GMR Institute of Technology
An Autonomous Institute Affiliated to JNTUK, Kakinada

Seven UG Programs accredited by National Board of Accreditation (Tier-1) *
Institute Accredited by NAAC with "A" Grade and ISO 9001-2008 Certified

GMR Nagar, Rajam-532 127
Srikakulam (Dist.)
Andhra Pradesh

CIN U80301AP2003NPL042195
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AR!3	Program Outcomes:

The Bachelor of Technology program aims to produce students that at the time of graduation will be able to:

1. Apply the knowledge of basic sciences and fundamental engineering concepts in solving engineering problems.
2. Identify and define engineering problems, conduct experiments and investigate to analyze and interpret data to arrive at substantial conclusions.
3. Propose appropriate solutions for engineering problems complying with functional constraints such as economic, environmental, societal, ethical, safety and sustainability.
4. Perform investigations, design and conduct experiments, analyze and interpret the results to provide valid conclusions.
5. Select/develop and apply appropriate techniques and IT tools for the design & analysis of the systems.
6. Give reasoning and assess societal, health, legal and cultural issues with competency in professional engineering practice.
7. Demonstrate professional skills and contextual reasoning to assess environmental/societal issues for sustainable development.
8. Demonstrate Knowledge of professional and ethical practices.
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary situations.
10. Communicate effectively among engineering community, being able to comprehend and write effectively reports, presentation and give / receive clears instructions.
11. Demonstrate and apply engineering & management principles in their own/team projects in multidisciplinary environment.
12. Recognize the need for, and have the ability to engage in independent and lifelong learning.

AR!6	Program Outcomes:

Civil Engineering

Program Outcomes (POs):

Engineering graduate will be able to:

PO 1: Apply the knowledge of basic sciences and fundamental engineering concepts in solving civil engineering problems (Engineering knowledge)

PO 2: Identify and define civil engineering problems and investigate to analyze and interpret data to arrive at substantial conclusions. (Problem analysis)

PO 3: Propose appropriate solutions for engineering problems complying with functional constraints such as economic, environmental, societal, ethical, safety and

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  Engineering (ME) & Information Technology (IT)

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sustainability in accordance with Indian standard codes of practices.(Design/development of solutions)

PO 4: Perform investigations, design and conduct experiments, analyze and interpret the results to provide valid conclusions. (Conduct investigations of complex problems)

PO 5: Select/develop and apply appropriate techniques and IT tools to analyze, design and scheduling of activities with an understanding of the limitations. (Modern tool usage)

PO 6: Give reasoning and assess societal, health, legal and cultural issues with competency in professional engineering practice. (The engineer and society)

PO 7: Demonstrate professional skills and contextual reasoning to assess environmental/societal issues for sustainable development. (Environment and sustainability)

PO 8: Demonstrate Knowledge of professional and ethical practices. (Ethics)

PO 9: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary situations. (Individual and team work)

PO10:Communicate effectively with respect to oral, written and graphical communication(Communication)

PO 11: Demonstrate and apply engineering & management principles in their own / team projects in multidisciplinary environment. (Project management and finance)

PO 12: Recognize the need for, and have the ability to engage in independent and lifelong learning. (Life-long learning)

PSO#1: Demonstrate the quality and suitability of construction materials (Program Specific)

PSO#2: Understand the practical aspect of analysis, design and safe construction practices (Program Specific)

Electrical & Electronics Engineering
Engineering graduate will be able to:

PO 1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Engineering knowledge)

PO 2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Problem analysis)

PO 3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. (Design/development of solutions)

PO 4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. (Conduct investigations of complex problems)

PO 5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. (Modern tool usage)

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PO 6: 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. (The engineer and society)

PO 7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. (Environment and sustainability)

PO 8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. (Ethics)

PO 9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. (Individual and team work)

PO 10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. (Communication)

PO 11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. (Project management and finance)

PO 12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. (Life-long learning)

