, Energy and Power density spectrum and their relationships.
- apply z-transform to analyze discrete-time signals and systems.

Course objective-III YR-I Sem (R16)

1.POWER SYSTEMS–II

Course objectiveS:

- To compute inductance/capacitance of transmission lines and to understand the concepts of GMD/GMR.
- To study the short and medium length transmission lines, their models and performance.
- To study the performance and modeling of long transmission lines.
- To study the effect of travelling waves on transmission lines.

- To study the factors affecting the performance of transmission lines and power factor improvement methods.
- To discuss sag and tension computation of transmission lines as well as to study the performance of overhead insulators.

COURSE OUTCOMES:

- Able to understand parameters of various types of transmission lines during different operating conditions.
- Able to understand the performance of short and medium transmission lines.
- Student will be able to understand travelling waves on transmission lines.
- Will be able to understand various factors related to charged transmission lines.
- Will be able to understand sag/tension of transmission lines and performance of line insulators.

3. RENEWABLE ENERGY SOURCES

Course objectiveS:

- To study the solar radiation data, extraterrestrial radiation, radiation on earth's surface.
- To study solar thermal collections.
- To study solar photo voltaic systems.
- To study maximum power point techniques in solar pv and wind energy.
- To study wind energy conversion systems, Betz coefficient, tip speed ratio.
- To study basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.

COURSE OUTCOMES: Student should be able to

- Analyze solar radiation data, extraterrestrial radiation, and radiation on earth'ssurface.
- Design solar thermal collectors, solar thermal plants.
- Design solar photo voltaic systems.
- Develop maximum power point techniques in solar PV and wind energy systems.□ Explain wind energy conversion systems, wind generators, power generation.
- Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermalsystems.

4.SIGNALS & SYSTEMS

Course objectiveS:

- To introduce the terminology of signals and systems.
- To introduce Fourier tools through the analogy between vectors and signals.
- To introduce the concept of sampling and reconstruction of signals.
- To analyze the linear systems in time and frequency domains.
- To study z-transform as mathematical tool to analyze discrete-time signals and systems.

COURSE OUTCOMES: At the end of this course the student will able to:

- Characterize the signals and systems and principles of vector spaces, Concept of orthgonality.
- Analyze the continuous-time signals and continuous-time systems using Fourier

series, Fourier transform and Laplace transform.

- Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
- Understand the relationships among the various representations of LTI systems
- Understand the Concepts of convolution, correlation, Energy and Power density spectrum and their relationships.
- Apply z-transform to analyze discrete-time signals and systems.

5.PULSE AND DIGITAL CIRCUITS

Course objectiveS: The student will be made

- To understand the concept of wave shaping circuits, Switching Characteristics of diode and transistor.
- To study the design and analysis of various Multivibrators.
- To understand the functioning of different types of time-base Generators.
- To learn the working of logic families & Sampling Gates.

COURSE OUTCOMES:

After going through this course the student will be able to

- Design linear and non-linear wave shaping circuits.
- Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.
- Design different multivibrators and time base generators.
- Utilize the non sinusoidal signals in many experimental research areas.

6.POWER ELECTRONICS

Course objectiveS:

- To study the characteristics of various power semiconductor devices and to designfiring circuits for SCR.
- To understand the operation of single phase full–wave converters and analyzeharmonics in the input current.
- To study the operation of three phase full–wave converters.
- To understand the operation of different types of DC-DC converters.
- To understand the operation of inverters and application of PWM techniques forvoltage control and harmonic mitigation.
- To analyze the operation of AC-AC regulators.

COURSE OUTCOMES: Student should be able to

- Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's.
- Design firing circuits for SCR.
- Explain the operation of single phase full–wave converters and analyze harmonics in the input current.
- Explain the operation of three phase full–wave converters.
- Analyze the operation of different types of DC-DC converters.
- Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.

- Analyze the operation of AC-AC regulators.

Course objective-III YR-II Sem (R16)

1.POWER ELECTRONIC CONTROLLERS & DRIVES

Course objectiveS:

- To learn the fundamentals of electric drive and different electric braking methods.
- To analyze the operation of three phase converter controlled dc motors and fourquadrant operation of dc motors using dual converters.
- To discuss the converter control of dc motors in various quadrants.
- To understand the concept of speed control of induction motor by using AC voltagecontrollers and voltage source inverters.
- To learn the principles of static rotor resistance control and various slip powerrecovery schemes.
- To understand the speed control mechanism of synchronous motors

COURSE OUTCOMES: After completion of the course, studentswill be able to:

- Explain the fundamentals of electric drive and different electric braking methods.
- Analyze the operation of three phase converter fed dc motors and four quadrantoperations of dc motors using dual converters.
- Describe the converter control of dc motors in various quadrants of operation
- Know the concept of speed control of induction motor by using AC voltagecontrollers and voltage source inverters.
- Differentiate the stator side control and rotor side control of three phase induction motor..
- Explain the speed control mechanism of synchronous motors

2.POWER SYSTEM ANALYSIS

Course objectiveS:

- To development the impedance diagram (p.u) and formation of Y_{bus}
- To study the different load flow methods.
- To study the concept of the Z_{bus}building algorithm.
- To study short circuit calculation for symmetrical faults
- To study the effect of unsymmetrical faults and their effects.
- To study the rotor angle stability of power systems.**COURSE OUTCOMES:**

COURSE OUTCOMES:

- Able to draw impedance diagram for a power system network and to understand per unit quantities.
- Able to form a$Y_{bus}$and $Z_{bus}$for a power system networks.
- Able to understand the load flow solution of a power system using different methods.

- Able to find the fault currents for all types faults to provide data for the design of protective devices.
- Able to findthe sequence components of currents for unbalanced power system network.
- Able to analyze the steady state, transient and dynamic stability concepts of a power system.

3.MICROPROCESSORS AND MICROCONTROLLERS

Course objectiveS:

- To understand the organization and architecture of Micro Processor
- To understand addressing modes to access memory
- To understand 8051 micro controller architecture
- To understand the programming principles for 8086 and 8051
- To understand the interfacing of MP with IO as well as other devices
- To understand how to develop cyber physical systems

COURSE OUTCOMES:

- To be able to understand the microprocessor capability in general and explore the evaluation of microprocessors.
- To be able to understand the addressing modes of microprocessors
- To be able to understand the micro controller capability
- To be able to program mp and mc
- To be able to interface mp and mc with other electronic devices
- To be able to develop cyber physical systems

4.DATA STRUCTURES THROUGH C++

Course objectiveS:

- To be familiar with basic techniques of object oriented principles and exception handling using C++
- To be familiar with the concepts like Inheritance, Polymorphism
- Solve problems using data structures such as linear lists, stacks, queues, hash tables
- Be familiar with advanced data structures such as balanced search trees, AVLTrees, and B Trees.

COURSE OUTCOMES:

- Distinguish between procedures and object oriented programming.
- Apply advanced data structure strategies for exploring complex data structures.
- Compare and contrast various data structures and design techniques in the area of Performance.
- Implement data structure algorithms through C++. • Incorporate data structures into the applications such as binary search trees, AVL and B Trees
- Implement all data structures like stacks, queues, trees, lists and graphs and compare their Performance and trade offs

5.ENERGY AUDIT, CONSERVATION & MANAGEMENT

Course objectiveS:

- To understand energy efficiency, scope, conservation and technologies.
- To design energy efficient lighting systems.
- To estimate/calculate power factor of systems and propose suitable compensation techniques.
- To understand energy conservation in HVAC systems.
- To calculate life cycle costing analysis and return on investment on energy efficient technologies.

COURSE OUTCOMES: Student will be able to

- Explain energy efficiency, conservation and various technologies.
- Design energy efficient lighting systems.
- Calculate power factor of systems and propose suitable compensation techniques.
- Explain energy conservation in HVAC systems.
- Calculate life cycle costing analysis and return on investment on energy efficient technologies.

Course objective-IV YR-I Sem (R16)

1. UTILIZATION OF ELECTRICAL ENERGY

Course objectiveS:

- To understand the operating principles and characteristics of traction motors with respect to speed, temperature,loading conditions.
- To acquaint with the different types of heating and welding techniques.
- To study the basic principles of illumination and its measurement.
- To understand different types of lightning system including design.
- To understand the basic principle of electric traction including speed–time curves of different traction services.
- To understand the method of calculation of various traction system for braking, acceleration and other related parameters, including demand side management of energy.

COURSE OUTCOMES:

- Able to identify a suitable motor for electric drives and industrial applications
- Able to identify most appropriate heating or welding techniques for suitable applications.
- Able to understand various level of illuminosity produced by different illuminating sources.
- Able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.

- Able to determine the speed/time characteristics of different types of traction motors.
- Able to estimate energy consumption levels at various modes of operation.

2.LINEAR IC APPLICATIONS

Course objectiveS:

- To understand the basic operation &performance parameters of differential amplifiers.
- To understand & learn the measuring techniques of performance parameters of OP-AMP
- To learn the linear and non-linear applications of operational amplifiers.
- To understand the analysis & design of different types of active filters using opamps
- To learn the internal structure, operation and applications of different analog ICs
- To Acquire skills required for designing and testing integrated circuits

COURSE OUTCOMES:

- Design circuits using operational amplifiers for various applications.
- Analyze and design amplifiers and active filters using Op-amp.
- Diagnose and trouble-shoot linear electronic circuits.
- Understand the gain-bandwidth concept and frequency response of the amplifier
- configurations.
- Understand thoroughly the operational amplifiers with linear integrated circuits.

3.POWER SYSTEM OPERATION AND CONTROL

Course objectives:

- To understand optimal dispatch of generation with and without losses.
- To study the optimal scheduling of hydro thermal systems.
- To study the optimal unit commitment problem.
- To study the load frequency control for single area system with and without controllers
- To study the load frequency control for two area system with and without controllers
- To understand the reactive power control and compensation of transmission ines.

Course Outcome:

- Able to compute optimal scheduling of Generators.
- Able to understand hydrothermal scheduling.
- Understand the unit commitment problem.
- Able to understand importance of the frequency.
- Understand importance of PID controllers in single area and two area systems.
- Will understand reactive power control and compensation for transmission line.

4.SWITCHGEAR AND PROTECTION

Course objectives:

- To provide the basic principles and operation of various types of circuit breakers.
- To study the classification, operation and application of different types of electromagnetic protective relays.
- To explain protective schemes, for generator and transformers.
- To impart knowledge of various protective schemes used for feeders and bus bars.
- To explain the principle and operation of different types of static relays.
- To study different types of over voltages in a power system and principles of different protective schemes for insulation co–ordination.

Course Outcome:

- Able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF_6 gas type.
- Ability to understand the working principle and operation of different types of electromagnetic protective relays.
- Students acquire knowledge of faults and protective schemes for high power generator and transformers.
- Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.
- Able to understand different types of static relays and their applications.
- Able to understand different types of over voltages and protective schemes required for insulation co–ordination.

