SANMATI ENGINEERING COLLEGE, WASHIM

COMPUTER SCIENCE AND ENGINEERING

About Department

The field of Computer Science and Engineering has been pushing the envelope of almost all other disciplines, which use computing as a fundamental means of inquiry and tool for discovery. Computer science and engineering offers exciting, intellectually challenging, and rapidly growing career opportunities. It is the heart of where the action is: whether this means intelligent game playing, mobile applications, smart robots, cloud computing, data security, social networks, or bioinformatics.

Department Vision

To continually improve the education environment, in order to develop graduates with strong academic and technical background needed to achieve distinction in the discipline. The excellence is expected in various domains like workforce, higher studies or lifelong learning. To strengthen links between industry through partnership and collaborative development works.

Department Mission

To develop strong foundation of theory and practices of computer science amongst the students to enable them to develop into knowledgeable, responsible professionals, lifelong learners and implement the latest computing technologies for the betterment of the society.

PROGRAM SPECIFIC OUTCOMES (PSO)

1. Engineering Graduates will be able to pursue higher studies or get placed in IT based companies or Government organizations.
2. Engineering Graduates will demonstrate an ability to investigate, design and develop software's for industrial and social needs.
3. Engineering Graduates will be able to analyze and interpret data so as to work on multidisciplinary projects.
4. Engineering Graduates will demonstrate an ability to identify, formulate & solveproblems related to computer science and engineering.
5. Engineering Graduates will be able to use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations.
6. The ability to apply the concepts learned to constantly develop innovative things andfind solutions to complex problems.
7. To collect requirements, analyze, design, implement and test software Systems.
8. To analyze the errors and debug them within minimal time.

PROGRAM EDUCATIONAL OBJECTIVES
(PEO)

Within a short span of time after graduation, the graduates shall:

1. Be employed as computer science professionals beyond entry-level positions or bemaking satisfactory progress in graduate programs.
2. Be able to route their talents in to post graduate and research programs, promoting remarkable advancements in emerging areas.
3. Have peer-recognized expertise together with the ability to articulate that expertise as computer science professionals.
4. Apply good analytic, design, and implementation skills required to formulate and solve computer science problems.
5. Demonstrate that they can function, communicate, collaborate and continue to learn effectively as ethically and socially responsible computer science professionals.

SANMATI ENGINEERING COLLEGE, WASHIM

COMPUTER SCIENCE AND ENGINEERING

DEPARTMENT

Program Outcomes (POs)

PO1. The ability to apply knowledge of mathematics, basic science and engineering in problem solving.

PO2. The ability to design and conduct experiments, to analyze and interpret data using fundamental knowledge of Computer Science.

PO3. The ability to design a system, a component, or a process to meet the desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability, and sustainability.

PO4. The ability to perform or function in multi-disciplinary teams with contemporary techniques, tools and skill set necessary for computing practices.

PO5. The ability to identify, formulates, define computing requirements appropriate to its solution and solve problems.

PO6. The ability to analyze the impact of computing on individuals, organizations and professional societies. g. The ability to communicate effectively with all stakeholders.

PO7. The ability to engage in lifelong learning in technical and administrative domains.

PO8. To possess the ability to interpret and acquire knowledge on contemporary issues.

PO9. The ability to apply current state of art of technology and practices of Computer Science to solve the industry specific problems.

Course outcomes

Third Semester

3KS02 Discrete Structures and Graph Theory

Course Outcomes (Expected Outcome): On completion of the course, the students will be able to
1. Analyze and express logic sentence in terms of predicates, quantifiers, and logical connectives.

2. Derive the solution for a given problem using deductive logic and prove the solution based on logical inference.

3. Classify algebraic structure for a given mathematical problem.

4. Perform combinatorial analysis to solve counting problems.

5. Perform operation on trees data structures.

6. Develop the given problem as graph networks and solve with techniques of graph theory

3KS03 Object Oriented Programming

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to

1. Apply Object Oriented approach to design software.

2. Implement programs using classes and objects.

3. Specify the forms of inheritance and use them in programs.

4. Analyze polymorphic behaviour of objects.

5. Design and develop GUI programs.

6. Develop Applets for web applications

3KS04/3KE04 Data Structures

ourse Outcomes(Expected Outcome): On completion of the course, the students will be able to

1. Apply various linear and nonlinear data structures

2. Demonstrate operations like insertion, deletion, searching and traversing on various data structures

3. Examine the usage of various structures in approaching the problem solution.

4. Choose appropriate data structure for specified problem domain

3KS05 Analog & Digital Electronics

Course Outcomes(Expected Outcome): At the end of course students will able to

1. Explain basic concepts of semiconductor devices and its application.

2. Compare different Number System and basics of conversion of number systems.

3. Realize different minimization technique to obtain minimized expression.

4. Design Combinational Circuits.

5. Design and Develop Sequential Circuits.

3KS06 Object Oriented Programming Lab
Course Outcomes(Expected Outcome): On completion of the course, the students will be able to

1. Design, implement, test, and debug simple programs in an object-oriented programming language.

2. Interpret the basics of object-oriented design and the concepts of encapsulation, abstraction, inheritance, and
polymorphism

3. Build applications in Java by applying concepts like interfaces, packages and exception handling.

4. Make use of Java concepts like API, Applets, AWT

3KS07 Data Structure Lab

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to
1. Apply various linear and nonlinear data structure.
2. Demonstrate operations like insertion, deletion, searching and traversing on various data structures
3. Examine the usage of various structures in approaching the problem solution.
4. Choose appropriate data structure for specified problem domain

3KS08 Analog & Digital Electronics Lab

Course Outcomes(Expected Outcome): After successfully completing the lab, the students will be able to
1. Apply practically the concepts of analog and digital electronics.
2. Explain the operation and characteristics of semiconductor devices.
3. Illustrate the operation of various logic gates and their implementation using digital IC"s.
4. Design and implement various combinational logic circuits.
5. Design and implement various sequential logic circuits

3KS09 C-Skill-Lab I

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to
1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Interpret different Decision Making statements, Functions, Object oriented programming in Python
3. Summarize different File handling operations
4. Explain how to design GUI Applications in Python and evaluate different database operations
5. Develop applications using Django framework or Flask

Fourth Semester

4KS01 Artificial Intelligence

Course Outcomes (Expected Outcome): On completion of the course, the students will be able to

1. Explain concepts of Artificial Intelligence and different types of intelligent agents and their architecture.
2. Formulate problems as state space search problem & efficiently solve them.
3. Summarize the various searching techniques, constraint satisfaction problem and example problems -
game playing techniques.
4. Apply AI techniques in applications which involve perception, reasoning and learning.
5. Compare the importance of knowledge, types of knowledge, issues related to knowledge acquisition and
representation.

4KS02 Data Communication and Networking

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to
1. Describe data communication Components, Networks, Protocols and various topology based network
architecture
2. Design and Test different encoding and modulating techniques to change digital –to- digital conversion,
analog-to-digital conversion, digital to analog conversion, analog to analog conversion,
3. Explain the various multiplexing methods and evaluate the different error detection & correction techniques.
4. Illustrate and realize the data link control and data link protocols.
5. Describe and demonstrate the various Local area networks and the IEEE standards.

4KS03 Operating System

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to
1. Explain memory management issues like external fragmentation, internal fragmentation.
2. Illustrate multithreading and its significance.
3. List various protection and security mechanisms of OS.
4. Analyze and solve the scheduling algorithms.
5. Analyze the deadlock situation and resolve it.
6. Compare various types of operating systems

4KS04 Microprocessor & Assembly Language Programming

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to
1. Describe 8086 microprocessor and its architecture; also understand instruction processing during the
fetch-decode-execute cycle.2. Design and Test assembly language programs using 8086 microprocessor instruction set.
3. Demonstrate the implementation of standard programming constructs, including control structures and
functions, in assembly language.
4. Illustrate and realize the Interfacing of memory & various I/O devices with 8086 microprocessor.
5. Explain the basic concepts of Internet of Things

4KS05 Theory of Computation

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to
1. To construct finite state machines to solve problems in computing.
2. To write regular expressions for the formal languages.
3. To construct and apply well defined rules for parsing techniques in compiler
4. To construct and analyze Push Down, Turing Machine for formal languages

5. To express the understanding of the Chomsky Hierarchy.

6. To express the understanding of the decidability and un-decidability problems.

4KS06 Data Communication & Networking Lab

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to

1. Analyze performance of various communication protocols

2. Implement Configure various network protocols.

3. Compare IP Address classes of networks

4KS07 Operating System Lab

Course Outcomes(Expected Outcome): On completion of the course, the students will be able to

1. Explain memory management issues like external fragmentation, internal fragmentation.

2. Illustrate multithreading and its significance.

3. List various protection and security mechanisms of OS.

4. Analyze and solve the scheduling algorithms.

5. Analyze the deadlock situation and resolve it.

6. Compare various types of operating systems

4KS08 Microprocessor & Assembly Lang. Prog Lab

Course Outcomes(Expected Outcome):

On completion of the course, the students will be able to

1. Analyze the internal workings of the microprocessor

2. Design and develop programs in Assembly Language Programming

3. Describe 8086 microprocessor and its architecture; also understand instruction processing during the

fetch-decode-execute cycle.