PO 13: Utilize statistics, transformation methods, discrete mathematics and application of differential equations in analyzing and design of electrical/electronic systems.. (Program Specific)

PO 14: Analyze, design and implement control of electrical systems in any problem/application of electrical/electronic (s) engineering. (Program Specific)

Electronics and Comunication Engineering

Engineering graduate will be able to

PO 1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.(Engineering knowledge)

PO 2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.(Problem analysis)

PO 3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.(Design/development of solutions)

PO 4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.(Conduct investigations of complex problems)

PO 5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.(Modern tool usage)

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PO 7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.(Environment and sustainability)

PO 8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.(Ethics) PO 9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.(Individual and team work)

PO 10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.(Communication)

PO 11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.(Project management and finance)

PO 12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.(Life-long learning)

PO 14: Understand and apply the fundamentals of communication and signal processing to develop systems wrapped with industry standard protocols and standards. (Program Specific)

PO 13: Apply the knowledge of technological evolutions, model / character the devices and design the integrated as to build analog and digital systems. (Program Specific) the integrated

Computer Science and Engineering
Engineering graduate will be able to

PO 1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Engineering knowledge)

PO 2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Problem analysis)

PO 3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. (Design/development of solutions)

PO 4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. (Conduct investigations of complex problems)

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PO 5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. (Modern tool usage)

PO 6: 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. (The engineer and society)

PO 7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. (Environment and sustainability)

PO 8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. (Ethics)

PO 9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. (Individual and team work)

PO 10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. (Communication)

PO 11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. (Project management and finance)

PO 12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. (Life-long learning)

PSO1: Understand of social & civic responsibilities, and rights of individuals or groups while developing software tools. (Program Specific)

PSO2: Demonstrate personal strengths & limitations, committed to critical thinking and performance evaluation to manage software projects. (Program Specific)

Information Technology

Engineering graduate will be able to

PO 1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.(Engineering knowledge)

PO 2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.(Problem analysis)

PO 3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.(Design/development of solutions)

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PO 4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.(Conduct investigations of complex problems)

PO 5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.(Modern tool usage)

PO 6: 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.(The engineer and society)

PO 7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.(Environment and sustainability)

PO 8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.(Ethics)

PO 9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.(Individual and team work)

PO 10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.(Communication)

PO 11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.(Project management and finance)

PO 12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.(Life-long learning)

PSO1: Implementation of soft computing applications for secure environment to support contemporary services (Program Specific)

PSO2: Construct software solutions to deliver quality products for Future Enterprise Mobility (Program Specific)

Mechanical Engineering

Engineering graduate will be able to

PO 1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. (Engineering knowledge)

PO 2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. (Problem analysis)

PO 3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public

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health and safety, and the cultural, societal, and environmental considerations. (Design/development of solutions)

PO 4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. (Conduct investigations of complex problems)

PO 5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. (Modern tool usage)

PO 6: 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. (The engineer and society)

PO 7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. (Environment and sustainability)

PO 8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. (Ethics) PO 9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. (Individual and team work)

PO 10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. (Communication)

PO 11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. (Project management and finance)

PO 12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. (Life-long learning)

PSO1: Demonstrate the knowledge and application of Geometric modeling, Analysis and Simulation of mechanical engineering systems. (Program Specific)

PSO2: Demonstrate the knowledge and application of advanced techniques in manufacturing. (Program Specific).

Chemical Engineering

Engineering graduate will be able to

PO 1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.(Engineering knowledge)

PO 2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.(Problem analysis)

PO 3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public

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PO 5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.(Modern tool usage)

PO 6: 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.(The engineer and society)

PO 7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.(Environment and sustainability)

PO 8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.(Ethics)

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PO 12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.(Life-long learning)

PO 13: Utilize the knowledge of chemistry, thermodynamics, material and energy balances, transport processes, reaction engineering, process dynamics and control in optimal design of Chemical Engineering equipment and processes to meet the desired needs. (Program Specific)