5.INSTRUMENTATION

Course objectives:

- To study various types of signals and their representation.
- To study various types of transducers: Electrical, Mechanical, Electromechanical,Optical etc.
- To study and measure the various types of Non–electrical quantities.
- To study various types of digital voltmeters
- To study the working principles of various types of oscilloscopes and their applications.
- To study various types of signal analyzers.

Course Outcome:

- Able to represent various types of signals .
- Acquire proper knowledge to use various types of Transducers.
- Able to monitor and measure various parameters such as strain, velocity, temperature, pressure etc.
- Acquire proper knowledge and working principle of various types of digital voltmeters.
- Able to measure various parameter like phase and frequency of a signal with the help of CRO.

- Acquire proper knowledge and able to handle various types of signal analyzers.

6.SPECIAL ELECTRICAL MACHINES

Course objectives:

- To explain theory of operation and control of switched reluctance motor.
- To explain the performance and control of stepper motors, and their applications.
- To describe the operation and characteristics of permanent magnet dc motor.
- To distinguish between brush dc motor and brush less dc motor**.**
- To explain the theory of travelling magnetic field and applications of linear motors.

Course Outcome: The student should be able to

- Distinguish between brush dc motor and brush less dc motor**.**
- Explain the performance and control of stepper motors, and their applications.
- Explain theory of operation and control of switched reluctance motor.
- Explain the theory of travelling magnetic field and applications of linear motors.
- Understand the significance of electrical motors for traction drives.

Course objective-IV YR-II Sem (R16)

1.DIGITAL CONTROL SYSTEMS

Course objectives:

- To understand the concepts of digital control systems and assemble various components associated with it. Advantages compared to the analog type.
- The theory of z–transformations and application for the mathematical analysis of digital control systems.
- To represent the discrete–time systems in state–space model and evaluation of state transition matrix.
- To examine the stability of the system using different tests.
- To study the conventional method of analyzing digital control systems in the w–plane.
- To study the design of state feedback control by “the pole placement method.”

Course Outcome:

- The students learn the advantages of discrete time control systems and the “know how” of various associated accessories.
- The learner understand z–transformations and their role in the mathematical analysis of different systems(like Laplace transforms in analog systems).
- The stability criterion for digital systems and methods adopted for testing the same are explained.
- Finally, the conventional and state space methods of design are also introduced.

2.H.V.D.C. TRANSMISSION

Course objectives:

- To Understand basic concepts of HVDC Transmission.
- To analyze the converter configuration.
- To Know the control of converter and HVDC Transmission.
- To Understand the significance of reactive power control and AC/Dc load flow.
- To Know different converter faults, protection and effect of harmonics.
- To leave low pass and high pass filters.

Course Outcome: The Student shall be able to

- Learn different types of HVDC levels and basic concepts
- Know the operation of converters
- Acquire control concept of reactive power control and AC/DC load flow.
- Understand converter faults, protection and harmonic effects
- Design low pass and high pass filters

3.ELECTRICAL DISTRIBUTION SYSTEMS

Course objectives:

- To study different factors of Distribution system.
- To study and design the substations and distribution systems.
- To study the concepts of voltage drop and power loss.
- To study the distribution system protection and its coordination.
- To study the effect of compensation for power factor improvement.
- To study the effect of voltage control on distribution system.

Course Outcome:

- Able to understand various factors of distribution system.
- Able to design the substation and feeders.
- Able to determine the voltage drop and power loss
- Able to understand the protection and its coordination.
- Able to understand the effect of compensation for

4.FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS

Course objectives:

- To learn the basics of power flow control in transmission lines using FACTS controllers
- To explain operation and control of voltage source converter.
- To understand compensation methods to improve stability and reduce power oscillations of a power system.
- To learn the method of shunt compensation using static VAR compensators.
- To learn the methods of compensation using series compensators
- To explain operation of Unified Power Flow Controller (UPFC).

Course Outcome: The student should be able to

- Understandpower flow control in transmission lines using FACTS controllers.
- Explain operation and control of voltage source converter.

- Analyze compensation methods to improve stability and reduce power oscillations in the transmission lines.
- Explain the method of shunt compensation using static VAR compensators.
- Understand the methods of compensations using series compensators.
- Explain operation of Unified Power Flow Controller (UPFC).

SIGNATURE OF HOD

SITAM

SATYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, VIZIANAGARAM

Gajula Rega, Vizianagaram , ANDHRA PRADESH, INDIA-535002.

Accredited by NAAC,Approved by AICTE & Affiliated to JNTUK, KAKINADA

DEPARTMENT OF CIVIL ENGINEERING

CIVIL

Course objective-I YR-I Sem (R20)

MATHEMATICS-I (BS1101)

Course Objectives:

- To familiarize a variety of well-known sequences and series, with a developing intuition about the behavior of new ones.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

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

- utilize mean value theorems to real life problems (L3)
- solve the differential equations related to various engineering fields (L3)
- familiarize with functions of several variables which is useful in optimization (L3)
- apply double integration techniques in evaluating areas bounded by region (L3)
- students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)

COMMUNICATIVE ENGLISH (HS1101):

Course objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations

- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
- **Learning Outcomes**
- At the end of the module, the learners will be able to
- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms
- **ENGINEERING PHYSICS**
- **Unit-I: Unit Outcomes:**
- **The students will be able to**
- **Explain** the need of coherent sources and the conditions for sustained interference (L2)
- **Identify** engineering applications of interference (L3)
- **Analyze** the differences between interference and diffraction with applications (L4)
- **Illustrate** the concept of polarization of light and its applications (L2)
- **Classify** ordinary polarized light and extraordinary polarized light (L2)
- **Unit-II:**
- **Unit Outcomes:**
- **The students will be able to**
- **Understand** the basic concepts of LASER light Sources (L2)
- **Apply** the concepts to learn the types of lasers (L3)
- **Identifies** the Engineering applications of lasers (L2)
- **Explain** the working principle of optical fibers (L2)
- **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
- **Identify** the applications of optical fibers in various fields (L2)
- **UNIT III:**
- **Unit Outcomes:**
- **The students will be able to**
- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)

- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperaturedependence(L2)
- **Explain** the applications of dielectric and magnetic materials (L2)
- **Apply** the concept of magnetism to magnetic devices (L3
- **Unit-IV:**
- **Unit Outcomes:**
- **The students will be able to**
- **Explain** how sound is propagated in buildings (L2)
- **Analyze** acoustic properties of typically used materials in buildings (L4)
- **Recognize** sound level disruptors and their use in architectural acoustics (L2)
- **Identify** the use of ultrasonics in different fields (L3)
- **Unit-V:**
- **Unit Outcomes:**
- **The students will be able to**
- **Classify** various crystal systems (L2)
- **Identify** different planes in the crystal structure (L3)
- **Analyze** the crystalline structure by Bragg's X-ray diffractometer (L4)
- **Apply** powder method to measure the crystallinity of a solid (L4)

ENGINEERING DRAWING (ESC1101)

Course Objective: Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc**.**

Unit I

Objective: To introduce the students to use drawing instruments and to draw polygons, Engg. Curves**.**

Unit II

Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

Unit III

Objective: The objective is to make the students draw the projections of the plane inclined toboth The planes.

Unit IV

Objective: The objective is to make the students draw the projections of the various types of Solids in different positions inclined to one of the planes.

Unit V

Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

ENGINEERING GELOGOY Integrated (Theory & Lab) (ESC1102)

Course Learning Objectives:

The objective of this course is:

• To introduce the course: Engineering Geology to the Civil Engineering graduates.
• To enable the students, understand what minerals and rocks are and their formation and identification.
• To highlight significance/ importance/ role of Engineering Geology in construction of Civil Engineering structures.
• To enable the student, realise its importance and applications of Engineering Geology in Civil Engineering constructions.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:
• Identify and classify the geological minerals
• Measure the rock strengths of various rocks
• Classify and measure the earthquake prone areas to practice the hazard zonation
• Classify, monitor and measure the Landslides and subsidence
• Prepares, analyses and interpret the Engineering Geologic maps
• Analyses the ground conditions through geophysical surveys.
• Test the geological material and ground to check the suitability of civil engineering project construction.
• Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc.

ENGINEERING GELOGOY Lab

Course Learning Objectives:

The objective of this course is:
• To identify the Megascopic types of Ore minerals & Rock forming minerals.
• To identify the Megascopic types of Igneous, Sedimentary, Metamorphic rocks.
• To identify the topography of the site & material selection.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:
• Identify Megascopic minerals & their properties.
• Identify Megascopic rocks & their properties.
• Identify the site parameters such as contour, slope & aspect for topography.

• Know the occurrence of materials using the strike & dip problems.

BASICS OF CIVIL ENGG. (WORK SHOP) LAB (ESC1103)

COURSE OBJECTIVES:

a.To outline the process of identification of various building components and their estimation
b. To provide knowledge on operation of the various survey instruments used for linear and angular measurements.
c.To explain the concept of measurement of discharge and velocity in a pipe and density of water
d. To demonstrate automatic weather station

COURSE OUTCOMES:

Learners at the end of this Laboratory course will be able to

❖ Identify various components of a building and give lump-sum estimate.

❖ Determine distances and irregular areas using conventional survey instruments like chain, tape, cross-staff and compass

❖ Identify different soils

❖ Know various traffic signs & signals

❖ Determine centre of gravity and moment of inertia of channel and I-sections.

❖ Set out a signal room building as per given plan

❖ Install simple sanitary filling and find discharge/velocity in a water pipe line as density of water

❖ Know to the process of making cement mortar / concrete for nominal mix

Course objective-I YR-II Sem (R20)

MATHEMATICS –II (LINER ALGEBRA & NUMERICAL METHODS)

Course Objectives: To instruct the concept of Matrices in solving linear algebraic equations

- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Course Outcomes: At the end of the course, the student will be able

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- Apply numerical integral techniques to different Engineering problems (L3)

- apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

ENGINEERING CHEMISTRY (BS1202)

COURSE OBJECTIVES

- Importance of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- Outline the basics for the construction of electrochemical cells, batteries and fuel cells.Understand the mechanism of corrosion and how it can be prevented.
- Express the increases in demand as wide variety of advanced materials are introduced; whichhave excellent engineering properties.
- Classify and discuss the materials used in major industries like steel industry, metallurgical industries and construction industries and electrical equipment manufacturing industries. Lubrication is also summarized.
- Relate the need of fuels as a source of energy to any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence introduced.
- Explain the importance and usage of water as basic material in almost all the industries;
- Interpret drawbacks of steam boilers and also how portable water is supplied for drinking purposes.

UNIT I

Course Outcomes: ***At the end of this unit, the students will be able to Analyze*** the different types of composite plastic materials and ***interpret*** the mechanism ofconduction in conducting polymers.

UNIT II:

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

Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and c***ategorize*** the reasons for corrosion and study methods to control corrosion.