4. Design and Test assembly language programs using 8086 microprocessor instruction set.

5. Demonstrate the implementation of standard programming constructs, including control structures and

functions, in assembly language

6. Illustrate and realize the Interfacing of memory & various I/O devices with 8086 microprocessor

4KS09 C-Skill-Lab II

Course Outcomes(Expected Outcome):

On completion of the course, a student will be able to

1. Develop client server program and web applications

2. Make use of project-based experience for web application development.

3. Create embedded systems using Raspberry Pi/Ardino

5KS01 **Database Management Systems**

CourseOutcomes(ExpectedOutcome):
On completion of the course, the students will be able to
[1] Model, design and normalize databases for real life applications.
[2] Discuss data models, conceptualize and depict a database system
using ER diagram.
[3] Query Database applications using Query Languages like SQL.
[4] Design & develop transaction processing approach for relational
databases.
[5] Understand validation framework like integrity constraints, triggers
and assertions.

5KS02 Compiler Design

On completion of the course, the students will be able to
1. Describe the fundamentals of compiler and various phases of compilers.
2. Design and implement LL and LR parsers
3. Solve the various parsing techniques like SLR,CLR,LALR.
4. Examine the concept of Syntax-Directed Definition and translation.
5. Assess the concept of Intermediate-Code Generation and run-time
environment
6. Explain the concept code generation and code optimization.

5KS03 Computer Architecture & Organization

On completion of the course, the students will be able to
1. Discuss basic structure of computer.
2. Understand the basic operation of CPU.
3. Compare and select various Memoryand I/O devices as per requirement.
4. Solve the concepts of number representation and their operation.
5. Explain the concept of parallel processing and pipelining.

5KS04 Introduction to Cyber Security

After completion of this course, the students should be able to:
1. Know fundamentals of Cybercrimes and Cyber offenses
2. Realize the Cyber threats, attacks and Vulnerabilities.
3. Explore the industry practices and tools.
4. Comprehend the Access Control and Authentication Process.
5. Implement Intrusion Detection and Prevention.

5KS05 Soft skill and Interpersonal Communication
On completion of the course, student will be able to–
•Effectively communicate through verbal/oral communication and improve the listening skills
•Write precise briefs or reports and technical documents .
 •Actively participate in group discussion / meetings / interviews and prepare & deliver
presentations . •Become more effective individual through goal/target setting, self motivation and
practicing creative thinking.
 •Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of
team work, Inter-personal relationships, conflict management and leadership quality.

Sixth Semester

6KS01 Security Policy & Governance

On completion of the course, the students will be able to
[1] List and discuss the key characteristics of Information Security,Leadership and Management
[2] Differentiate between Law and Ethics
[3] Describe why ethical codes of conduct are important to InformationSecurity
[4] Discuss the importance, benefits and desired outcomes of InformationSecurity Governance
[5] Discuss the process of developing, implementing and maintainingvarious types of Information Security Policies.
[6] Define Risk Management and its role in the organization.

6KS02 Design and Analysis of Algorithms

On completion of the course, the students will be able to
1. Carry out the analysis of various Algorithms for mainly Time complexity.
2. Apply design principles and concepts to algorithm design.
3. Understand different algorithmic design strategies.
4. Analyze the efficiency of algorithms using time complexity.
5. Apply the standard sorting algorithms.

6KS03 Software Engineering

On completion of the course, student will be able to–
1. Decide on a process model for a developing a software project
2. Classify software applications and identify unique features of various domains
3. Design test cases of a software system.
4. Understand basics of Project management.
5. Plan, schedule and execute a project considering the risk management.
6. Apply quality attributes in software development life cycle.
7. Understand quality control and to ensure good quality software.

6KS04 Cryptography
On completion of the course, the students will be able to
1. Classify the symmetric encryption techniques
2. Illustrate various public key cryptographic techniques
3. Evaluate the authentication and hash algorithms.
4. Discuss authentication applications
5. Summarize the intrusion detection and its solutions to overcome theattacks.
6. Understand basic concepts of system level security

6KS05 Environmental Management

• Apply key terminology, facts, concepts, principles, historical perspectives and theories concerning environmental management and global sustainability toward solving environmental challenges. •

 Align sustainability initiatives with organization mission and core values.

• Manage environmental-related risk from an organization's operation.

• Identify environmental hazards affecting air, water and soil quality.

• Assess environmental-related risk.

 • Develop controls to reduce or eliminate risk

VII SEMESTER

Course: DIGITAL SIGNAL PROCESSING

Course outcomes:

1.To know the classification of discrete signals such as periodic- Aperiodic signals, Symmetric Anti symmetric signals, Causal- non causal signals, Stable –unstable signalsand mathematical operations.

2.To identify various types of systems such as linear- nonlinear, causal-Non causalTime invariant - Time variant, Stable –unstable systems etc.

3.To learn frequency domain analysis using Fourier transform and Z-transform4.To implement N-point FFT using DIT and DIF algorithms.

5. To learn digital filter design methods viz. IIR Butterworth, Chebysheve and FIR filter.

Course: COMPUTER NETWORKS

Course outcomes:

1. Understand basics of computer networks and reference models

2. Understand the details of Guided and Unguided media

3. Identify the Design issues of each layer of OSI model

4. Implement the protocols of OSI model

Course: DESIGN AND ANALYSIS OF ALGORITHMS

Course outcomes:

1. Ability to understand mathematical formulation, complexity analysis and methodologiesto solve recurrence relations for algorithms.

2. Ability to design algorithms using standard paradigms like: Greedy, Divide and Conquer, Dynamic Programming and Backtracking.

3. Ability to design algorithms using advance data structures and implement traversals techniques.

4. Ability to understand NP class problems and formulate solutions using standard approaches.

5. Ability to apply algorithm design principles to derive solutions for real life problems and comment on complexity of solution.

Course: OBJECT ORIENTED ANALYSIS AND DESIGN

Course outcomes:

1. The students will understand key concepts and modeling techniques in object-oriented analysis and design.

2. The student will learn the concepts of Object and class, Link and association and Generalization & Inheritance.

3. The student will learn the advanced object and class concepts.

4. The student will learn the state modeling concept.

5. The student will learn the Nested state diagram and Relation of class and state models.

6. The student will learn Use case relationships, Procedural sequence model.
The student will learn Development life cycle

### Course: MULTIMEDIA TECHNOLOGIES

Course outcomes:

1. Study of multimedia authoring and data representation

2. Student learns color in image and video.

3. Student learns basics of digital audio.

4. Study of multimedia data compression.

5. Study of basic audio and video compression technique

Course: PROJECT AND SEMINAR

Course outcomes:

1. Define and analyze the problem

2. Apply software engineering and core engineering principles to the analyzed problems

3. Implement using different programming languages and software tools

4. Contribute to the society by developing solutions to real world problems
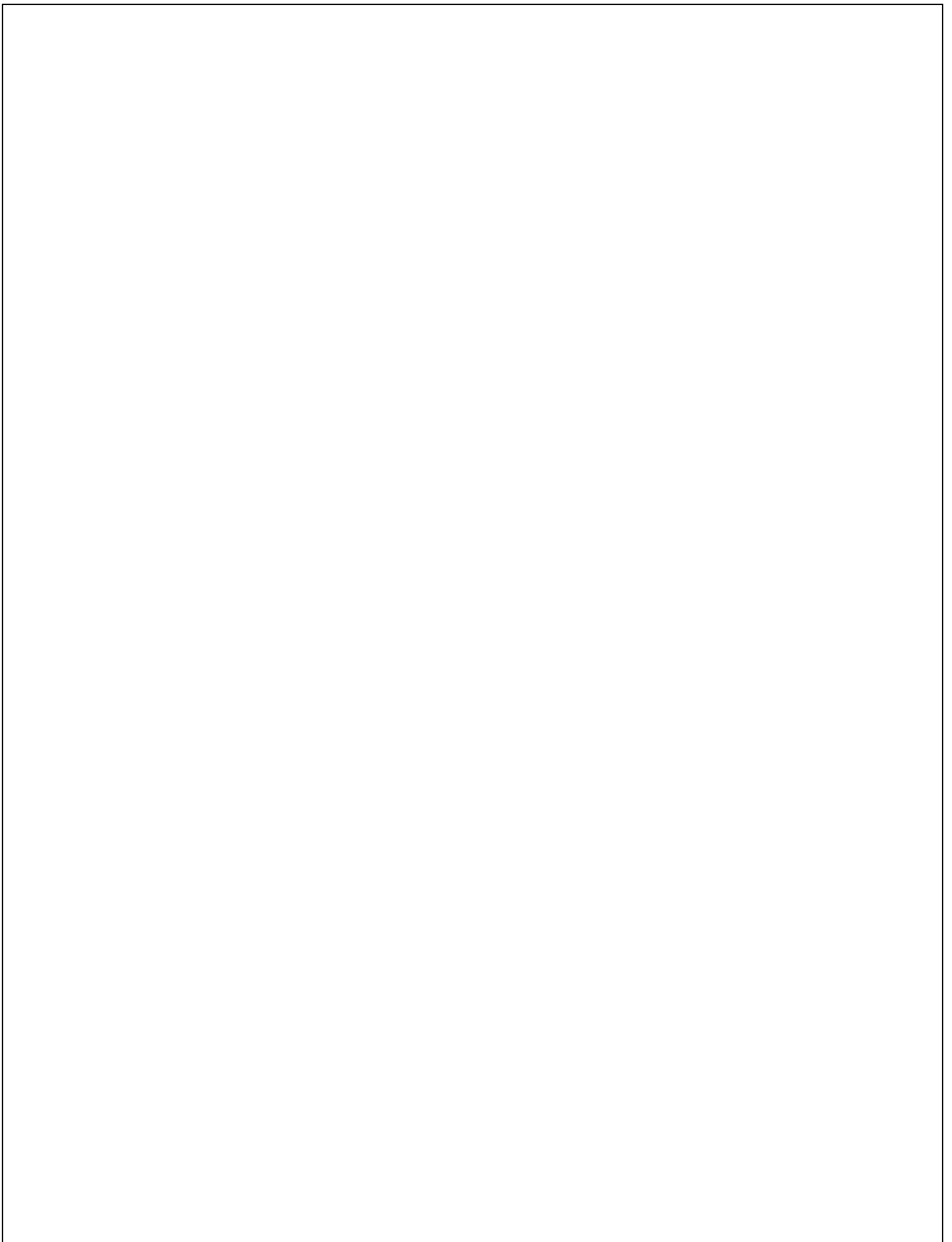
Based on current trends in IT Industry with executable project as deliverable, thetopics and practical's will be discussed during the conduction.

VIII SEMESTER

Course: ARTIFICIAL INTELLIGENCE

Course outcomes:

1. Understand challenges involved in designing intelligent systems by exploring human intelligence nature and its role in problem solving.

2. Represent given problem using state space representation and apply informed anduninformed search techniques on it.

3. Understand knowledge representation methods using logic programming, frames,Scripts Semantic net etc.

4. Understand uncertainty theory based on techniques like probability theory and fuzzylogic.

5. Design Knowledge Based Systems using production rules.

Course: EMBEDDED SYSTEMS

Course outcomes:

1. Understand the architecture and organization of ARM microcontroller and itsprogramming

2. Acquire the knowledge, techniques and skill to integrate microcontroller hardware and software

3. Understand the concept of real time operating system architecture.

4. Interface microcontroller based system to real world.

Course: SOFTWARE ENGINEERING

Course outcomes:

1. Ability to understand software engineering practices and various models.

2. Ability to understand software development Life Cycle.

3. Ability to understand software testing principles and techniques.

4. Ability to understand various software project management tasks and methods to implement them.

Course: NETWORK SECURITY

Course outcomes:

1. Introduction of network security and trends.
2. Public key cryptography and message authentication
3. Authentication of network security.
4. To study IP security and network management security
5. To study malicious software.

Course: PROJECT AND SEMINAR

Course outcomes:

1. Define and analyze the problem

2. Apply software engineering and core engineering principles to the analyzed problems

3. Implement using different programming languages and software tools

4. Contribute to the society by developing solutions to real world problems

Based on current trends in IT Industry with executable project as deliverable, the topicsand practical's will be discussed during the conduction.

VISION

Department of Mechanical Engineering aims to inculcate in students flair for excellence to become technological leader in industry and society.

MISSION

- To create the learning environment that stimulates students & faculty to enhance the knowledge in Mechanical Engineering.
- To prepare the students to carry out research intended to cater the needs of the industry and society.
- To march ahead with dedication, zeal and with a system responsive to the need of all the stakeholders.

Sanmati Engineering College, Washim

Department of Mechanical Engineering

Program Outcomes

➢ An ability to apply knowledge of mathematics, science and engineering

➢ An ability to design and conduct experiments, as well as to analyze and interpret data

➢ An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety manufacturability, and sustainability

➢ An ability to function in multidisciplinary teams.

➢ An ability to identify, formulate and solve engineering problems

➢ Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice

➢ Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development

Sanmati Engineering College, Washim

Department of Mechanical Engineering

Program Specific Outcomes: PSOs

➢ Utilize probability and statistics; transform methods, engineering mathematics in support of mechanical engineering systems.

➢ To design and analyze the performance of mechanical and thermal systems using analytical, experimental and computational tools.

➢ An ability to apply the principles of manufacturing engineering and technology to develop techno commercial skills.

III SEMESTER

Course Outcomes:

Students will be able to –

CO 1: Demonstrate the knowledge to solve ordinary Linear Differential equations with constant coefficient and its reducible equation using particular integral and complementary function and apply method of variation of parameter to solve ordinary linear differential equations.

CO 2: Define the Laplace transform and its inverse transform for the basic functions. Locate the Laplace transform of periodic function. Apply the Laplace transform to solve differential equation.

CO 3: Apply False Position, Newton Raphson method to solve nonlinear & polynomial equations Apply Gauss Elimination method, Gauss Seidal iterative method, Relaxation method to solve system of linear equations, Apply Eulers method, Runge-Kutta method, Picards method to solve differential equations.

CO 4: Define Gradient, divergent and curl of vector point functions. Finds the directional derivatives of scalar point functions. Discuss the Irrotational and solenoidal vector fields. Define line surface and volume integrals.

III SEMESTER

Course Code: 3ME02

Course: MANUFACTURING PROCESSES

L: 3 Hrs, T: 0Hr, P: 2 Hrs.

Per week Total Credits: 04

<u>Course Outcomes:</u>

Students will understand the

CO 1: Basic concept of foundry process and related activities

CO2: concept of complete sand casting process with advance casting methods

CO 3: fundamentals of welding processes

CO 4: various processes like electroplating, anodizing etc and their importance in industries

III SEMESTER

Course Code: 3ME03   Course: MECHANICS OF MATERIALS

L: 3 Hrs, T: 0 Hr, P: 2 Hrs.   Per week Total Credits: 04

Course outcomes:

The expected learning outcome is that the students will be able to:

CO1: Determine the stress & strain in the member subjected to axial, bending & torsional load.

CO2: To observe different types of material behavior such as elastic, plastic, ductile and brittle.

CO3: Apply SF and BM diagrams to analyse resistance offered by the beam and able to solve practical problems in real world.

CO4: Apply deflection criteria to check the stability of beam.

III SEMESTER

Course Code: - 3ME04   Course: -ENGINEERING THERMODYNAMICS

L: 3Hrs, T: 0Hr, P: 0Hrs.   Per week Total Credits: 03

Course outcomes:

CO1: Understand the basic concepts of thermodynamics, thermodynamic systems, work and heat.

CO2: Apply first law of thermodynamics and application of first law to flow and non-flow processes.

CO3: Apply second law of thermodynamics and understand concept of entropy.

CO4: Understand the properties of steam, work done and heat transfer during various thermodynamics processes with steam as working fluid.

CO5: Understand the concept of air standard cycles.

III SEMESTER

Course outcomes:

The student will be able to:

CO 1: Identify importance of various fluid properties at rest and in motion.

CO 2: derive and apply general governing equations for various fluid flows.

CO 3: understand the concept of boundary layer theory and flow separation.

CO 4: calculate energy losses in pipe flow.

CO 5: evaluate the performance characteristics of hydraulic jets.