2016-17	Course Outcomes

16HSX01 English Communication Skills
1. Infer explicit and implicit meaning of a text
2. Construct clear, grammatically correct sentences using a variety of sentence structures
3. Analyze and Produce various types & formats of emails, letters in formal & informal ways to meet particular purposes
4. Select and apply appropriate words and phrases in different contexts
5. Formulate and present ideas effectively in spoken form

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6. Discuss social issues with concern and imagine possible solutions

16MAX01 Engineering Mathematics I

1. Classify and solve analytically a wide range of first and higher order ordinary differential equations with constant coefficients
2. Apply the knowledge of Mean value theorems, Maxima and Minima of unctions of several variables
3. Analyze the characteristics and trace the curve of an equation
4. Adapt methods for measuring lengths, volumes, surface area of an object and transformation of coordinates in practical situations
5. Utilize basic knowledge of conservative field, potential function and work done in engineering problems
6. Identify the relationships between line, surface and volume integrals

16PYX01 Engineering Physics

1. Illustrate the concepts of Interference, Diffraction, Polarization and their applications
2. Summarize the concepts of electric fields, magnetic fields and superconductivity and make out the scope of applications in various engineering fields
3. Outline the quantum mechanics to infer conductivity nature of metals
4. Explain the properties and application of dielectric, magnetic and Nano-materials
5. Demonstrate the emission of laser light, optical fibers and their applications in various Engineering fields
6. Analyze the engineering Applications based on Fundamental concepts

16MEX01 Engineering Mechanics

1. Draw the free body diagram of a given physical system and compute the resultant of a given coplanar system of forces
2. Estimate the centroid of composite figures and bodies
3. Estimate area moment of inertia and mass moment of inertia of composite figures and bodies
4. Explain concepts of friction and principle of virtual work
5. Summarize power transmission through belts
6. Analyze plane truss (frame) by method of joints and method of sections

16CSX01 Problem Solving using C

1. Develop the flow charts and algorithms, and then implement, compile and debug programs in C language for solving a problem

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2. Design programs involving decision structures, loops for problem solving
3. Design programs to develop applications using array data structure
4. Solve scientific problems using functions
5. Make use of pointers to design applications for efficient and dynamic memory allocation
6. Design programs to create/update basic data files

16PYX02 Engineering Physics Lab

1. Build the knowledge in the scientific methods and learn the process of measuring different physical parameters
2. Develop the laboratory skills in handling of electrical and Optical instruments
3. Demonstrate the interference and diffraction phenomena of light
4. Inspect and experience physical principles of Magnetic fields and optical fiber communications
5. Apply the principles of physics and measure the solid state properties of materials
6. Design and analyze experiment based on physics concepts

16CSX02 Problem Solving using C Lab
1. Implement, compile and debug programs in C language for solving a problem
2. Design programs involving decision structures, loops for problem solving
3. Design programs to develop applications using array data structure
4. Apply functions to solve real world problems
5. Make use of pointers to design applications with efficient use of memory
6. Design programs to create/update basic data files

16MEX02 Engineering Drawing
1. Understand Principles of engineering drawing
2. Construct Conic sections using general methods and other methods
3. Construct Orthographic projections of Points, Lines and Planes
4. Construct Orthographic projections of Solids using basic drafting software
5. Construct Isometric projections using basic drafting software
6. Construct Orthographic projections from given isometric projections of an object and vice

16HSX03 English Communication Skills II

1. Build new academic vocabulary & phrases and make use of them in different contexts
2. Construct clear, grammatically correct sentences using a variety of sentence structures
3. Analyze and Produce various types & formats of emails, letters in formal & informal ways to meet particular purposes
4. Compose and present ideas logically in written form

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5. Organize ideas effectively in spoken form
6. Discuss social issues with concern and imagine possible solutions