UNIT III:

Course Outcomes: ***At the end of this unit, the students will be able to Synthesize*** nanomaterials for modern advances of engineering technology. ***Summarize*** the techniques that detect and measure changes of state of reaction. ***Illustrate*** the commonly used industrial materials

UNIT IV:

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

Differentiate petroleum, petrol, synthetic petrol and have knowledge how they are produced.

Study alternate fuels and a***nalyse*** flue gases

UNIT V:

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

Analyze the suitable methods for purification and treatment of hard water and brackish water.

ENIGINEERING MECHANICS

Objectives: Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes ,resultant of force system, Forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

- The students are to be exposed to the concepts of force and friction , direction and its application.
- The students are to be exposed to application of free body diagrams. Solution to problems• using graphical methods and law of triangle of forces.
- The students are to be exposed to concepts of centre of gravity
- The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.
- The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.
- The students are to be exposed to concepts of work, energy and particle motion

PROGRAMMING FOR PROBLEM SOLVING USING C (ES1101)

Course Objectives:

- The objectives of Programming for Problem Solving Using C are
- To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
- To gain knowledge of the operators, selection, control statements and repetition in C
- To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage.
- To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.

- To assimilate about File I/O and significance of functions

Course Outcomes:

- Upon the completion of the course the student will learn
- To write algorithms and to draw flowcharts for solving problems
- To convert flowcharts/algorithms to C Programs, compile and debug programs
- To use different operators, data types and write programs that use two-way/ multi-way selection
- To select the best loop construct for a given problem
- To design and implement programs to analyze the different pointer applications
- To decompose a problem into functions and to develop modular reusable code
- To apply File I/O operations

BUILDING MATERIALS AND CONCRETE TECHNOLOGY (ESC1203)

Aim and Objective of this course 1. To introduce various building construction materials

2. To describe various properties of ingredients of concrete

3. To explain various properties and tests of fresh and Hardened Concrete

Course Outcomes (COs) 1. Know various engineering properties of building construction materials and suggest their suitability

2. Identify the functional role of ingredients of concrete and apply this knowledge to concrete mix design

3. Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete

ENGINEERING CHEMISTRY LAB (BSC1203)

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

PROGRAMMING FOR PROBLEM SOLVING USING C LAB (ESC1204)

Course Outcomes: By the end of the Lab, the student

1) Gains Knowledge on various concepts of a C language.

2) Able to draw flowcharts and write algorithms.

3) Able design and development of C problem solving skills.

4) Able to design and develop modular programming skills.

5) Able to trace and debug a program

BUILDING PLANNING AND COMPUTER AIDED BUILDING DRAWING (ESC1205)

Aim and Objective of this course

To help the student to attain competency in preparation of engineering drawings as per principles of planning using a suitable CAD software through various teaching learning experiences:

Course Outcomes (COs)

1. Perform basic commands of any suitable CAD software to draw 2D drawings
2. Interpret the conventions, signs and symbols from a given drawing.
3. Prepare line plans of residential and public buildings using principles of planning.
4. Prepare submission and working drawing from the given requirement for Load Bearing and Framed structures

ENVIRONMENTAL SCIENCE (MC1201)

Learning Objectives:

The objectives of the course are to impart:

- Overall understanding of the natural resources.
- Basic understanding of the ecosystem and its diversity.
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
- An understanding of the environmental impact of developmental activities.
- Awareness on the social issues, environmental legislation and global treaties

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CSE

Course objective-I YR-I Sem (R20)

COMMUNICATIVE ENGLISH (HS1101):

Course objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
- **Learning Outcomes**
- At the end of the module, the learners will be able to

- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

MATHEMATICS-I (BS1101)

Course Objectives:

- To familiarize a variety of well-known sequences and series, with a developing intuition about the behavior of new ones.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

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

- utilize mean value theorems to real life problems (L3)
- solve the differential equations related to various engineering fields (L3)
- familiarize with functions of several variables which is useful in optimization (L3)
- apply double integration techniques in evaluating areas bounded by region (L3)
- students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)

APPLIED PHYSICS

Course Objectives:

1. Bridging the gap between the physics in school at 10+2 level and UG level engineering courses.

2. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications

3. Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications, study of propagation of light through optical fibers and their implications in optical communications.

4. Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application, the importance

of free electron theory for metals and band theory for crystalline solids. Metals- Semiconductors-Insulators concepts utilization of transport phenomenon of charge carriers in semiconductors.

5. To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.

6. To Understand the physics of Semiconductors and their working mechanism. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Course Outcomes:

1. Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)

2. Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).

3. Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).

4. Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)

5. Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic

devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).

Unit-I

Unit Outcomes:

The students will be able to

- **Explain** the need of coherent sources and the conditions for sustained interference (L2)
- **Identify** engineering applications of interference (L3)
- **Analyze** the differences between interference and diffraction with applications (L4)
- **Illustrate** the concept of polarization of light and its applications (L2)
- **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit-II:

Unit Outcomes:

The students will be able to

- **Understand** the basic concepts of LASER light Sources (L2)
- **Apply** the concepts to learn the types of lasers (L3)
- **Identifies** the Engineering applications of lasers (L2)
- **Explain** the working principle of optical fibers (L2)
- **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
- **Identify** the applications of optical fibers in various fields (L2)

Unit III

Unit Outcomes:

The students will be able to

- **Explain** the concept of dual nature of matter (L2)
- **Understand** the significance of wave function (L2)
- **Interpret** the concepts of classical and quantum free electron theories (L2)
- **Explain** the importance of K-P model
- **Classify** the materials based on band theory (L2)
- **Apply** the concept of effective mass of electron (L3)

Unit-IV

Unit Outcomes: *The students will be able to*

- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
- **Explain** the applications of dielectric and magnetic materials (L2)
- **Apply** the concept of magnetism to magnetic data storage devices (L3)

Unit – V:

Unit Outcomes:

The students will be able to

- **Classify** the energy bands of semiconductors (L2)
- **Interpret** the direct and indirect band gap semiconductors (L2)
- **Identify** the type of semiconductor using Hall effect (L2)
- **Identify** applications of semiconductors in electronic devices (L2)
- **Classify** superconductors based on Meissner's effect (L2)
- **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2)

PROGRAMMING FOR PROBLEM SOLVING USING C

Course Objectives:

The objectives of Programming for Problem Solving Using C are

- To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
- To gain knowledge of the operators, selection, control statements and repetition in C
- To learn about the design concepts of arrays, strings, enumerated structure and union types and their usage.
- To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.
- To assimilate about File I/O and significance of functions

Course Outcomes:

Upon the completion of the course the student will learn

- To write algorithms and to draw flowcharts for solving problems

- To convert flowcharts/algorithms to C Programs, compile and debug programs
- To use different operators, data types and write programs that use two-way/ multi-way selection
- To select the best loop construct for a given problem
- To design and implement programs to analyze the different pointer applications
- To decompose a problem into functions and to develop modular reusable code
- To apply File I/O operations

COMPUTER ENGINEERING WORKSHOP

Course Objectives:

The objective of this course is to

- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate basic command line interface commands on Linux
- Teach the usage of Internet for productivity and self paced lifelong learning
- Describe about Compression, Multimedia and Antivirus tools
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools

Course Outcomes:

Students should be able to:

- Assemble and disassemble components of a PC
- Construct a fully functional virtual machine, Summarize various Linux operating system commands,
- Recognize characters & extract text from scanned images, Create audio files and podcasts

Course objective-I YR-II Sem (R20)

MATHEMATICS - II (BS1201)

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

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

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- apply numerical integral techniques to different Engineering problems (L3)
- apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

APPLIED CHEMISTRY

Course Objectives

- Importance of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- Outline the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- Explain the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
- Recall the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
- Outline the basics of computational chemistry and molecular switches

Unit 1:Course Outcomes: At the end of this unit, the students will be able to

- Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.

Unit 2:Course Outcomes: At the end of this unit, the students will be able to

- Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.

Unit 3:Course Outcomes: At the end of this unit, the students will be able to

- Synthesize nanomaterials for modern advances of engineering technology.
- Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.

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Unit 4:Course Outcomes: At the end of this unit, the students will be able to

- Analyze the principles of different analytical instruments and their applications.
- Design models for energy by different natural sources.

Unit 5:Course Outcomes: At the end of this unit, the students will be able to

- Obtain the knowledge of computational chemistry and molecular machines

COMPUTER ORGANIZATION

Course Objectives:

The purpose of the course is to introduce principles of computer organization and the basic architectural concepts. It provides an in depth understanding of basic organization, design, programming of a simple digital computer, computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems.

Course Outcomes:

By the end of the course the student will be able to

- Demonstrate and understanding of the design of the functional units of a digital computer system.
- Relate Postulates of Boolean algebra and minimize combinational functions
- Recognize and manipulate representations of numbers stored in digital computers
- Build the logic families and realization of logic gates.
- Design and analyze combinational and sequential circuits
- Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components
- Solve elementary problems by assembly language programming

PYTHON PROGRAMMING

Course Objectives:

The Objectives of Python Programming are

- To learn about Python programming language syntax, semantics, and the runtime environment
- To be familiarized with universal computer programming concepts like data types, containers
- To be familiarized with general computer programming concepts like conditional execution, loops & functions
- To be familiarized with general coding techniques and object-oriented programming

Course Outcomes:

- Develop essential programming skills in computer programming concepts like data types, containers
- Apply the basics of programming in the Python language
- Solve coding tasks related conditional execution, loops

- Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming

DATA STRUCTURES

Course Objectives:

The objective of the course is to

- Introduce the fundamental concept of data structures and abstract data types
- Emphasize the importance of data structures in developing and implementing efficient algorithms
- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms

Course Outcomes:

After completing this course a student will be able to:

- Summarize the properties, interfaces, and behaviors of basic abstract data types
- Discuss the computational efficiency of the principal algorithms for sorting & searching
- Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
- Demonstrate different methods for traversing trees

PYTHON PROGRAMMING LAB

Course Objectives:

The Objectives of Python Programming are

- To learn about Python programming language syntax, semantics, and the runtime environment
- To be familiarized with universal computer programming concepts like data types, containers
- To be familiarized with general computer programming concepts like conditional execution, loops & functions
- To be familiarized with general coding techniques and object-oriented programming

Course Outcomes:

- Develop essential programming skills in computer programming concepts like data types, containers
- Apply the basics of programming in the Python language
- Solve coding tasks related conditional execution, loops

- Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming

APPLIED CHEMISTRY LAB

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

DATA STRUCTURES LAB

Course Objectives:

The objective of this lab is to

- Demonstrate the different data structures implementation.

Course Outcomes:

By the end of this lab the student is able to

- Use basic data structures such as arrays and linked list.
- Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
- Use various searching and sorting algorithms.

ENVIRONMENT SCIENCE

Course Objectives:

The objectives of the course are to impart:

- Overall understanding of the natural resources.
- Basic understanding of the ecosystem and its diversity.
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
- An understanding of the environmental impact of developmental activities.
- Awareness on the social issues, environmental legislation and global treaties.