III SEMESTER

Course Code: 3ME10   Course: MACHINE DRAWING-LAB

L: 0 Hrs, T: 0 Hr, P: 2 Hrs.   Per week Total Credits: 01

Course outcomes:

Student will be able to -

CO 1: Demonstrate the techniques of sectioning and visualizing the objects.

CO 2: Imagine, understand and sketch the missing views.

CO 3: Develop surfaces of objects and apply knowledge during their fabrication.

CO 4: Understand the concept of intersection of solid objects.

CO 5: Understand and apply the conventions for materials and parts used in

industries.

CO 6: Prepare detail machine assembly drawings.

IV SEMESTER

Course code: 4ME01   Course: MATERIAL SCIENCE

L: 3Hrs, T: 0 Hr, P: 2 Hrs.   Per week Total Credits: 04

Course Outcomes:

Students will understand the –

CO1. Basic concepts of metallurgy and types of materials.

CO2. Iron-Carbon Equilibrium Diagram, critical temperatures, formation of

microstructures and they will get the knowledge of alloys.

CO3. Uses and practical applications of ferrous & non ferrous materials

CO4. Various heat treatment processes, powder metallurgy and industrial

applications.

IV SEMESTER

Course Code: 4ME02   Course: ENERGY CONVERSION - I

L: 3Hrs, T: 1 Hr, P: 0Hrs.   Per week Total Credits: 04

Course outcomes:

CO1. Students will study the concept steam and steam power plant, mounting and accessories.

CO2. Students will demonstrate the calculation of various efficiency & related parameters.

CO3. Student will show the adequate knowledge of fuel & ash handling systems.

CO4.Students will demonstrate the knowledge of condenser & application.

CO5. Students will understand the concepts of steam nozzles & steam turbine.

IV SEMESTER

Course Code: 4ME03   Course: MANUFACTURING TECHNOLOGY

L: 3 Hrs, T: 0 Hr, P: 2 Hrs.   Per week Total Credits: 04

Course Outcomes:

Students will be able to -

CO1. Apply the knowledge of theory of metal cutting, tool selection & calculate cutting forces.

CO2. Demonstrate the knowledge of basics of turning operations.

CO3. Understand the drilling and boring operations and working of drilling & boring machines.

CO4. Understand the milling and gear cutting operations and working of respective machines.

CO5. Understand the working of grinding, shaper, planer and slotter machines.

CO6. Understand the knowledge of unconventional machining processes.

IV SEMESTER

Course Code: 4ME04   Course: BASIC ELECTRICAL DRIVES AND CONTROL

L: 3 Hrs, T: 0Hr, P: 2 Hrs.   Per week Total Credits: 04

Course Outcomes:

Students will be able to -

CO1. Understand the working of electrical drives and their components.

CO2. Understand the basics of DC motors and their characteristics.

CO3. Understand the working of AC motors, induction motors and concept of

braking

CO4. Understand the different speed control methods of A.C. and D.C. motors.

CO5. Understand the design of transducers and their applications.

CO6. Understand the industrial applications of different drives.

IV SEMESTER

Course Code: 4ME05   Course: HYDRAULIC AND PNEUMATIC SYSTEMS

L: 3 Hrs, T: 0Hr, P: 2 Hrs.   Per week Total Credits: 04

Course Outcomes:

Students will be able to -

CO1. Demonstrate basic concepts of prime movers and turbines.

CO2. Utilize the knowledge of centrifugal and reciprocating pumps for

applications.

CO3. Reveal the importance of other water lifting devices.

CO4. Solve the elementary treatment on compressible fluid flow.

CO5. Understand the concept of hydrostatic and hydrokinetic systems.

CO6. Use the knowledge of hydraulics & pneumatics in developing project work.

V SEMESTER

Course Code: 5ME01   Course: HEAT TRANSFER

 L: 3 Hrs, T: 0Hr, P: 2 Hrs.   Per week Total Credits: 04

Course Outcomes:

At the end of Heat Transfer course the student will be able to:

CO1. Solve steady state heat transfer problems of 1-D heat conduction with and without internal heat generation.

CO2. Design and to analyze the performance of extended surfaces.

CO3. Apply Lumped heat capacity method for analysis of unsteady state heat transfer.

CO4. Explain the laws of radiation and its applications.

CO5. Predict heat transfer coefficients for forced and free convection heat transfer applied to internal and external flow conditions.

CO6. Design and analyze the performance of heat exchangers using NTU and LMTD methods.

V SEMESTER

Course Code: 5ME02   COURSE: METROLOGY & QUALITY CONTROL

 L: 3 Hrs, T: 0 Hr, P: 2 Hrs.   Per week Total Credits: 04

Course Outcomes:

CO1. Create & apply the concept of inspection, quality control and its importance to industry.

CO2. Demonstrate the skills of controlling various out of control processes using statistical quality control tools.

CO3. Understand the importance of improving production and productivity using work study approach.

CO4. Apply the knowledge of various measurement standards and techniques in the industry to measure various parameters related to metrology.

V SEMESTER

Course Code: 5ME03   Course: KINEMATICS OF MACHINES

L: 3 Hrs. T: 1 Hrs, P: 2Hrs   per week Total Credits: 05

Course Outcomes:

Students will be able to-

CO1. Understand & apply the concept and its applications of link, mechanisms and machines.

CO2. Demonstrate the ability to analyze the mechanisms and machines on the basis of velocity and acceleration and they will show the ability to solve analytical methods.

CO3. Show the ability to use graphical and analytical methods for synthesis of mechanisms to develop mini projects in the course duration.

CO4. Understand the practical for study of brake, clutch, dynamometer, gear train etc.

V SEMESTER

Course Code: 5ME04   Course: MEASUREMENT SYSTEMS

 L: 3Hrs, T: 0Hr, P: 2 Hrs.   Per week Total Credits: 04

Course Outcomes:

At the end of Measurement System course, the student will be able to:

CO1. Analyze different measurement systems.

CO2. Calculate different types of errors in the measurement system.

CO3. Use strain gauges and pressure measurement devices for several applications.

CO4. Compare different methods of force, Power and flow measurement using

different methods.

CO5. Select appropriate liquid level and temperature measurement devices for

given applications.

V SEMESTER

Course Code: FEME 05   Course: BASICS OF BUILDING CONSTRUCTION

L: 3Hrs, T: 0 Hr, P: 0 Hrs.   Per week Total Credits: 03

Course Outcomes:

On the completion of course, the students will able to:

CO1. Understand the role and importance of various building components

CO2. Examine various construction activities at the time of actual execution.

CO3. Know the properties of various construction materials.

CO4. Identify and select the quality materials for construction activities.

VI SEMESTER

Course Code: 6ME01   Course: DESIGN OF MACHINE ELEMENTS

 L: 3 Hrs, T: 0 Hr, P: 2 Hrs.   Per week Total Credits: 04

Course Outcomes:

CO1. Understand the concept of various stresses and apply the design procedure to riveted joints and welded joints.

CO2. Understand design procedure of knuckle joint, springs and power screw.

CO3. Analyze & select types of shafts, keys, couplings for various machines and industrial applications.

CO4. Analyze the various types of bearings and understand the design procedure of IC Engine parts.

VI SEMESTER

Course Code: 6ME02   Course: DYNAMICS OF MACHINES

L: 3Hrs, T: 1Hr, P: 2Hrs.   Per week Total Credits: 05

Course Outcomes:

Students will be able to

CO1. Apply basic concept of static force analysis and lubrication mechanism.

CO2. Understand the knowledge of dynamic force analysis analytically and graphically.

CO3. Apply the knowledge of space mechanism and vehicle dynamics.

CO4. Understand concept of free vibration and force vibration, concept of Torsional vibration.

CO5. Analyze the concept of balancing of machinery.

VI SEMESTER

Course Code: 6ME03   Course: CONTROL SYSTEM ENGINEERING

L: 3Hrs, T: 0Hr, P: 0Hrs.   Per week Total Credits: 03

Course Outcomes:

CO1. Understand the basic system concept and study different types of systems.

CO2. Understand the concept Transient- Response analysis and will apply in numerical methods, the knowledge of basic control action and industrial controllers.

CO3. Understand the concept of Stability and exhibit the knowledge of root locus concept.

CO4. Understand the concept of Frequency Response method and use bode diagram in solving analytical problems.

VI SEMESTER

Course Code: 6ME04   Course: NON-CONVENTIONAL ENERGY SOURCES

L: 3Hrs, T: 0Hr, P: 2Hrs.   Per week Total Credits: 04

COURSE OUTCOMES:

CO1. Able to study the concept of renewable and non-renewable sources.