16MAX02 Engineering Mathematics II
1. Apply matrix knowledge to Engineering problems
2. Solve problems related to engineering applications using integral transform techniques
3. Make use of Laplace transforms in solving the differential equations with the initial and boundary conditions
4. Apply the concept of Fourier series of periodic functions and expand a function in sine and cosine series
5. Solve problems related to basic linear and non-linear partial differential equations
6. Formulate and solve some of the physical problems of engineering using partial differential equations

16CYX01 Engineering Chemistry

1. Outline the fundamental chemistry with an applied perspective as future engineers with a focus on engineering and industry
2. Analyze the quality of water and its treatment methods for domestic and industrial applications
3. Utilize the polymers, plastics, elastomers and advanced materials (Nano materials) as engineering materials and apply them in domestic and industrial life
4. Infer the concepts of renewable & non-renewable energy sources, quality of fuels and apply a suitable fuel as an energy source
5. Outline the corrosion factors and implement the prevention measures
6. Interpret the Nernst equation for electrode potentials and construction and working of various types of energy storage devices

16EEX01 Basic Electrical Engineering
1. Demonstrate the basic principles of electrical components
2. Outline electric circuits using network laws and reduction techniques
3. Illustrate the behavior of basic circuit elements for an AC excitation
4. Relate the laws of electro-magnetism and select a machine for practical applications
5. Outline the working principle and construction of the measuring instruments
6. Choose appropriate safety measures and wiring schemes

16CHX01 Environmental Studies
1. Translate the learner's attitude to think globally and act locally

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2.   Motivate environmental organizaions to create a concern about our present state of Environment.
3.   Find solutions for conservation of natural resources
4.   Identify the benefits of ecosystem conservation, biodiversity protection, implement pollution prevention and control measures
5.   Illustrate social issues of environmental protection and adopt sustainable developmental practices
6.   Perceives the basic structure of environmental policy and law pertaining to specific environmental issues (water quality, air quality, biodiversity protection, Forest, etc.)

16HSX02 English Communication Skills Lab

1.   Develop the pronunciation ability by using their gained knowledge of the English sound system
2.   Improve the articulation of sounds and pronunciation of words for intelligible English
3.   Recognize the use of language in conversational style with focus on communication in English
4.   Organize ideas effectively in spoken form
5.   Discuss social issues with concern and imagine possible solutions
6.   Develop the pronunciation abilityby using their gained knowledge of the English sound system

16CYX02 Engineering Chemistry Lab

1.   Utilize different Analytical tools and develop the necessary skills in executing experiments involving estimation of metals in alloys, raw materials, finished products and environmental samples etc.
2.   Utilize modern instruments like flame photometer, ion analyzer, UV Vis spectrophotometer, Atomic Absorption Spectrophotometer for characterization of materials used in industry & environmental monitoring
3.   Determine the amount of hardness, chloride, fluoride, nitrite, DO of water for its quality and know its utility in domestic and industry
4.   Summarize the characteristics of lubricants and able to choose/modify lubricants according to purpose
5.   Compose some cross-linked polymers like Bakelite, Nylon etc.
6.   Identify the adulteration of food items such as milk, honey, tea, coffee & fertility of soil to increase crop production

16MEX03 Engineering Workshop

1.   Utilize basic carpentry tools for the preparation of wooden joints

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2. Make use of basic hand tools for the preparation of mild steel joints
3. Build simple house hold items with GI sheet using tin smithy tools
4. Make use of house wiring accessories to build simple electrical circuits
5. Build simple components with hand tools for making experimental setups
6. Build simple components with hand tools as per the drawing specifications

2015-16	Course Outcomes

B.Tech (Civil Engineering)
Course Title: BUILDING MATERIALS AND CONSTRUCTION   Course Code: CE 2401
At the end the course student will be able to
1. Highly command and Knowledge Towards civil engineering materials used in construction
2. Gains knowledge on stones, bricks, tiles and their importance in building construction
3. Gains Knowledge on brick and stone masonry in building construction
4. Gains knowledge on lime, cement, wood and geo-synthetics and their importance in construction field
5. Gains knowledge on building components and various finishing's in building construction