AI&DS

Course objective-I YR-I Sem (R20)

COMMUNICATIVE ENGLISH (HS1101):

Course objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
- **Learning Outcomes**
- At the end of the module, the learners will be able to
- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

MATHEMATICS-I (BS1101)

Course Objectives:

- To familiarize a variety of well-known sequences and series, with a developing intuition about the behaviour of new ones.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

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

- utilize mean value theorems to real life problems (L3)
- solve the differential equations related to various engineering fields (L3)
- familiarize with functions of several variables which is useful in optimization (L3)
- apply double integration techniques in evaluating areas bounded by region (L3)

- students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)

APPLIED CHEMISTRY (BS1102)

Course Objectives

- Importance of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- Outline the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- Explain the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
- Recall the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
- Outline the basics of computational chemistry and molecular switches

Unit 1:Course Outcomes: At the end of this unit, the students will be able to

- Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.

Unit 2:Course Outcomes: At the end of this unit, the students will be able to

- Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.

Unit 3:Course Outcomes: At the end of this unit, the students will be able to

- Synthesize nanomaterials for modern advances of engineering technology.
- Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.

.

Unit 4:Course Outcomes: At the end of this unit, the students will be able to

- Analyze the principles of different analytical instruments and their applications.
- Design models for energy by different natural sources.

Unit 5:Course Outcomes: At the end of this unit, the students will be able to

- Obtain the knowledge of computational chemistry and molecular machines

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PROGRAMMING FOR PROBLEM SOLVING USING C (ES1101)

Course Objectives:

The objectives of Programming for Problem Solving Using C are

- To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
- To gain knowledge of the operators, selection, control statements and repetition in C
- To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage.

● To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.
● To assimilate about File I/O and significance of functions
.

Course Outcomes:

Upon the completion of the course the student will learn
● To write algorithms and to draw flowcharts for solving problems
● To convert flowcharts/algorithms to C Programs, compile and debug programs
● To use different operators, data types and write programs that use two-way/ multi-way selection
● To select the best loop construct for a given problem
● To design and implement programs to analyze the different pointer applications
● To decompose a problem into functions and to develop modular reusable code
● To apply File I/O operations

COMPUTER ENGINEERING WORKSHOP (ES1102)

Course Objectives:

The objective of this course is to
- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate basic command line interface commands on Linux
- Teach the usage of Internet for productivity and self paced lifelong learning
- Describe about Compression, Multimedia and Antivirus tools
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools

Course Outcomes:

Students should be able to:
- Assemble and disassemble components of a PC
- Construct a fully functional virtual machine, Summarize various Linux operating system commands,
- Recognize characters & extract text from scanned images, Create audio files and podcasts and structures useful for writing reports.

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

PROGRAMMING FOR PROBLEM SOLVING USING C LAB (ES1103)

Course Objectives:
- Apply the principles of C language in problem solving.
- To design flowcharts, algorithms and knowing how to debug programs.
- To design & develop of C programs using arrays, strings pointers & functions.
- To review the file operations, preprocessor commands.

Course Outcomes:

By the end of the Lab, the student
- Gains Knowledge on various concepts of a C language.
- Able to draw flowcharts and write algorithms.

- Able design and development of C problem solving skills.
- Able to design and develop modular programming skills.
- Able to trace and debug a program

ENVIRONMENTAL SCIENCE (MC1101)

Course Objectives:

The objectives of the course are to impart:

- Overall understanding of the natural resources.
- Basic understanding of the ecosystem and its diversity.
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
- An understanding of the environmental impact of developmental activities.
- Awareness on the social issues, environmental legislation and global treaties.

Course objective-I YR-II Sem (R20)

MATHEMATICS - II (BS1201)

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

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

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- apply numerical integral techniques to different Engineering problems (L3)
- apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

APPLIED PHYSICS (BS1202)

Course Objectives:

1. Bridging the gap between the physics in school at 10+2 level and UG level engineering courses.

2. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
3. Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications, study of propagation of light through optical fibers and their implications in optical communications.
4. Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals and band theory for crystalline solids. Metals- Semiconductors-Insulators concepts utilization of transport phenomenon of charge carriers in semiconductors.
5. To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
6. To understand the physics of Semiconductors and their working mechanism. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Course Outcomes:

1. Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)
2. Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).
3. Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).
4. Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)
5. Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).

Unit 1: Outcomes:

The students will be able to

- **Explain** the need of coherent sources and the conditions for sustained interference (L2)
- **Identify** engineering applications of interference (L3)
- **Analyze** the differences between interference and diffraction with applications (L4)
- **Illustrate** the concept of polarization of light and its applications (L2)
- **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit-II:

Unit Outcomes:

The students will be able to

- **Understand** the basic concepts of LASER light Sources (L2)
- **Apply** the concepts to learn the types of lasers (L3)
- **Identifies** the Engineering applications of lasers (L2)
- **Explain** the working principle of optical fibers (L2)
- **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
- **Identify** the applications of optical fibers in various fields (L2)

Unit III:

Unit Outcomes:

The students will be able to

- **Explain** the concept of dual nature of matter (L2)
- **Understand** the significance of wave function (L2)
- **Interpret** the concepts of classical and quantum free electron theories (L2)
- **Explain** the importance of K-P model
- **Classify** the materials based on band theory (L2)
- **Apply** the concept of effective mass of electron (L3)

Unit Outcomes: ***The students will be able to***

- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
- **Explain** the applications of dielectric and magnetic materials (L2)
- **Apply** the concept of magnetism to magnetic data storage devices (L3)

Unit – V: Unit Outcomes:

The students will be able to

- **Classify** the energy bands of semiconductors (L2)
- **Interpret** the direct and indirect band gap semiconductors (L2)
- **Identify** the type of semiconductor using Hall effect (L2)
- **Identify** applications of semiconductors in electronic devices (L2)
- **Classify** superconductors based on Meissner's effect (L2)
- **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2)

DIGITAL LOGIC DESIGN (ES1201)

Course objectives:

● To study the basic philosophy underlying the various number systems, negative number representation, binary arithmetic, theory of Boolean algebra and map method for minimization of switching functions.

● To introduce the basic tools for design of combinational and sequential digital logic.

● To learn simple digital circuits in preparation for computer engineering.

Course outcomes:

A student who successfully fulfills the course requirements will have demonstrated:

● An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.

● An ability to understand the different switching algebra theorems and apply them for logic functions.
● An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
● Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.
● Students will be able to design various sequential circuits starting from flip-flop to registers and counters.

PROGRAMMING (ES1202)

Course Objectives:

The Objectives of Python Programming are
● To learn about Python programming language syntax, semantics, and the runtime environment
● To be familiarized with universal computer programming concepts like data types, containers
● To be familiarized with general computer programming concepts like conditional execution, loops & functions
● To be familiarized with general coding techniques and object-oriented programming

Course Outcomes:

● Develop essential programming skills in computer programming concepts like data types, containers
● Apply the basics of programming in the Python language
● Solve coding tasks related conditional execution, loops

MECH

Course objective-I YR-I Sem (R20)

MATHEMATICS-I (BS1101)

Course Objectives:

• To familiarize a variety of well-known sequences and series, with a developing intuition about the behavior of new ones.
• To enlighten the learners in the concept of differential equations and multivariable calculus.
• To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

Course Outcomes: At the end of the course, the student will be able to
• utilize mean value theorems to real life problems (L3)
• solve the differential equations related to various engineering fields (L3)

- familiarize with functions of several variables which is useful in optimization (L3)
- apply double integration techniques in evaluating areas bounded by region (L3)
- students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)

ENGINEERING PHYSICS

Unit-I: Unit Outcomes:

The students will be able to

- **Explain** the need of coherent sources and the conditions for sustained interference (L2)
- **Identify** engineering applications of interference (L3)
- **Analyze** the differences between interference and diffraction with applications (L4)
- **Illustrate** the concept of polarization of light and its applications (L2)
- **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit-II:

Unit Outcomes:

The students will be able to

- **Understand** the basic concepts of LASER light Sources (L2)
- **Apply** the concepts to learn the types of lasers (L3)
- **Identifies** the Engineering applications of lasers (L2)
- **Explain** the working principle of optical fibers (L2)
- **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
- **Identify** the applications of optical fibers in various fields (L2)

UNIT III:

Unit Outcomes:

The students will be able to

- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their

temperaturedependence(L2)

- **Explain** the applications of dielectric and magnetic materials (L2)
- **Apply** the concept of magnetism to magnetic devices (L3

Unit-IV:

Unit Outcomes:

The students will be able to

- **Explain** how sound is propagated in buildings (L2)
- **Analyze** acoustic properties of typically used materials in buildings (L4)
- **Recognize** sound level disruptors and their use in architectural acoustics (L2)
- **Identify** the use of ultrasonics in different fields (L3)

Unit-V:

Unit Outcomes:

The students will be able to

- **Classify** various crystal systems (L2)
- **Identify** different planes in the crystal structure (L3)
- **Analyze** the crystalline structure by Bragg's X-ray diffractometer (L4)
- **Apply** powder method to measure the crystallinity of a solid (L4)

PROGRAMMING FOR PROBLEM SOLVING USING C

COURSE OBJECTIVES:

The objectives of Programming for Problem Solving Using C are

1) To learn about the computer systems, computing environments, developing of a computerprogram and Structure of a C Program

2) To gain knowledge of the operators, selection, control statements and repetition in C

3) To learn about the design concepts of arrays, strings, enumerated structure and union types. Tolearn about their usage.

4) To assimilate about pointers, dynamic memory allocation and know the significance ofPreprocessor.

5) To assimilate about File I/O and significance of functions

COMMUNICATIVE ENGLISH (HS1101):

Course objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information

- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
- **Learning Outcomes**
- At the end of the module, the learners will be able to
- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

ENGINEERING DRAWING

- **Course Objective:** Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit I

- **Objective:** To introduce the students to use drawing instruments and to draw polygons,

Unit II

- **Objective:** To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

Unit III

- **Objective:** The objective is to make the students draw the projections of the plane inclined to both the planes

Unit IV

- **Objective:** The objective is to make the students draw the projections of the various types of solids indifferent positions inclined to one of the planes.

Unit V

- **Objective:** The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic viewand vice versa.

PROGRAMMING FOR PROBLEM SOLVING USING C LABORATORY

Course Objectives:

1) Apply the principles of C language in problem solving.
2) To design flowcharts, algorithms and knowing how to debug programs.
3) To design & develop of C programs using arrays, strings pointers & functions.
4) To review the file operations, preprocessor commands.

Course Outcomes:

By the end of the Lab, the student

1) Gains Knowledge on various concepts of a C language.
2) Able to draw flowcharts and write algorithms.
3) Able design and development of C problem solving skills.
4) Able to design and develop modular programming skills.
5) Able to trace and debug a program.