CO2. Apply the basic concept of solar energy utilization and storage.

CO3. Apply the concept of energy from ocean and wind.

CO4. Study the concept of bio-mass energy resources.

VI SEMESTER

Course Code: 6ME05   Course: ENVIRONMENTAL MANAGEMENT

 L: 3Hrs, T: 0Hr, P: 0Hrs.   Per week Total Credits: 03

COURSE OUTCOMES:

CO1.Identify environmental attributes to be considered for EIA study and methodology to prepare EIA

CO2. Described the components of EMP and pollution effects of disposal off industrial effluent formulate EMP

CO3 Prepare, certify approve and review of EMP

CO4 Environmental legislation and acts, EMS: ISO 14000

VII SEMESTER

Course Outcomes:-

CO1. Ability to understand the various systems and mechanisms used for special / single purpose machines.

CO2. Ability to analyze the various components of mechanisms on basis of machine design principles.

CO3. Ability to understand the selection of hydraulic / pneumatic drive and electrical control system.

CO 4: To design spur, helical, bevel and worm gears.

CO 5: To design I.C. Engine parts Cylinder, Piston, Connecting rod and Crank.

CO 6: To understand design and drawing procedure of Governor ((Parts and Assembly).

Course code: 7ME04   Course: AUTOMATION ENGINEERING

L: 3hrs, T: 1hrs, P: 2hrs,   Per week Credits: 6 hrs

Course Outcomes:

CO1. Student must know the importance of automation in modern industry and its types

CO2. Student must have the knowledge of NC/CNC programming and used of robots in industry

CO3.Ability to understand the FMS systems in industry and Group Technology, process planning

CO4. Student must have the knowledge of CIM wheel.

Course code: 7ME02	Course: ENERGY CONVERSION II
L: 3hrs, T: 1hrs, P: 2hrs,	per week Credits: 6 hrs

Course Outcomes:

CO1. To prepare the graduate with knowledge of industrial based reciprocating air compressor and rotary compressor.

CO2. Ability to understand the concepts of various old and eco-friendly refrigerants with their environmental impact and select the most appropriate to design the cooling system for particular application.

 CO3.Student understand the basic knowledge of gas turbine and nuclear power

CO 4: To explain working of gas Turbine power plants and jet propulsion methods.

CO 5: To describe the working of nuclear power plant and its components.

CO 6: To explain various renewable energy sources like solar, wind, biomass, MHD, Geothermal etc. and their importance for present energy scenario.

VII SEMESTER

Course Outcomes:

CO1 Get knowledge about evolution of management thoughts and the principles of scientific management.

CO2 Understand the functions of personnel management and the related legislations

Co3 Know the different types of production system and the concept of production planning and control

Co4 Get knowledge about entrepreneurship, traits and competencies for the same and the factors affecting entrepreneurial growth.

Co5 Get knowledge about the steps involved in setting up a business.

Co6 Get overview of the marketing function and the various sources of finance.

VII SEMESTER

Course Outcomes:

CO1. Student must know the importance of automation in modern industry and its types

CO2. Student must have the knowledge of NC/CNC programming and used of robots in industry

CO3.Ability to understand the FMS systems in industry and Group Technology, process planning

CO4. Student must have the knowledge of CIM wheel.

VII SEMESTER

Course code: 7ME05   Course: NON-CONVENTIONAL ENERGY SYSTEM

L: 3hrs, T: 1hrs, P: 2hrs,   per week Credits: 6 hrs

Course Outcomes:

Co1 List and describe the primary renewable energy sources, their feasibility and challenges.

Co2 Perform elementary mathematical analysis for designing of different solar thermal collectors

Co3 Describe different types and components of wind energy conversion systems and can analyze wind speed data and wind turbine performance in a given wind regime

C04 Describe components and principles of other renewable systems like biomass, biogas, ocean energy conversion systems, geothermal systems et

VIII SEMESTER

Course Code: 8ME 01   Course: AUTOMOBILE ENGINEERNIG

L: 3 Hrs, T: 0 Hr, P: 0 Hrs.   Per week Total Credits: 03

Course Outcomes:

CO1. Ability to identify and classify different types of automobiles.

CO2. Ability to understand the working of various automobile sub-systems such as engines, transmission, suspension, braking etc.

CO3. Knowledge about the emission norms, and passenger safety in automobiles

CO4. Knowledge about the recent advancements in automobiles.

CO 5: To explain the operation of steering system and braking systems, also apply the knowledge for Fault finding and maintenance of brakes.

CO 6: To describe the Suspensions and Lubrication in Automobile, and apply knowledge for solving Engine lubrication troubles and suggesting remedies.

VII SEMESTER

Course Outcomes:

CO1. Ability to understand the concepts of various old and eco-friendly refrigerants with their environmental impact and select the most appropriate to design the cooling system for particular application.

CO2. Ability to analyze the psychometric processes & carry out heat load calculations for designing the air conditioning system of a specific problem.

CO3. Ability to understand and analyze the thermodynamics of refrigeration, air conditioning and cryogenics systems.

CO4. Ability to design the air duct system as per the requirement of air conditioning application.

CO5. Ability to learn the function and principle of various components and controls of refrigeration and air conditioning systems.

VIII SEMESTER

Course Code: 8ME03   Course: INTERNAL COMBUSTION ENGINES

L: 3 Hrs, T: 0Hr, P: 2 Hrs.   Per week Total Credits: 05

Course Outcomes:

CO1. Ability to identify and differentiate between various types of engines and their applications.

CO2. Ability to understand the working principle and parameters affecting performance of engines.

CO 3. Ability to understand the working of various systems and sub-systems of engine.

CO 4: To analyze the performance and heat balance of IC engines.

CO 5: To develop an ability to optimize exhaust pollutants and demonstrate an understanding of the generation of undesirable exhaust emissions and methods used to reduce them.

CO6 To analyze the exhaust pollutants, its causes and describe methods to reduce them

SEMESTER VIII

Course Outcomes:-

CO1. Ability to understand the Classification, Characteristics, application and problems on Operations Research and Linear Programming s.

CO2. Ability to understand the Classification, Characteristics, application and problems on Transportation Models and Assignment Models

CO3. Ability to understand the Classification, Characteristics, application and problems on Network Models

CO4. Ability to understand the Classification, Characteristics, application and problems on Waiting line models and Sequencing:

CO5. Ability to understand the Classification, Characteristics, application and problems on Replacement models and Simulation

CO6. Ability to understand the Classification, Characteristics, application and problems on Dynamic Programming.

SEMESTER VIII

Course Outcomes:

CO1. Ability to understand the Classification, Characteristics, application and problems on Operations Research and Linear Programming's.

CO2. Ability to understand the Classification, Characteristics, application and problems on Transportation Models and Assignment Models.

CO3. Ability to understand the Classification, Characteristics, application and problems on Network Models.

CO4. Ability to understand the Classification, Characteristics, application and problems on Waiting line models and Sequencing.

CO5. Ability to understand the Classification, Characteristics, application and problems on Replacement models and Simulation.

CO6. Ability to understand the Classification, Characteristics, application and problems on Dynamic Programming.

Civil Engineering Department

Program Outcomes (POs)

PO1:- Apply principles of mechanics and basic sciences to analyze Civil Engineering structures.

PO2:- Survey, map, measure and analyze data for sustainable infrastructure.

PO3:- Characterize and evaluate materials for adoptability in Civil Engineering projects.

PO4:- Analyze and design concrete and steel structures, earthen embankments, irrigation structures, water supply, treatment system and transport systems.

PO5:- Apply best management practices for construction and maintenance of infrastructure facilities.

PO6:- Predict and forecast societal needs, floods, droughts, pollution and travel demand

PO7:- Work and lead in multi-disciplinary projects and demonstrate social responsibility and professional ethics

PO8:- Engage in research and life-long learning to adapt to changing environment.

PSO

1. The Graduates of this Programme with proficiency in mathematics and physical sciences will excel in the core areas of Civil Engineering such as Structural, Environmental and Water Resources Engineering.
2. The graduates will plan, produce detailed drawings, write specification, and prepare cost estimates.
3. The graduates will interact with stakeholders effectively and execute quality construction work applying necessary tools.
4. Enhancing the employability skills by making the students find innovative solutions for challenges and problems in various domains of Civil Engineering

Second year Third SEM CO's

MATHEMATICS III

1. Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.