Course Title: ENIGINEERING MECHANICS   Course Code: CE 2402
At the end of the course the learners will be able to
1. Identify the significance of centroid/ center of gravity and find centroids of composite figures and bodies.
2. Understand the moment of inertia and method of finding moment of inertia of areas and bodies.
3. Identify the type of frame and analyze for the forces in the members of the truss (frame) by method of joints and method of sections.
4. Understand the kinetics of the rigid bodies and solve simple problems using work-energy method.
5. Understand virtual work method and solve simple problems.
6. Apply the principle of Impulse momentum to the real world problems.

Course Title: FUNDAMENTALS OF FLUID MECHANICS   Course Code: CE 2403
After the end of the course, Students are able to:
1. Understand the concepts of fluid properties like specific gravity, viscosity, density, surface tension.
2. Determine the pressure head of a fluid in a pipe by using manometer.
3. Understand the friction losses while flowing through a pipe and also used for the designing of pipeline net work.
4. Understand the minor losses and evaluate the performance of a fluid transport system.

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5. This study is used for the hydraulicstrictures.
6. This is study is applied for the design of pipes flows
7. Used for the estimation of flows in pipes, open channels and over head tanks.
8. This study is used for the estimation of shear stress and velocity gradient for the design ofsubmersed bodies.

Course Title: GEODESY   Course Code: CE 2404
At the end of the course the students will be able to
1. Explain the difference between planar and geodetic surveying (Knowledge)
2. Apply basic geometry to earth surface for typical survey projects (Action)
3. Plan and organize a survey with least possible probable errors(Criteria)
4. Acquire technical operation of equipment viz., Compass, Level, Theodolite, Tacheometer and Total station that are used in the construction industry(Condition)
5. Appreciate the role of Civil Engineer in infrastructure building (Criteria).

Course Title: SOLID MECHANICS   Course Code: CE 2405
At the end of the course student will be able to
1. Identify the position and the magnitude of maximum shear force and maximum bending moment at any section within a beam under uniformly distributed loads, point loads, uniformly varying loads and their combinations.
2. Plot the variation of shear stresses andidentify the position and magnitude of maximum flexural stress across the depth in rectangular, circular, I, T, channel cross sections.
3. Plot the variation of shear stresses and identify the position and magnitude of maximum shear stresses across the depth in rectangular, circular, triangular, I, T, angular cross sections.
4. Find the torsional moment of resistance and power transmitted by a shaft for a given shear.
5. Evaluate the resultant forces due to effect of combined bending and torsion on a bar and determine the deflection of close and open coiled helical springs under axial pull and axial couple.
6. Calculate the longitudinal and circumferential stresses in thin cylinders and identify the location and orientation of principal planes on an element under a given loading.
7. Determine the resultant stresses in the case of chimneys, retaining walls and dams and checking or their stability.
8. Calculate the effective lengths and Euler bulking loads for the given column when end conditions are held in position, free, either restrained fully or partially.

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Lab: Geodesy   Course Code: CE 2206

At the end of the course the student will gain

1. The ability to choose tools, measuring distances and directions of objects accurately and plotting.
2. An ability to choose suitable technique, method and tools to perform field work accurately.
3. An ability to prepare different profiles of ground along longitudinal and cross-section.
4. Productive knowledge in determining areas of field.
5. Ability to work in field as a team member.
6. An overview of applications of conventional (Chain, compass etc.) and modern instruments viz., Total station, GPS and DGPS.