ENVIRONMENTAL SCIENCE

Learning Objectives:

The objectives of the course are to impart:

Overall understanding of the natural resources.

Basic understanding of the ecosystem and its diversity.

Acquaintance on various environmental challenges induced due to unplanned anthropogenicactivities.

An understanding of the environmental impact of developmental activities. Awareness on the social issues, environmental legislation and global treaties.

Course objective-I YR-II Sem (R20)

LINEAR ALGEBRA AND NUMERICAL METHODS -M-II

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

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

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- apply numerical integral techniques to different Engineering problems (L3)
- apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

ENGINEERING CHEMISTRY

COURSE OBJECTIVES

Importance of usage of plastics in household appliances and composites (FRP) in aerospace andautomotive industries.

Outline the basics for the construction of electrochemical cells, batteries and fuel cells.Understand the mechanism of corrosion and how it can be prevented.

Express the increases in demand as wide variety of advanced materials are introduced; whichhave excellent engineering properties.

Classify and discuss the materials used in major industries like steel industry, metallurgical industries and construction industries and electrical equipment manufacturing industries. Lubrication is also ***summarized***.

Relate the need of fuels as a source of energy to any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence introduced.

Explain the importance and usage of water as basic material in almost all the industries; ***interpret***

drawbacks of steam boilers and also how portable water is supplied for drinking purposes.

UNIT I

Course Outcomes: ***At the end of this unit, the students will be able to Analyze*** the different types of composite plastic materials and ***interpret*** the mechanism ofconduction in conducting polymers.

UNIT II:

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

Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and c***ategorize*** the reasons for corrosion and study methods to control corrosion.

UNIT III:

Course Outcomes: ***At the end of this unit, the students will be able to Synthesize*** nanomaterials for modern advances of engineering technology. ***Summarize*** the techniques that detect and measure changes of state of reaction. ***Illustrate*** the commonly used industrial materials

UNIT IV:

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

Differentiate petroleum, petrol, synthetic petrol and have knowledge how they are produced. ***Study*** alternate fuels and a***nalyse*** flue gases

UNIT V:

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

Analyze the suitable methods for purification and treatment of hard water and brackish water.

ENIGINEERING MECHANICS

Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes, resultant of force system, Forces acting on a body,

their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

UNIT – I

Objectives: The students are to be exposed to the concepts of force and friction, direction and itsapplication.

UNIT II

Objectives: The students are to be exposed to application of free body diagrams. Solution toproblems using graphical methods and law of triangle of forces.

UNIT – III

Objectives : The students are to be exposed to concepts of centre of gravity. The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications

UNIT – IV

Objectives: The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.

UNIT – V

Objectives: The students are to be exposed to rigid motion kinematics and kinetics Rigid

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Learning Objectives:

To learn the basic principles of electrical circuital law's and analysis ofnetworks. To understand principle of operation and construction details of DC machines.

To understand principle of operation and construction details of transformers, alternator and 3-Phase induction motor.

To study operation of PN junction diode, half wave, full wave rectifiers and OP-AMPs. To learn operation of PNP and NPN transistors and various amplifiers.

Learning Outcomes:

The student should be able to:

Analyse various electrical networks.

Understand operation of DC generators,3-point starter and DC machine testing by Swinburne'sTest and Brake test.

Analyse performance of single-phase transformer and acquire proper knowledge and working of3-phase alternator and 3-phase induction motors.

Analyse operation of half wave, full wave bridge rectifiers and OP-AMPs. Understanding operations of CE amplifier and basic concept of feedback amplifier.

THERMODYNAMICS

Course Objectives

To impart the knowledge of the thermodynamic laws and principles so as to enable the student to prepare an energy audit of any mechanical system that exchange heat and work with the surroundings.

8. Engineering Thermodynamics – P.Chattopadhyay – Oxford Higher Edn Publ.

COURSE OUTCOMES:

After undergoing the course the student is expected to learn CO1: Basic concepts of thermodynamics

CO2: Laws of thermodynamics CO3: Concept of entropy

CO4: Property evaluation of vapors and their depiction in tables and charts CO5: Evaluation of properties of perfect gas mixtures.

WORKSHOP PRACTICE LAB

Course Objective: To impart hands-on practice on basic engineering trades and skills.

ENGINEERING CHEMISTRY LABORATORY

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of somecommonly employed instruments. They thus acquire some experimental skills

BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

Learning Objectives:

To predetermine the efficiency of dc shunt machine using Swinburne's test. To predetermine the efficiency and regulation of 1-phase transformer with

O.C and S.C tests.

To obtain performance characteristics of DC shunt motor &3-phase induction motor. To find out regulation of an alternator with synchronous impedance method.

To control speed of dc shunt motor using Armature voltage and Field flux control methods. To find out the characteristics of PN junction diode & transistor

To determine the ripple factor of half wave & full wave rectifiers

Learning Outcomes:

The student should be able to:

Compute the efficiency of DC shunt machine without actual loading of the machine. Estimate the efficiency and regulation at different load conditions and power factors for singlephase transformer with OC and SC tests.

Analyse the performance characteristics and to determine efficiency of DC shunt motor &3-Phaseinduction motor

Pre-determine the regulation of an alternator by synchronous impedance method.

Control the speed of dc shunt motor using Armature voltage and Field flux control methods.

Draw the characteristics of PN junction diode & transistor

Determine the ripple factor of half wave & full wave rectifiers.

CONSTITUTION OF INDIA

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high courtcontroller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative

PROGRAMMING FOR PROBLEM SOLVING USING C (ES1101)

Course Objectives:

The objectives of Programming for Problem Solving Using C are

● To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program

● To gain knowledge of the operators, selection, control statements and repetition in C

● To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage.

● To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.
● To assimilate about File I/O and significance of functions

.

Course Outcomes:

Upon the completion of the course the student will learn
● To write algorithms and to draw flowcharts for solving problems
● To convert flowcharts/algorithms to C Programs, compile and debug programs
● To use different operators, data types and write programs that use two-way/ multi-way selection
● To select the best loop construct for a given problem
● To design and implement programs to analyze the different pointer applications
● To decompose a problem into functions and to develop modular reusable code
● To apply File I/O operations

ENGINEERING DRAWING & DESIGN

Course Objective:

Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit I

Objective: To introduce the students to use drawing instruments and to draw poly

Unit II

Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

gons, Engg. Curves

Unit III

Objective: The objective is to make the students draw the projections of the plane inclined to both the planes.

Unit IV

Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

Unit V

Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Course Outcome: The student will learn how to visualize 2D & 3D objects.

ELECTRICAL ENGINEERING WORKSHOP

Course Objectives:

• To demonstrate the usage of measuring equipment

• To train the students in setting up simple wiring circuits

• To impart methods in electrical machine wiring

Course Outcomes:

After the completion of the course the student should be able to:

• Explain the limitations, tolerances, safety aspects of electrical systems and wiring.

• Select wires/cables and other accessories used in different types of wiring.

• Make simple lighting and power circuits.

• Measure current, voltage and power in a circuit

PROGRAMMING FOR PROBLEM SOLVING USING C LAB (ES1202)

Course Objectives:

• Apply the principles of C language in problem solving.

• To design flowcharts, algorithms and knowing how to debug programs.

• To design & develop of C programs using arrays, strings pointers & functions.

• To review the file operations, preprocessor commands.

Course Outcomes:

After the completion of the course the student should be able to:

• Gains Knowledge on various concepts of a C language.

• Draw flowcharts and write algorithms.

• Design and development of C problem solving skills.

• Design and develop modular programming skills.

• Trace and debug a program

Course objective-I YR-II Sem (R20)

3 MATHEMATICS-III(Vector Calculus, Transforms and PDE)

Course Objectives:

- To familiarize the techniques in partial differential equations
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

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

- interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- estimate the work done against a field, circulation and flux using vector calculus (L5)
- apply the Laplace transform for solving differential equations (L3)
- find or compute the Fourier series of periodic signals (L3)
- know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)
- identify solution methods for partial differential equations that model physical processes (L3)

APPLIED PHYSICS

Course Objectives:

1. Bridging the gap between the physics in school at 10+2 level and UG level engineering courses.

2. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications

3. Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications, study of propagation of light through optical fibers and their implications in optical communications.

4. Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals and band theory for crystalline solids. Metals- Semiconductors-Insulators concepts utilization of transport phenomenon of charge carriers in semiconductors.

5. To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.

6. To Understand the physics of Semiconductors and their working mechanism. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Course Outcomes:

1. Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)

2. Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).

3. Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).

4. Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)

5. Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).

Unit-I

Unit Outcomes:

The students will be able to

- **Explain** the need of coherent sources and the conditions for sustained interference (L2)
- **Identify** engineering applications of interference (L3)
- **Analyze** the differences between interference and diffraction with applications (L4)
- **Illustrate** the concept of polarization of light and its applications (L2)
- **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit-II:

Unit Outcomes:

The students will be able to

- **Understand** the basic concepts of LASER light Sources (L2)
- **Apply** the concepts to learn the types of lasers (L3)
- **Identifies** the Engineering applications of lasers (L2)
- **Explain** the working principle of optical fibers (L2)
- **Classify** optical fibers based on refractive index profile and mode of propagation (L2)
- **Identify** the applications of optical fibers in various fields (L2)

Unit III

Unit Outcomes:

The students will be able to

- **Explain** the concept of dual nature of matter (L2)
- **Understand** the significance of wave function (L2)

- **Interpret** the concepts of classical and quantum free electron theories (L2)
- **Explain** the importance of K-P model
- **Classify** the materials based on band theory (L2)
- **Apply** the concept of effective mass of electron (L3)

Unit-IV

Unit Outcomes: ***The students will be able to***

- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
- **Explain** the applications of dielectric and magnetic materials (L2)
- **Apply** the concept of magnetism to magnetic data storage devices (L3)

Unit – V:

Unit Outcomes:

The students will be able to

- **Classify** the energy bands of semiconductors (L2)
- **Interpret** the direct and indirect band gap semiconductors (L2)
- **Identify** the type of semiconductor using Hall effect (L2)
- **Identify** applications of semiconductors in electronic devices (L2)
- **Classify** superconductors based on Meissner's effect (L2)
- **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2)

DATA STRUCTURES THROUGH C

Course Objectives:

• Operations on linear data structures and their applications.

• The various operations on linked lists.

• The basic concepts of Trees, Traversal methods and operations.

• Concepts of implementing graphs and its relevant algorithms.

• Sorting and searching algorithms.

Course Outcomes:

After the completion of the course the student should be able to:

• data structures concepts with arrays, stacks, queues.

• linked lists for stacks, queues and for other applications.

• traversal methods in the Trees.

• various algorithms available for the graphs.

• sorting and searching in the data ret retrieval applications

ELECTRICAL CIRCUIT ANALYSIS -I

Course Objectives:

• To study the concepts of passive elements, types of sources and various network reduction techniques.

• To understand the applications of network topology to electrical circuits.