2. Apply Laplace transform to solve differential equations.

3. Demonstrate the use of Partial Differential Equations.

4. Compute different Numerical Methods.

5. Apply the knowledge of Complex Analysis.

6. Demonstrate the basic concepts of probability and statistics.

STRENGTH OF MATERIALS

1. To understand the basics of material properties, stress and strain.

2. To apply knowledge of mathematics, science, for engineering applications

3. To identify, formulate, and solve engineering & real life problems

4. To design and conduct experiments, as well as to analyze and interpret action and reaction data.

5. To understand specific requirement from the component to meet desired needs within realistic constraints of safety.

BUILDING CONSTRUCTION & ENGINEERING GEOLOGY

1. To understand Load bearing and Frame structure.

2. To recognize various types of construction material and its suitability

3. To recognize the various levels in building and its need.

4. To know types of staircase, doors, windows and other related fixtures.

5. To recognize types of rock and minerals and its construction properties.

6. To know reason for earthquake and seismic waves.

TRANSPORTATION ENGINEERING

1. To identify type of roads and its utility.

2. To understand the application of various road studies at time of survey and actual construction.

3. To design the various types of road pavements.

4. To understand rules regulations, signals , type of gauges and railway sleepers density.

5. To recognize the Airport features and design concept of components for Aero plains movement.

6. To identify types and components of Tunnels and bridges and its design components.

CONCRETE TECHNOLOGY & RCC:-

1. To know need and composition of binding material, cement.

2. To recognize concrete and RCC and will be able to perform desired test for suitability,

3. To analyze RCC Components like slab and lintels.

4. To decide and utilize the admixtures as per the need of Concrete.

5. To understand importance of mix design.

Third year Fifth SEM CO's

5CE01: Design Of Reinforced & Prestressed Concrete Structures
- To analyze and design of rectangular section.
- To analyze and design of slab.
- To analyze and design of staircase and retaining wall.
- To analyze and design of column and footing.
- To understand grid slab and ductile detailing.
- Explain the general behavior of PC sections under external load.

5CE02: Surveying & Geomatics

- Understand the use of different types of curves and their field implications.
- Understand the triangulation adjustment.
- Understand the hydrographic survey.
- Acquire skills in handling spatial data base warehousing and mining.
- Understand the surveying with advance instrument like remote sensing, GPS and GIS.

5CE03: Numerical Methods and Computer Programming
- Define computer programming related terms
- Explain computer programming related concepts
- Write demonstration programs to show working of I/O statements, control structures, arrays, library functions and subprograms
- Analyze programs related to numerical methods, civil and structural engineering problems
- Write programs to demonstrate the application of programming to numerical methods, civil and structural engineering problems
- Develop own program for automating/ solving Civil Engineering problems

5CE04: Highway Construction and Management
- Explain the basic concepts about highway engineering
- To design geometric elements of the highway.
- To design the various types of road pavements with construction and
- Maintenance of highway.
- To carry out traffic studies and implement traffic regulation and control
  Measures and intersection design.
- To apply the knowledge to prevent the road accidents.
- To use appropriate equipment's for road construction.

(Open Elective)

5CE05: Basics to Building Construction

- To understand Load bearing and Frame structure with their foundations.
- To recognize various types of construction material and its suitability
- To recognize the various levels in building and its need.
- To know types of openings, doors, windows and other related fixtures.
- To recognize types of rock and minerals and its construction properties.
- To understand the basic concepts of DPC, fireproof, soundproof and expansion joints in structure.

Sixth Semester CO's

6CE01: Design of Steel Structure
- To explain the methods of design of steel structure.
- To design bolted and welded connection.
- To identify the different failure modes of bolted and welded connections, and determine their design strengths.
- To design the Tension and compression member.
- To identify and compute the design loads on a typical steel roof trusses.
- To design basic elements of steel structure like beams, column and bases.

6CE02: Environmental Engineering – I
- Define and explain the significance of terms and parameters frequently used in water supply engineering.
- Evaluate the influence of the different parameter in design and treatment of water treatment plant (water quality parameters).
- Basic methodology for water treatment (viz., sedimentation, coagulation, flocculation, filtration, disinfection and water softening.)
- An understanding of water quality criteria and standards, and their relation to public health.

6CE03: Fluid Mechanics

1. Describe basic properties of fluid flow.
2. Apply the knowledge to fluid flow problems.
3. Analyze the type of flow by using basic of mathematical principle.
4. Solve and modeling the pipe flow problems.

Professional Elective - II

6CE04 : Traffic Engineering & Management
1. To explain the road characteristics & traffic planning.
2. To analyze traffic capacity of roads & intersection by different methods.
3. To design different types of road intersections & use of visual aids for roads.
4. To use knowledge of traffics safety & environmental hazards.
5. To recommend suitable traffic management system and traffic regularity measures
6. To apply the knowledge of Intelligent Transportation System to traffic management system.

Seventh Sem. Course Outcome

Subject: - Advanced Concrete Technology (Free Elective)

- On the Completion of the course, the students would be able
- CO1 Admixtures and construction chemicals.
- CO2 Durability of concrete.
- CO3 Deformation in concrete.
- CO4 Special concrete and concreting techniques.
- CO5 Repairs and rehabilitations.
- CO6 Non-destructive testing of concrete.

Subject:- Environmental Engineering-I

- On the Completion of the course, the students would be able
- CO1. Calculate water requirement and consumption.
- CO2. Know about various water distribution systems.
- CO3. Understand various processes of water purification.
- CO4:-Design various filters for water purification.
- CO5:-Calculate quantity of disinfectant.

Subject:- Geotechnical Engineering-II

- On the Completion of the course, the students would be able
- CO1. An ability to determine the earth pressures on foundations and retaining structures.
- CO2. An ability to analyze shallow and deep foundations.
- CO3. To understand calculate and bearing capacity of soils and foundations settlements.
- CO4:-To Understand soil exploration methods.

- Subject:- Structural Design-II

- On the Completion of the course, the students would be able
- CO1. Design various types of retaining walls and flat slabs.
- CO2. Design combined footing.
- CO3. Analyze prestressed sections.
- CO4:-Design of prestressed sections and water tank.

    Subject:- Theory of Structure-II

- On the Completion of the course, the students would be able
- CO1. Analyze the different types of fixed, continuous beams, overhang beams, two hinged, and three hinged arches..
- CO2. Apply the basic tables and equations in analyzing the beams and portals frames by using slope deflection and moment distribution methods. .
- CO3. Know various methods of analysis of beams and portal frames, such as flexibility and stiffness coefficient method.
- CO4:- Use of castiglianous theorem for analyzing beams and portals popularly called as unit load method..

Eight Sem. Course Outcome

Subject:- Environmental Engineering-II

- On the Completion of the course, the students would be able

- CO1 Find out biological parameter and treatment of water.
- CO2 Know about various charateristics of water and methods use to calculate them.
- CO3 Understand effects of air polution and its control measures.
- CO4 Design low cost treatment plant for sewer.
- CO5 Design sewer system its testing and maintenance .

Subject:- Project Planning and Management

- On the Completion of the course, the students would be able
- CO1 Understand the roles and responsibilities of a project manager
- CO2 Prepare schedule of activities in a construction project
- CO3 Prepare tender and contract document for a construction project
- CO4 Understand safety practices in construction industry
- CO5 Identify the equipment used in construction.

Subject:- Water Resources Engineering-II

- On the Completion of the course, the students would be able
- CO1 An abilty to plan an irrigation system.
- CO2 To understand design irrigation canals and canal network.
- CO3 An ability to plan and design diversion head works.
- CO4 An abilty to design irrigation canal structures.
- CO5 To understand analyze gravity and earth dams.
- CO6 An ability to Design spillways and energy dissipations works.

- Subject:- Advanced Design of Concrete Technology (Professional Elective)

- On the Completion of the course, the students would be able
- CO1 Design of Portal frame, Design of circular slab.
- CO2 Design of a footbridge, Design of RCC girder.
- CO3 Analysis of multistoried frame by seismic coefficient method.
- CO4 Design of square bunkers Silos..
- CO5 Design of R.C.C. Intze tanks, staging for Intze tanks.

Second year Fourth SEM CO's
BUILDING PLANNING DESIGNING & CAD
- 1. To make engineering drawings by First angle and Third angle method.
- 2. To apply building planning principles practically while developing projects.

- 3. To study the climatic conditions and decide the corresponding provision in structure.
- 4. To know about Bylaws, Town development authority rules and terms.
- 5. To draw various plans manually and computationally.