Lab: SOLID MECHANICS   Course Code: CE 2207

At the end of course student will be able to

1. Estimate compressive strength of wood/Concrete/Brick materials
2. Check the suitability of wood, steel and concrete in construction works.
3. Find the impact resistance of steel used in construction works.
4. Estimate young's modulus of wood/steel materials

Course Title: CONCRETE TECHNOLOGY   Course Code: CE 2408

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

1. Have knowledge of allavailable ingredients of concrete like Cement, sand, aggregates, water and chemical admixtures and their use and have a comprehensive Overview and understand their mechanism in concrete.
2. Exposure on different types of concrete.
3. Have good knowledge of the concrete materials (i.e. properties of cement, sand, coarse aggregate water & admixtures.) and the main operations of concreting i.e. selection of materials, its mix proportioning, mixing, placing, compaction, curing & finishing.)
4. Acquire the skill of testing, supervision of concrete work & interpretation of tests results
5. broadening the knowledge to new concrete types and their design methods, testing and application conditions, further to modern trends in concrete technology and also on concrete with special properties such as e.g. high-quality, high strength, self-compressing, light, heavy concrete and further concretes with increased endurance against aggressive surrounding.

Course Title: ENGINEERING GEOLOGY   Course Code: CE 2409

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

1. Know his duties as engineering geologist in the field and know how to write an engineering geology report

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2. Assess the importance of weathering, caused by different geological agents, with respect to various civil engineering constructions like dams, reservoirs, and tunnels

3. Identify and classify the different minerals and rocks based on their physical properties and geological genesis

4. Map the various geological structures present in the subsurface and their importance in the study of natural hazards like earthquakes etc...

5. Apply the different investigation techniques from initial stage to final stage for the selection of proper project site.

6. Do the interpretation of available data to determine the favorable geological considerations (i.e., Lithological structural and ground water) in the study area for the construction of different civil engineering projects dams etc...

Course Title:Hydraulic &Hydraulic Machinery   Course Code: CE 2410

1. Knowledge is useful for the design of open channels for most economical sections like rectangular, trapezoidal and circular sections. This is also useful for the estimation of hydraulic jump accordingly design the energy disputers for giving protection to the hydraulic structures.

2. The Knowledge of dimensionless numbers this is useful for the classification of flows and helps difference between model and actual structure.

3. The Knowledge about jet forces on different plates is used for estimation of efficiency and work done of different type's blades.

4. Knowledge is useful for the selection of type of turbine required with reference to available head of water and also used for Identification of type of turbine with estimated specific speed.

5. This study is also used for the estimation of efficiency and performance of the turbine with the study of characteristics curves.

6. This study is also used for the estimation of efficiency of different pumps and performance of the pumps with the study of characteristics curves.

7. Study is used for the design and planning of Hydro electric Power plant with the available water resources and requirement of power.

Course Title: Managerial Economics and Financial Analysis   Course Code: HS 2404L:
At the end of the course the learners will be able to
1. Explain the application of Managerial Economics in various aspects of decision making.
    1. 2. List determinant factors of Elasticity of Demand and carry out Demand Forecasting.
    2. Discuss the production functions and outline concepts of cost functions.
    3. Outline classification of markets and Contrast price determination in various market situations.
    4. Understand the things that are important to them in order to start the business organization.

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5. Understand the key elements of the capital budgeting and evaluating investment proposals.
6. List the basic requirements and formats of financial statements.
7. Appreciate analysis and interpretation of Financial Statement through ratios.

Course Title: STRUCTURAL ANALYSIS-I   Course Code: CE
At the end of course student will be able to
1. Apply suitable method for calculating defelctions in simply supported beam and cantilever beams, familiarise with the relative merits and demerits of Double Integration, Mecaulay's mehod, Moment area and Conjugate beam method.
2. Determine the reactions at supports in a propped cantilever/fixed beam with number of point loads, uniformly varying load, couple and combination of loads /settlements of supports / rotation supports and plotting SFD and BMD.
3. Analyse continuous beam with constant or varying moment of inertia, with one or both ends fixed/ overhang, with and without sinking of supports and plotting SFD and BMD
4. Determine the strain energy due to axial load, shear force, and bending moment and apply the strain energy method for finding the deflections in a simply supported beams, and pin jointed trusses using Castigliano's theorem-I.
5. Determine static and kinematic indeterminacy in continuous beams and trusses and apply the Castigliano's theorem-II for finding the deflection in a simple indeterminate truss.
6. Analyse design forces at any section in a simply supported beam/simple trusses for various moving load combinations such as single, multiple point loads, U.D.l and their combinations.
7. Determine the design forces in a simply supported beam for load combinations such as single, multiple point loads, U.D.l and their combination.