• To study the concept of magnetic coupled circuit.

• To understand the behavior of RLC networks for sinusoidal excitations.

• To study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.

• To understand the applications of network theorems for analysis of electrical networks.

Course Outcomes:

After the completion of the course the student should be able to:

• Various electrical networks in presence of active and passive elements.

• Electrical networks with network topology concepts.

• Any magnetic circuit with various dot conventions.

• Any R, L, C network with sinusoidal excitation.

• Any R, L, network with variation of any one of the parameters i.e., R, L, C and f.

• Electrical networks by using principles of network theorems.

BASIC CIVIL AND MECHANICAL ENGINEERING

Course Objectives:

COB 1: To impart basic principles of stress, strain, shear force and bending moment.

COB 2: To teach principles of strain measurement using electrical strain gauges.

COB 3: To impart basic characteristics of building materials.

COB 4: To familiarize the sources of energy, power plant economics and environmental aspects.

COB 5: To make the students to understand the basics concept of Boilers & I.C. engines.

Course Outcomes:

At the end of this course, the student will be able to

CO 1 : Apply Shear force diagram & Bending moment diagram principles for Cantilever and Simply supported beams.

CO 2 : Apply concepts of Rosette analysis for strain measurements. CO 3 : Analyse the characteristics of common building materials.

CO 4 : Compare the working characteristics of Internal Combustion engines. CO 5 : Compare the differences between boiler mountings and accessories.

BASIC CIVIL AND MECHANICAL ENGINEERING LAB

Course Objectives:

COB 1: To make the student learn about the constructional features and operational details of various types of internal combustion engines.

COB 2: To make the student learn about the constructional features, operational details of various types of hydraulic turbines

COB 3: To practice the student about the fundamental of fluid dynamic equations and its applications fluid jets.

COB 4: To train the student in the areas of types of hydro electric power plants, estimation and calculation of different loads by considering various factors.

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Solve to arrive at finding constant speed and variable speed on IC engines and interpret their performance.

CO 2: Estimate energy distribution by conducting heat balance test on IC engines

CO 3: Explain procedure for standardization of experiments.

CO 4: Determine flow discharge measuring device used in pipes channels and tanks.

CO 5: Determine fluid and flow properties. CO 6: Solve for drag coefficients.

CO 7: Test for the performance of pumps and turbines

DATA STRUCTURES THROUGH C LAB

Course Objectives:

- To develop skills to design and analyze simple linear and non linear data structures.
- To strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem.
- To gain knowledge in practical applications of data structures

Course Outcomes:

After the completion of the course the student should be able to:

- Be able to design and analyze the time and space efficiency of the data structure.
- Be capable to identity the appropriate data structure for given problem.
- Have practical knowledge on the applications of data structures.

CONSTITUTION OF INDIA

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary

- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative

Unit I

Learning outcomes:

After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History, features of Indian constitution
- Evaluate Preamble Fundamental Rights and Duties

UNIT-II

Learning outcomes: -After completion of this unit student will

● Understand the structure of Indian government

● Differentiate between the state and central government

● Explain the role of President and Prime Minister

● Know the Structure of supreme court and High court

UNIT-III

Learning outcomes: -After completion of this unit student will

● Understand the structure of state government

● Analyze the role Governor and Chief Minister

● Explain the role of state Secretariat

● Differentiate between structure and functions of state secretariat

UNIT-IV

Learning outcomes: -After completion of this unit student will

● Understand the local Administration

● Compare and contrast district administration role and importance

● Analyze the role of Myer and elected representatives of Municipalities

● Evaluate Zilla panchayat block level organization

UNIT-V

Learning outcomes: -After completion of this unit student will

● Know the role of Election Commission apply knowledge

● Contrast and compare the role of Chief Election commissioner and Commissionerate

● Analyze role of state election commission

● Evaluate various commissions of viz SC/ST/OBC and women

Course Outcomes:

At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

1. Know the sources, features and principles of Indian Constitution.
2. Learn about Union Government, State government and its administration.

3. Get acquainted with Local administration and Pachayati Raj.

4. Be aware of basic concepts and developments of Human Rights.

5. Gain knowledge on roles and functioning of Election Commission

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EEE

Course objective-I YR-I Sem (R20)

COMMUNICATIVE ENGLISH (HS1101):

Course objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
- **Learning Outcomes**
- At the end of the module, the learners will be able to
- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

MATHEMATICS-I (BS1101)

Course Objectives:

- To familiarize a variety of well-known sequences and series, with a developing intuition about the behavior of new ones.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

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

- utilize mean value theorems to real life problems (L3)
- solve the differential equations related to various engineering fields (L3)
- familiarize with functions of several variables which is useful in optimization (L3)
- apply double integration techniques in evaluating areas bounded by region (L3)
- students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)

MATHEMATICS-II

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

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

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- apply numerical integral techniques to different Engineering problems (L3)
- apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

PROGRAMMING FOR PROBLEM SOLVING USING C (ES1101)

Course Objectives:

The objectives of Programming for Problem Solving Using C are

● To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program

● To gain knowledge of the operators, selection, control statements and repetition in C

● To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage.

● To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.

● To assimilate about File I/O and significance of functions

.

Course Outcomes:

Upon the completion of the course the student will learn

● To write algorithms and to draw flowcharts for solving problems

● To convert flowcharts/algorithms to C Programs, compile and debug programs

● To use different operators, data types and write programs that use two-way/ multi-way selection

● To select the best loop construct for a given problem

● To design and implement programs to analyze the different pointer applications

● To decompose a problem into functions and to develop modular reusable code

● To apply File I/O operations

ENGINEERING DRAWING & DESIGN

Course Objective:

Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit I

Objective: To introduce the students to use drawing instruments and to draw poly

Unit II

Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

gons, Engg. Curves

Unit III

Objective: The objective is to make the students draw the projections of the plane inclined to both the planes.

Unit IV

Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

Unit V

Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Course Outcome: The student will learn how to visualize 2D & 3D objects.

ELECTRICAL ENGINEERING WORKSHOP

Course Objectives:

• To demonstrate the usage of measuring equipment

• To train the students in setting up simple wiring circuits

• To impart methods in electrical machine wiring

Course Outcomes:

After the completion of the course the student should be able to:

• Explain the limitations, tolerances, safety aspects of electrical systems and wiring.

• Select wires/cables and other accessories used in different types of wiring.

• Make simple lighting and power circuits.

• Measure current, voltage and power in a circuit

PROGRAMMING FOR PROBLEM SOLVING USING C LAB (ES1202)

Course Objectives:

• Apply the principles of C language in problem solving.

• To design flowcharts, algorithms and knowing how to debug programs.

• To design & develop of C programs using arrays, strings pointers & functions.

• To review the file operations, preprocessor commands.

Course Outcomes:

After the completion of the course the student should be able to:

• Gains Knowledge on various concepts of a C language.

• Draw flowcharts and write algorithms.

• Design and development of C problem solving skills.

• Design and develop modular programming skills.

• Trace and debug a program

Course objective-I YR-II Sem (R20)

3 MATHEMATICS-III(Vector Calculus, Transforms and PDE)

Course Objectives:

- To familiarize the techniques in partial differential equations
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

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

- interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
- estimate the work done against a field, circulation and flux using vector calculus (L5)
- apply the Laplace transform for solving differential equations (L3)
- find or compute the Fourier series of periodic signals (L3)
- know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)

- identify solution methods for partial differential equations that model physical processes (L3)

APPLIED PHYSICS

Course Objectives:

1. Bridging the gap between the physics in school at 10+2 level and UG level engineering courses.
2. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
3. Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications, study of propagation of light through optical fibers and their implications in optical communications.
4. Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals and band theory for crystalline solids. Metals- Semiconductors-Insulators concepts utilization of transport phenomenon of charge carriers in semiconductors.
5. To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
6. To Understand the physics of Semiconductors and their working mechanism. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Course Outcomes:

1. Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)
2. Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers

in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).

3. Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).

4. Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)

5. Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).

Unit-I

Unit Outcomes:

The students will be able to

- **Explain** the need of coherent sources and the conditions for sustained interference (L2)
- **Identify** engineering applications of interference (L3)
- **Analyze** the differences between interference and diffraction with applications (L4)
- **Illustrate** the concept of polarization of light and its applications (L2)
- **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit-II:

Unit Outcomes:

The students will be able to

- **Understand** the basic concepts of LASER light Sources (L2)
- **Apply** the concepts to learn the types of lasers (L3)
- **Identifies** the Engineering applications of lasers (L2)
- **Explain** the working principle of optical fibers (L2)
- **Classify** optical fibers based on refractive index profile and mode of propagation (L2)

- **Identify** the applications of optical fibers in various fields (L2)

Unit III

Unit Outcomes:

The students will be able to

- **Explain** the concept of dual nature of matter (L2)
- **Understand** the significance of wave function (L2)
- **Interpret** the concepts of classical and quantum free electron theories (L2)
- **Explain** the importance of K-P model
- **Classify** the materials based on band theory (L2)
- **Apply** the concept of effective mass of electron (L3)

Unit-IV

Unit Outcomes: ***The students will be able to***

- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
- **Explain** the applications of dielectric and magnetic materials (L2)
- **Apply** the concept of magnetism to magnetic data storage devices (L3)

Unit – V:

Unit Outcomes:

The students will be able to

- **Classify** the energy bands of semiconductors (L2)
- **Interpret** the direct and indirect band gap semiconductors (L2)
- **Identify** the type of semiconductor using Hall effect (L2)
- **Identify** applications of semiconductors in electronic devices (L2)
- **Classify** superconductors based on Meissner's effect (L2)
- **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2)

DATA STRUCTURES THROUGH C

Course Objectives:

• Operations on linear data structures and their applications.

• The various operations on linked lists.

• The basic concepts of Trees, Traversal methods and operations.

• Concepts of implementing graphs and its relevant algorithms.

• Sorting and searching algorithms.

Course Outcomes:

After the completion of the course the student should be able to:

• data structures concepts with arrays, stacks, queues.

• linked lists for stacks, queues and for other applications.

• traversal methods in the Trees.

• various algorithms available for the graphs.

• sorting and searching in the data ret retrieval applications

ELECTRICAL CIRCUIT ANALYSIS -I

Course Objectives:

• To study the concepts of passive elements, types of sources and various network reduction techniques.

• To understand the applications of network topology to electrical circuits.

• To study the concept of magnetic coupled circuit.

• To understand the behavior of RLC networks for sinusoidal excitations.

• To study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.

• To understand the applications of network theorems for analysis of electrical networks.

Course Outcomes:

After the completion of the course the student should be able to:

• Various electrical networks in presence of active and passive elements.

• Electrical networks with network topology concepts.

• Any magnetic circuit with various dot conventions.

• Any R, L, C network with sinusoidal excitation.

• Any R, L, network with variation of any one of the parameters i.e., R, L, C and f.

• Electrical networks by using principles of network theorems.