HYDROLOGY & WATER RESOURCE ENGINEERING
- 1. Explain the hydrology and hydrological data.
- 2. To analyze the hydrological methods for runoff.
- 3. Evaluate the ground water hydrological problems.
- 4. Explain the need of irrigation systems and its alternatives

SURVEYING
- 1. Define principles of Surveying, Remote Sensing and Geomatics.
- 2. Describe different instruments, tools, applications and techniques to determine the positions on the surface of the earth, change detection.
- 3. To perform Liner measurement methods of surveying.
- 4. Differentiate the techniques for setting out alignments, curves, other layouts, modern survey systems etc.
- 5. To perform survey at elevation and conduct Plane Table survey

- GEOTECHNICAL ENGINEERING –I
- 1. To determine the Index properties and Atterbergs limits for soil classification.
- 2. To understand the mechanics of compaction and quality control in field.
- 3. To explain permeability of soil and methods of dewatering.
- 4. To calculate the seepage discharge and design the graded filter.
- 5. To understand the concept of consolidation and stress distribution in soil mass.
- 6. To calculate the shear strength of different soil.

- STRUCTURAL ANALYSIS- I
- 1. To decide what is required to be analyzed depending upon type of structural element.
- 2. To know about degree of freedom, Condition of equilibrium and determinacy of element.
- 3. To understand reason for failure and permissible limits for safety.
- 4. To apply the knowledge of beam analysis for practical analysis and design purpose.
- 5. To make application of various analysis methods for actual structural member analysis and design.
- 6. To know merits for utilization of suspension, 2 hinged and 3 hinged arches

Sanmati Engineering College, Washim

Department of Electrical Engineering

Program Outcomes (POs)

- Will have an ability to apply knowledge of mathematics and science, Network analysis, Power system and Electrical machine in Electrical engineering systems.
- Will have an ability to design and conduct experiments, as well as to analyze and interpret data.
- will have knowledge and exposure on different power electronic circuits and drives for industrial applications.
- Will able to Identify, formulate, review research literature, and analyze engineering problems reaching substantiated conclusions using first principles of machines, Network theorems, Load flow studies, Electrical Parameters and Electrical Circuits, Power measurements.
- Develop an ability of self-education and understand the value of life-long learning.
- Be able to communicate effectively.
- Will have confidence to apply engineering solutions with professional, ethical and social responsibilities.
- Students will be able to develop confidence for Self Education and ability to engage in life –long learning.

SEM. III *Course Outcomes:*

3EE01   ENGINEERING MATHEMATICS –III

Course Outcomes:
1. Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.
2. Apply Laplace transform to solve differential equations.
3. Demonstrate the use of Fourier Transform to connect the time domain and frequency domain.
4. Apply Z Transform to solve of various Linear Difference equations with constant

coefficients.
5. Apply the knowledge of vector calculus to solve physical problems.
6. Demonstrate the basic concepts of probability and statistics.

3EE02   ELECTRICAL CIRCUIT ANALYSIS
Course Outcomes:
1. Analyze electric and magnetic circuits using basic circuital laws
2. Analyze the circuit using Network simplification theorems.
3. Solve circuit problems using concepts of electric network topology.
4. Evaluate transient response of different circuits using Laplace transform
5. Evaluate two-port network parameters and network functions

3EE03   ELECTRICAL MACHINES – I
Course Outcomes:
1. Explain the construction and working of DC Machines.
2. Illustrate the different Characteristics, types, their applications and parallel Operation of D.C. Generators.
3. Demonstrate the various characteristics, starting, speed control and braking operation on DC motors
4. Analyze the performance of DC machines by conducting the various tests on it.
5. Determine the parameters of equivalent circuits, performance parameters of single phase transformer and merits & demerits of autotransformer
6. Explain the construction, working, different connections, applications and testing of three phase transformer

3EE04   ENERGY RESOURCES AND GENERATION
Course Outcomes:
1. Explain the operation of Thermal, Hydro, Nuclear and Diesel power plants.
2. Summarize solar energy conversion, solar radiation measuring instruments, wind energy conversion and
their applications.
3. Outline the principle and operation of fuel cells, ocean & tidal energy conversion, and other nonconventional energy resources.
4. Determine the various factor sand curves related to electrical load & generating plant.

3EE05   ELECTRONIC DEVICES AND CIRCUITS

Course Outcomes:

1. Demonstrate the knowledge of semiconductor physics and PN Junction Diode
2. Analyze the rectifier and regulator circuits.
3. Analyze the operational parameters of BJT
4. Analyze various multistage amplifier circuits
5. Demonstrate the knowledge of JFET, MOSFET, UJT and their operational parameters

SEMESTER – IV

4EE01   ELECTROMAGNETIC FIELDS

Course outcomes :

1. Demonstrate the basic mathematical concepts related to electromagnetic vector fields.
2. Apply the principles of electrostatics to the solutions of problems relating to electric field and electric

potential, boundary conditions and electric energy density.
3. Apply the principles of magneto statics to the solutions of problems relating to magnetic field.
4. Apply Maxwell's equation in different forms (differential and integral) to diverse engineering problems.

4EE02   ELECTRICAL MEASUREMENTS &

INSTRUMENTATION

Course Outcomes:

1. Demonstrate construction & working of Instrument Transformers and special purpose meters.
2. Analyze various methods for measurement of resistance, inductance, capacitance using bridges.
3. Explain the working of various Digital measuring instruments.
4. Explain the generalized Instrumentation system & working of different transducers used for measurement of

various non-electrical quantities

4EE03/4EX03 POWER SYSTEM – I

Course Outcomes:

At the end of the course the student should be able to:
1. Calculate the transmission line parameters like resistance, inductances and capacitances.

2. Explain the various configurations of line conductors and their effects on the line parameters.

3. Estimate the electrical characteristics of transmission lines and hence to evaluate the performance of the

lines.

4. Draw the single line diagram of any electrical system.

5. Perform the per unit calculation of any electrical system.

6. Apply knowledge of voltage control and power factor improve methods practically.

7. Perform the load flow or power flow methods to any electrical system.

8. Design HV, EHV lines, insulators used.

9. Evaluate the mechanical parameters of line supports.

10. draw the various underground cable configurations and to calculate their electrical parameters.

4EE04   ANALOG AND DIGITAL CIRCUITS

Course Outcomes:

After completing the course, students will be able to

1. Explain the principles of operational amplifiers, parameters of op-amp

2. Illustrate the linear and nonlinear applications of op-amp

3. Demonstrate the knowledge of Voltage regulator and Timer ICs

4. Describe the working of Logic families and their applications.

5. Demonstrate the knowledge of combinational and sequential circuits and its application.

4EE05   SIGNALS & SYSTEMS

Course Outcomes:

1. Understand importance and applications of signals and systems

2. Classify Systems into various categories

3. Perform convolution of Analog and Discrete time signals

4. Convert Analog signal into discrete signal by using Sampling Method

5. Apply CTFT,Z-Transform, DTFT, FFT for the analysis of Various Signals and Systems

5EE01   **CONTROL SYSTEMS**

Course Outcomes:

1. Demonstrate the fundamental concepts of automatic Control and mathematical modeling of the Systems.
2. Determine the transfer function of control system components.
3. Analyze the time response of various systems and performance of controllers.
4. Evaluate the stability of linear systems using various methods.

5 EE02   **MICROPROCESSOR & MICROCONTROLLER**

Course Outcomes:

1. Recite Fundamentals and Architecture of Microprocessor 8085, Microcontroller 8051
2. Interpret Assembly Language Programming of Microprocessor 8085, Microcontroller 8051
3. Illustrate interfacing with Microprocessor 8085, Microcontroller 8051
4. Develop applications of Microprocessor 8085, Microcontroller 8051.

5EE03   **ELECTRICAL MACHINES – II**

Course Outcomes:

1. Describe the construction, working operation & performance characteristics of three phase Induction Motor
2. Analyze the starting, braking and speed control of three phase induction motors by various methods.
3. Describe the construction, working operation & performance characteristics of single-phase Induction Motor
4. Demonstrate the construction, working operation & performance characteristics of synchronous
machine.
5. Explain the construction & working of special motors like Universal, Reluctance, PMSM & BLDC Motor.

5EE04   ELECTRICAL ENGINEERING MATERIAL

Course Outcome

1. Understand importance of electrical engineering materials
2. Understand how electric conduction takes place in conductors
3. Understand importance of semiconductors and magnetic materials in electrical engineering.
4. Understand importance of dielectric materials in electrical engineering.
5. Identify the need of special materials in electrical engineering.

 5EE05   ENTREPRENEURSHIP

Course Outcomes:

1. Analyze the business environment in order to identify business opportunities,

2. Identify the elements of success of entrepreneurial ventures,

3. Evaluate the effectiveness of different entrepreneurial strategies,

4. Specify the basic performance indicators of entrepreneurial activity,

5. Explain the importance of marketing and management in small businesses venture,

6. Interpret their own business plan.

6EE01   POWER ELECTRONICS

Course Outcome

1. Explain the concepts and techniques used in power electronics
2. Apply the knowledge of series and parallel connection of SCRs in power control applications
3. Analyze various power converter circuits
 4. Analyze the single phase and three phase Inverter circuits
5. Explain the operation of DC/DC converter circuits
6. Demonstrate the applications of power electronic circuits.

6EE02   POWER SYSTEMS –II

Course Outcome

1. Understand Power Factor improvement, Capacitor bank installation in distribution system, metering system in Industries and Residential area.
2. Understand Positive Sequence, Negative & zero sequence system and fault analysis.
3. Create computational models for analysis of both symmetrical and unsymmetrical conditions in power systems,
 4. Analyse the system performance where there is an unbalanced fault, and also calculate the corresponding fault current.
5. Examine the need of various analysis like fault analysis, short circuit analysis stability analysis, steady state and transient analysis.

6EE03   COMPUTER AIDED ELECTRICAL MACHINE DESIGN

Course Outcome

1. Explain the Basics of Computer aided machine design & material selection.
2. Derive the design parameters of single & three phase transformer core.
3. Calculate the winding& cooling system parameters of the transformer
4. Develop the armature winding diagram for three phase Induction Motor
5. Determine the stator core dimensions of three phase Induction motor
 6. Design the squirrel cage & wound type rotor for three phase Induction motor.

6EE04 INDUSTRIAL ELECTRICAL SYSTEMS

Course Outcome

1. Understand the electrical wiring systems for residential, commercial and industrial consumers.
2. representing the systems with standard symbols and drawings, SLD.
3. Understand various components of industrial electrical systems.
4. Analyze and select the proper size of various electrical system components.

6EE05 NON-CONVENTIONAL ENERGY SOURCES

Course Outcome

1. Understand concept of renewable and non-renewable sources.

2. Understand the basic concept of radiation transmission through covers and solar energy collections, the basic concept of solar energy utilization and storage.

3. Demonstrate, concept of energy from ocean and wind.

4. Understand the concept of bio-mass energy resources, concept of direct energy conversion and fuel cell.

Course: **CONTROL SYSTEM - II**

Course Outcome

CO1. To study compensation Techniques

CO2. To study State Space Techniques I & II

CO3. To study Sampled Data Control Systems

CO4. To study non-Linear System Analysis I & II

Course: **POWER SYSTEM OPERATION & CONTROL**

Course outcome

CO1. To study Economic Operation.

CO2. To study Generator Control Loops and Automatic Voltage Regulator.

CO3. To study Automatic Load Frequency Control.

C04. To study Control Area and Steady-State Instabilities.

Course: ELECTRICAL POWER II

Course outcome

CO1. To understand the basic ideas about symmetrical and unsymmetrical fault analysis.

CO2. To understand transformer bank and power system elements.

CO3. To understand overvoltage and its causes.

CO4. To understand HVDC transmission, inverters and converters.

CO5. To understand FACTS technology and comparison with AC.

Course: SWITCHGEAR & PROTECTION

Course outcomes

CO1. To study Current interruption, ratings, maintenance, properties and interruption theories of various circuit breakers.

CO2. To study Constructional features, operation, Characteristics and Applications Fuses

CO3. To study Principle, Components, Essential features, Characteristics & various Types of Relays.

CO4. To study Power System Elements ProtectionTransformers, Motors, Generators and Buses.

Course: COMPUTER METHODS IN POWER SYSTEM ANALYSIS

Course outcomes

CO1. To study Representation of power systems for computerized analysis

CO2. To study Topology of Electric Power Systems.

CO3. To study Formation of bus impedances and admittances matrices by algorithm.

CO4. To study Short circuit and load flow studies.

CO5. To study Stability studies of power system.

Course: POWER SYSTEM STABILITY

Course outcomes

- CO1.   To study Basic Concepts of power system stability.
- CO2.   To study Steady State Stability – I and II
- CO3.   To study Transient State Stability – I and II
- CO4.   To study Excitation System

Course: High Voltage Engineering

Course outcomes

- CO1.   To study Breakdown in Gases, Liquid and Solid Dielectrics.
- CO2.   To study Lightning and Switching over Voltage and Protection.
- CO3.   To study High Voltage Testing and E.H.V. Lines Design
- CO4.   To study High voltage measurement.
- **CO5.**

Course: DIGITAL SIGNAL PROCESSING

Course outcomes

- CO1.   Introduction to DSP.
- CO2.   Introduction to Fourier transform and Sampling of Bandpass signals.
- CO3.   To study Filters
- CO4.   To study DSP Processors and applications.

Course: PE II (Power Quality)

Course outcomes

    CO1.   To study Introduction of power quality and its characteristics.

    CO2.   To study Power Quality Standards and its solution.

    CO3.   To study Wiring and Grounding.

    CO4.   To study Power Quality Measurement Tools & Power Quality Surveys.

Course Outcome

Subject :- Engineering Mathematics-I

1. Able to understand Rolle's Theorem and its applications to Engeering Problems

2. Able to understand maxima minima concept.

3. Able to apply Demoiver's theorem in various concepts of complex number.

4. Able to solve differential equations of certain types that they might encounter in the same

    or higher semester.

Subject :- Engineering Physics

1. To understand the Conducting, superconducting and dielectric materials, Semi

    conducting, new engineering materials and Electron Wave

2. To Understand the Interferometric techniques in metrology & Communication.

3. To exposed themselves to Application of quantum physics to optical & electrical phenomena

4. To exposed themselves to Application of lasers and Fiber Optics, Diodes in Engineering

    and Technology, ultrasonic, Acoustics

5. To understand the Electromagnetic phenomena and wave propagation, Physics of

    Modern engineering materials.

Subject :- Engineering Mechanics

1. Compose and resolve the forces along with its effect.

2. Apply principles of statics to the system of rigid bodies and analyse simple structures.

3. Calculate frictional forces for simple contact, wedges and belt friction.

4. Locate centroid and calculate moment of inertia.

5. Calculate various kinematic quantities.

Subject :- Computer Programming

1. Prove the concepts related to engineering mechanics.

2. Calculate lifting machine parameters.

3. Perform graphical analysis of force systems and simple structures.

Subject :- Workshop Practice

1) Upon completion of this course, the students will gain knowledge of different manufacturing processes which are commonly employed in industry.

·2) Upon completion of this course, the students will be able to fabricate the components using various manufacturing techniques.

3) The students will be conversant with the concept of dimensional accuracy and tolerances.

Subject :- Engineering Mathematics-II

1 The essential tool of matrices and linear Algebra in a comprehensive Manner.

2 Evaluation of Integrals by Reduction Formulae, Gamma and Beta Function

3 Use the tool of Fourier series for learning advanced engineering mathematics.

4 Use new techniques DUIS to evaluate Integrals and Tracing of Curves

5 The Mathematical tools needed in evaluating Multiple Integrals and their usage

Subject :- Engineering Chemistry

1. Apply the knowledge of chemistry in softening processes involved in water technology.

2. Identify various types of corrosion and methods to protect the metallic structures form

   corrosive environment

3. Understanding of the energy storage system (battery) .

4. Apply the knowledge of useful engineering materials such as cement, lubricants,

   ceramics, refractories and nano materials based on their properties.

5. Develop the technique involved in the manufacturing process of cement

Subject :- Basic Electrical Engineering

1. Explain the basic concepts of electric and magnetic circuits.

2. The students will be able to solve problems on AC fundamentals & three phase circuits

3. Explain the operating principles of various electrical machines and describe the

   working of various measuring instruments and importance of earthing

Subject :- Engineering Graphics

1) Students will able to read/prepare/understand the engineering drawings

2) Students will able to create the projections and sectional views of 3D objects

3) Students will able to draw the orthographic and isometric views of 3D objects

4) Students will able to use graphics software to create Engineering drawings and represent

   engineering systems

Subject :- English Communication Skills Laboratory

1) The learning outcome of students will be assessed through assignments, tests and final exams and most importantly through practical performances.

2) · Through these tests, it would be revealed that students are able to reproduce their understanding of concepts/principles of communication in English language.

3) Students can present themselves well in front of large audience on a variety of topics. Moreover they get the knack for structured conversation to make their point of views clear to the listeners.

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