BASIC CIVIL AND MECHANICAL ENGINEERING

Course Objectives:

COB 1: To impart basic principles of stress, strain, shear force and bending moment.

COB 2: To teach principles of strain measurement using electrical strain gauges.

COB 3: To impart basic characteristics of building materials.

COB 4: To familiarize the sources of energy, power plant economics and environmental aspects.

COB 5: To make the students to understand the basics concept of Boilers & I.C. engines.

Course Outcomes:

At the end of this course, the student will be able to

CO 1 : Apply Shear force diagram & Bending moment diagram principles for Cantilever and Simply supported beams.

CO 2 : Apply concepts of Rosette analysis for strain measurements. CO 3 : Analyse the characteristics of common building materials.

CO 4 : Compare the working characteristics of Internal Combustion engines. CO 5 : Compare the differences between boiler mountings and accessories.

BASIC CIVIL AND MECHANICAL ENGINEERING LAB

Course Objectives:

COB 1: To make the student learn about the constructional features and operational details of various types of internal combustion engines.

COB 2: To make the student learn about the constructional features, operational details of various types of hydraulic turbines

COB 3: To practice the student about the fundamental of fluid dynamic equations and its applications fluid jets.

COB 4: To train the student in the areas of types of hydro electric power plants, estimation and calculation of different loads by considering various factors.

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Solve to arrive at finding constant speed and variable speed on IC engines and interpret their performance.

CO 2: Estimate energy distribution by conducting heat balance test on IC engines

CO 3: Explain procedure for standardization of experiments.

CO 4: Determine flow discharge measuring device used in pipes channels and tanks.

CO 5: Determine fluid and flow properties. CO 6: Solve for drag coefficients.

CO 7: Test for the performance of pumps and turbines

DATA STRUCTURES THROUGH C LAB

Course Objectives:

- To develop skills to design and analyze simple linear and non linear data structures.
- To strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem.
- To gain knowledge in practical applications of data structures

Course Outcomes:

After the completion of the course the student should be able to:

- Be able to design and analyze the time and space efficiency of the data structure.

- Be capable to identity the appropriate data structure for given problem.
- Have practical knowledge on the applications of data structures.

CONSTITUTION OF INDIA

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative

Unit I

Learning outcomes:

After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History, features of Indian constitution
- Evaluate Preamble Fundamental Rights and Duties

UNIT-II

Learning outcomes: -After completion of this unit student will

- Understand the structure of Indian government
- Differentiate between the state and central government
- Explain the role of President and Prime Minister
- Know the Structure of supreme court and High court

UNIT-III

Learning outcomes: -After completion of this unit student will

● Understand the structure of state government

● Analyze the role Governor and Chief Minister

● Explain the role of state Secretariat

● Differentiate between structure and functions of state secretariat

UNIT-IV

Learning outcomes: -After completion of this unit student will

● Understand the local Administration

● Compare and contrast district administration role and importance

● Analyze the role of Myer and elected representatives of Municipalities

● Evaluate Zilla panchayat block level organization

UNIT-V

Learning outcomes: -After completion of this unit student will

● Know the role of Election Commission apply knowledge

● Contrast and compare the role of Chief Election commissioner and Commissionerate

● Analyze role of state election commission

● Evaluate various commissions of viz SC/ST/OBC and women

Course Outcomes:

At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.

- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

1. Know the sources, features and principles of Indian Constitution.
2. Learn about Union Government, State government and its administration.
3. Get acquainted with Local administration and Pachayati Raj.
4. Be aware of basic concepts and developments of Human Rights.
5. Gain knowledge on roles and functioning of Election Commission

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ECE

Course objective-I YR-I Sem (R20)

COMMUNICATIVE ENGLISH (HS1101):

Course objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
- **Learning Outcomes**
- At the end of the module, the learners will be able to
- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

MATHEMATICS-I (BS1101)

Course Objectives:

• To familiarize a variety of well-known sequences and series, with a developing intuition about the behavior of new ones.
• To enlighten the learners in the concept of differential equations and multivariable calculus.
• To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

Course Outcomes: At the end of the course, the student will be able to
• utilize mean value theorems to real life problems (L3)
• solve the differential equations related to various engineering fields (L3)
• familiarize with functions of several variables which is useful in optimization (L3)
• apply double integration techniques in evaluating areas bounded by region (L3)
• students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)

APPLIED CHEMISTRY (BS1102)

Course Objectives
• Importance of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
• Outline the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
• Explain the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
• Recall the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
• Outline the basics of computational chemistry and molecular switches

Unit 1:Course Outcomes: At the end of this unit, the students will be able to
• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.
Unit 2:Course Outcomes: At the end of this unit, the students will be able to
• Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.
Unit 3:Course Outcomes: At the end of this unit, the students will be able to
• Synthesize nanomaterials for modern advances of engineering technology.
• Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.
.

Unit 4:Course Outcomes: At the end of this unit, the students will be able to

- Analyze the principles of different analytical instruments and their applications.
- Design models for energy by different natural sources.

Unit 5:Course Outcomes: At the end of this unit, the students will be able to

- Obtain the knowledge of computational chemistry and molecular machines

PROGRAMMING FOR PROBLEM SOLVING USING C (ES1101)

Course Objectives:

The objectives of Programming for Problem Solving Using C are

● To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program

● To gain knowledge of the operators, selection, control statements and repetition in C

● To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage.

● To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor.

● To assimilate about File I/O and significance of functions

.

Course Outcomes:

Upon the completion of the course the student will learn

● To write algorithms and to draw flowcharts for solving problems

● To convert flowcharts/algorithms to C Programs, compile and debug programs

● To use different operators, data types and write programs that use two-way/ multi-way selection

● To select the best loop construct for a given problem

● To design and implement programs to analyze the different pointer applications

● To decompose a problem into functions and to develop modular reusable code

● To apply File I/O operations

COMPUTER ENGINEERING WORKSHOP (ES1102)

Course Objectives:

The objective of this course is to

- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate basic command line interface commands on Linux
- Teach the usage of Internet for productivity and self paced lifelong learning
- Describe about Compression, Multimedia and Antivirus tools
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools

Course Outcomes:

Students should be able to:

- Assemble and disassemble components of a PC
- Construct a fully functional virtual machine, Summarize various Linux operating system commands,
- Recognize characters & extract text from scanned images, Create audio files and podcasts and structures useful for writing reports.

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with

different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

ENGINEERING DRAWING

Course Objective:

Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit II

Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

Unit III

Objective: The objective is to make the students draw the projections of the plane inclined to both the planes.

Unit IV

Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

Unit V

Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa

APPLIED CHEMISTRY LAB

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

PROGRAMMING FOR PROBLEM SOLVING USING C LAB

Course Objectives:

1) Apply the principles of C language in problem solving.

2) To design flowcharts, algorithms and knowing how to debug programs.

3) To design & develop of C programs using arrays, strings pointers &functions.

4) To review the file operations, preprocess or commands

Course Outcomes:

By the end of the Lab, the student

1) Gains Knowledge on various concepts of a C language.

2) Able to draw flowcharts and write algorithms.

3) Able design and development of C problem solving skills.

4) Able to design and develop modular programming skills.

5) Able to trace and debug a program

Course objective-I YR-II Sem (R20)

MATHEMATICS-II

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations
- To elucidate the different numerical methods to solve nonlinear algebraic equations
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

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

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
- evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
- apply numerical integral techniques to different Engineering problems (L3)

- apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)

APPLIED PHYSICS

Course Objectives:

1. Bridging the gap between the physics in school at 10+2 level and UG level engineering courses.
2. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
3. Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications, study of propagation of light through optical fibers and their implications in optical communications.
4. Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals and band theory for crystalline solids. Metals- Semiconductors-Insulators concepts utilization of transport phenomenon of charge carriers in semiconductors.
5. To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
6. To Understand the physics of Semiconductors and their working mechanism. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Course Outcomes:

1. Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)
2. Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers

in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).

3. Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).

4. Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)

5. Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).

Unit-I

Unit Outcomes:

The students will be able to

- **Explain** the need of coherent sources and the conditions for sustained interference (L2)
- **Identify** engineering applications of interference (L3)
- **Analyze** the differences between interference and diffraction with applications (L4)
- **Illustrate** the concept of polarization of light and its applications (L2)
- **Classify** ordinary polarized light and extraordinary polarized light (L2)

Unit-II:

Unit Outcomes:

The students will be able to

- **Understand** the basic concepts of LASER light Sources (L2)
- **Apply** the concepts to learn the types of lasers (L3)
- **Identifies** the Engineering applications of lasers (L2)
- **Explain** the working principle of optical fibers (L2)
- **Classify** optical fibers based on refractive index profile and mode of propagation (L2)

- **Identify** the applications of optical fibers in various fields (L2)

Unit III

Unit Outcomes:

The students will be able to

- **Explain** the concept of dual nature of matter (L2)
- **Understand** the significance of wave function (L2)
- **Interpret** the concepts of classical and quantum free electron theories (L2)
- **Explain** the importance of K-P model
- **Classify** the materials based on band theory (L2)
- **Apply** the concept of effective mass of electron (L3)

Unit-IV

Unit Outcomes: ***The students will be able to***

- **Explain** the concept of dielectric constant and polarization in dielectric materials (L2)
- **Summarize** various types of polarization of dielectrics (L2)
- **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **Classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
- **Explain** the applications of dielectric and magnetic materials (L2)
- **Apply** the concept of magnetism to magnetic data storage devices (L3)

Unit – V:

Unit Outcomes:

The students will be able to

- **Classify** the energy bands of semiconductors (L2)
- **Interpret** the direct and indirect band gap semiconductors (L2)
- **Identify** the type of semiconductor using Hall effect (L2)
- **Identify** applications of semiconductors in electronic devices (L2)
- **Classify** superconductors based on Meissner's effect (L2)
- **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors (L2)

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives:

This subject will help to improve

- the analytical skills of object oriented programming
- Overall development of problem solving and critical analysis.
- Formal introduction to Java programming language

Course Outcomes:

On successful completion of this course, the student should be able to:

- Show competence in the use of the Java programming language in the development of small to medium- sized application programs that demonstrate professionally acceptable coding and performances standard
- Illustrate the basic principles of the object-oriented programming
- Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.

NETWORK ANALYSIS

COURSE OBJECTIVES:

- To understand the basic concepts on RLC circuits.
- To know the behavior of the steady states and transients states in RLC circuits.
- To know the basic Laplace transforms techniques in periods 'waveforms.
- To understand the two port network parameters.
- To understand the properties of LC networks and filters.

COURSE OUTCOME:

- gain the knowledge on basic network elements.
- will analyze the RLC circuits behavior in detailed.
- analyze the performance of periodic waveforms.
- gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD ,h &g).
- analyze the filter design concepts in real world applications.

BASIC ELECTRICAL ENGINEERING

Course Educational Objectives:

- To understand the principle of operation, constructional details and operational characteristics of DC generators.

- To understand the principle of operation, characteristics of DC motor. Methods of starting and speed control methods of DC motors.
- To learn the constructional details, principle of operation and performance of transformers.
- To study the principle of operation, construction and details of synchronous machines.
- To learn the principle of operation, constructional details, performance, torque – slip characteristics and starting methods of 3-phaseinductionmotors.

Course Outcomes:

- Able to explain the operation of DC generator and analyze the characteristics of DC generator.
- Able to explain the principle of operation of DC motor and analyze their characteristics. Acquire the skills to analyze the starting and speed control methods of DC motors.
- Ability to analyze the performance and speed – torque characteristics of a3-phase induction motor and understand starting methods of 3-phaseinductionmotor.
- Able to explain the operation of Synchronous Machines
- Capability to understand the operation of various special machines

ELECTRONIC WORKSHOP LAB

Learning Objectives:

- To plot the magnetizing characteristics of DC shunt generator and understand the mechanism of self-excitation.
- To control the speed of DC motors.
- To determine and predetermine the performance of DC machines.
- To predetermine the efficiency and regulation of transformers and assess their performance.
- To analyse performance of three phase induction motor.
- To understand the significance of regulation of an alternators using synchronous impedance method.

APPLIED PHYSICS LABORATORY

Course Objective:

Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit I

Objective: To introduce the students to use drawing instruments and to draw polygons, Engg. Curves.

Unit II

Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

Unit III

Objective: The objective is to make the students draw the projections of the plane inclined to both the planes.

Unit IV

Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

Unit V

Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Course Outcome:

The student will learn how to visualize 2D & 3D objects.

SIGNATURE OF HOD

SITAM

SATYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, VIZIANAGARAM

Gajula Rega, Vizianagaram , ANDHRA PRADESH, INDIA-535002.

Accredited by NAAC,Approved by AICTE & Affiliated to JNTUK, KAKINADA

DEPARTMENT OF MECHANICAL ENGINEERING

II YR-I Sem (R19)

1. **METALLURGY & MATERIALS SCIENCE**

Course Objective:

- To understand the basic fundamentals of Material science and Physical metallurgy.
- To understand The basic concepts to be taught will help for the improvement, proper selection and effective utilization of materials which is essential to satisfy the ever increasing demands of the society**.**

Course outcomes:

- To know the basic concepts of bonds in metals and alloys. To understand the basic requirements for the formation of solid solutions and other compounds.
- To be able to understand the regions of stability of the phases that can occur in an alloy system in order to solve the problems in practical metallurgy.
- To study the basic differences between cast irons and steels, their properties and practical applications.

2. **MECHANICS OF SOLIDS**

Course Objectives:

- to understand the basic terms like stress, strain, poissons ratio…etc
- to understand different stresses induced in beams, thin cylinders, thick cylinders, columns.
- able to understand the shear stresses in circular shafts.

Course outcomes:

- to be able to know the basic terms like stress, strain poissons ratio…etc
- to be able to know the bending and shear stress induced in the beams which are made with different cross sections like rectangular, circular, triangular, I, T angle sections and also problem solving techniques.
- to be able to know how to finding slope and deflection for different support arrangements by Double integration method, Macaulay's method and Moment-Area and also problem solving techniques.

3. **THERMODYNAMICS**

Course Objectives:

- To impart the knowledge of the thermodynamic laws and principles
- to enable the student to prepare an energy audit of any mechanical system that exchange heat and work with the surroundings.

Course outcomes:

- The student should be able to understand the basic concepts like thermodynamic system, its boundary and related fundamental definitions.
- To learn the first law of thermodynamics, which is also the energy conservation principle, and should be able to apply to different thermodynamic systems.
- Should be able to analyse the concepts of Carnot cycle, entropy, availability and irreversibility. Should be able to understand the use of Maxwells relations and thermodynamic functions.
- Should be able to use Psychrometric chart and calculate various psychrometric properties of air.
- should be able to calculate the efficiency and performance parameters of the systems that use these cycles.

4. **MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS**

Course Objectives:

- to understand the concept and nature of Managerial Economics and its relationship with other disciplines.
- to understand the Concept of Demand and Demand forecasting, Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
- To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
- To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation. Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

Course outcomes:

- The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
- One is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

5. FLUID MECHANICS & HYDRAULIC MACHINES

Course Objectives:

- to understand the properties of fluids, its kinematic and dynamic behavior through various laws of fluids like continuity, Euler's, Bernoulli's equations, energy and momentum equations.
- to understand the theory of boundary layer, working and performance characteristics of various hydraulic machines like pumps and turbines.

Course outcomes:

- to be able to know the concept of fluid and its properties, manometry,hydrostatic forces acting on different surfaces and also problem solving techniques.
- will be aware of the concepts related to boundary layer theory, flow separation, basic concepts of velocity profiles, dimensionless numbers and dimensional analysis.
- will know the hydrodynamic forces acting on vanes and their performance evaluation.
- will be aware of the importance, function and performance of hydro machinery.

III YR-I Sem (R16)

1. DYNAMICS OF MACHINERY

COURSE OBJECTIVES:

- To equip the student with fundamental knowledge of dynamics of machines so that student can appreciate problems of dynamic force balance, transmissibility of forces, isolation of systems, vibrations.
- Develop knowledge of analytical and graphical methods for calculating alancing of rotary and reciprocating masses.
- Develop understanding of vibrations and its significance on engineering design.
- Develop understanding of dynamic balancing, flywheel analysis, gyroscopic forces and moments.

COURSE OUTCOMES:

Upon successful completion of this course the student should be able to:

- Analyze stabilization of sea vehicles, aircrafts and automobile vehicles
- Compute frictional losses, torque transmission of mechanical systems.
- Analyze dynamic force analysis of slider crank mechanism and design of flywheel.
- Understand how to determine the natural frequencies of continuous systems starting from the general equation of displacement.
- Understand balancing of reciprocating and rotary masses**.**

2. METAL CUTTING & MACHINE TOOLS

COURSE OBJECTIVES:

- The course provides students with fundamental knowledge and principles in material removal processes.
- .In this course, the students apply the fundamentals and principles of metal cutting to practical applications through multiple labs using lathes, milling machines, grinding machines, and drill presses, Computer Numerical Control etc.
- To demonstrate the fundamentals of machining processes and machine tools.
- To develop knowledge and importance of metal cutting parameters.
- To develop fundamental knowledge on tool materials, cutting fluids and tool wear mechanisms.
- To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.

COURSE OUTCOMES:

Upon successful completion of this course, the students will be able to:

- Apply cutting mechanics to metal machining based on cutting force and power consumption.
- Operate lathe, milling machines, drill press, grinding machines, etc.
- Select cutting tool materials and tool geometries for different metals.
- Select appropriate machining processes and conditions for different metals.
- Learn machining economics.Design jigs and Fixtures for simple parts.
- Learn principles of CNC Machines.

3. DESIGN OF MACHINE MEMBERS– II

COURSE OBJECTIVES:

This course gives the insight of slider and roller bearings and the life prediction.

- Learn to design I.C engine parts
- Design the mechanical systems for power transmission elements such as gears,belts,ropes,chains, keys and levers

COURSE OUTCOMES: At the end of the course

The student will able to

- select the suitable bearing based on the application of the loads and
- predict the life of the bearing Design power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws.
- Design of IC Engines parts.

4. OPERATIONS RESEARCH

COURSE OBJECTIVES:

- To learn the importance of Operations Research in the design, planning, scheduling, manufacturing and business applications and
- to use the various techniques of Operations Research in solving such problems.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- To solve the LP and DP problems.
- To solve the Transportation, assignment, game, inventory, replacement, sequencing, queuing problems.

5. THERMAL ENGINEERING – II

COURSE OBJECTIVES:

- to provide basic knowledge of components being used in steam and gas power plant cycles.
- to analyse the energy transfers and transformations in these components including individual performance evaluation.

COURSE OUTCOMES:

- to understand the working of steam and gas power plant cycles
- to analyze and evaluate the performance of individual components.
- should be in a position to understand basic principles of Jet propulsion and rocket engineering.

6. IPR & PATENTS

COURSE OBJECTIVES:

- To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines.
- Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments.

COURSE OUTCOMES:

- IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents.
- Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements**.**

IV YR-I Sem (R16)

1. MECHATRONICS

COURSE OBJECTIVES:

- to introduce the integrative nature of Mechatronics.
- To describe the different components and devices of mechatronics systems.

COURSE OUTCOMES:

- the student shall be able to use the various mechatronics systems devices and
- the student shall be able to use components in the design of electro mechanical systems.

2. CAD/CAM

COURSE OBJECTIVES:

- Understand the basic fundamentals of computer aided design and manufacturing.
- To learn 2D & 3D transformations of the basic entities like line, circle, ellipse etc
- To understand the different geometric modeling techniques like solid modeling,surface modeling, feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication
- To learn the part programming, importance of group technology, computer aided process planning computer aided quality control
- To learn the overall configuration and elements of computer integrated manufacturing systems.

COURSE OUTCOMES:

At the end of the course the students shall be able to:

- Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix.
- Describe the use of GT and CAPP for the product development.
- Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.

3. FINITE ELEMENT METHODS

COURSE OBJECTIVES:

- To learn basic principles of finite element analysis procedure
- To learn the theory and characteristics of finite elements that represent engineering structures.
- To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses performed by others.
- to model complex geometry problems and solution techniques**.**

COURSE OUTCOMES:

Upon successful completion of this course you should be able to:

- Understand the concepts behind variational methods and weighted residual methods in FEM.
- Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements, and 3-D element .
- Develop element characteristic equation procedure and generation of global stiffness equation will be applied.
- Able to apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form.
- Able to identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer, and fluid flow.

4. POWER PLANT ENGINEERING

COURSE OBJECTIVES:

- The course is aimed at providing knowledge of power generation through different prime movers viz steam, ICGT, Hydro, nuclear and hybrid systems along with their economics and environmental considerations.

COURSE OUTCOMES:

- the student can understand various conventional methods of power generation.
- principle of operation and performance of respective prime movers along with their economics and their impact on environment.

5. ADDITIVE MANUFACTURING

COURSE OBJECTIVES:

- The course aims at the importance of Additive Manufacturing, classifications, models, specifications of various Additive Manufacturing Techniques.
- To learn the different tools, soft-wares required and the applications of Additive Manufacturing.

COURSE OUTCOMES:

- shall be able to identify the use of Rapid Prototyping Techniques in the manufacturing of complex components that are otherwise very difficult to manufacture.

6. ADVANCED MATERIALS

COURSE OBJECTIVES:

- to understand the mechanics of different materials. This understanding will include concepts such as anisotropic material behavior, constituent properties and manufacturing processes of different composites.
- Suitability of smart and nano materials for engineering applications.

COURSE OUTCOMES:

- Able to understand Suitability of smart and nano materials for engineering applications