Lab: Concrete Technology   Course Code: CE 2212
At the end of course student will be able to
1. Infer the test results as per relevant I.S. provisions and check the suitability of materials for construction.
2. Understand the theoretical concepts learned in the course concrete technology.
3. Design the mix, make the specimens and test the same for the strength and in comparison with design strength.
4. Able to get the thorough knowledge on the Various Non destructive methodologies in comparison with the conventional methods.

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5. Acquires the skill of testing & interpretation of tests results and make necessary modifications to the Ingredients and Mix Proportion to achieve the high quality finished hardened concrete.

1. Lab:Fluid Mechanics and Hydraulic Machinery   Course Code: CE 2213

1. Students can able to explain about units, dimensions and fluid statics and its applications.
2. They can able to explain the fluid flow phenomena, types of fluid and its flow types.
3. They can able to derive the continuity equation, momentum balance equation and also solve problems.
4. They can able to derive the mechanical energy balance equation with friction and without friction.
5. They can able to explain and derive compressible fluid flow and flow processes.
6. Students can capable to design turbines with the available heads.
7. Student can able to identify the type of turbine with known specific speed.
8. Student can able identify and design the pumps with known specific speed and manometric head.

Course Title: ELEMENTS OF REINFORCED CONCRETE DESIGN Course Code: CE3414 L

At the end of the course student will e able to
1. **Design** a singly reinforced concrete beam of rectangular cross section by using Working Stress Design philosophy.
2. **Apply** IS: 456-2000, codal requirements of limit state philosophy related to shear bond, torsion and
3. **Design** singly, doubly reinforced beams of rectangular, T and L cross sections.
4. **Design** long and short rectangular and circular columns subjected to axial load, uniaxial and biaxial moments as per IS: 456-2000
5. **Design** the isolated rectangular and combined footing subjected to axial load, axial load and moment as per IS: 456-2000
6. **Design** one way and two way slabs as per IS: 456-2000
7. **Compute** the deflections under serviceability criteria as per IS: 456-2000

Course Title: HYDROLOGY AND IRRIGATION ENGINEERING Course Code: CE3415

At the end of the course students will be able to
1. Identify components of hydraulic structures
2. Estimate direct run off from total rain fall, ground water recharges potential, base flow and flood discharge in the catchment area.
3. Construct Hydrograph at a particular location on the stream.

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4. Calculate the inflow quantity in to the confined and unconfined wells and seepage characteristics of the ground.
5. Calculate duty and delta, depth and frequency of irrigation to improve the irrigation efficiency and design of irrigation canals suitable for different type of soils.

Course Title: METHODS OF STRUCTURAL ANALYSIS   Course Code: CE3416

At the end of the course student will be able to
1. Analyze three /two hinged arches and obtain internal forces at any cross section.
2. Determine design forces in arches subjected to concentrated, distributed and varying loads.
3. Determine the forces in indeterminate frames subjected to lateral loads by using approximate methods of analysis.
4. Solve statically indeterminate beams and frames using classical methods.
5. Evaluate the suitability of classical methods for a given structure and loading.
6. Utilize modern structural analysis software

Course Title: TRANSPORTATION ENGINEERING Course Code: CE3417

At the end of the course the Students will be able to:

1. Understand to fix ideal alignment and design of highway
2. Identify traffic problems and give measures to regulate the traffic
3. Build knowledge on highway materials quality, construction and maintenance
4. Adapt railway engineering terminology, basics and build knowledge on track geometric design

Course Title: BUILDING TECHNOLOGY (Elective-I) Course Code: CE3418

At the end of the course the learners will be able to
1. Know the various building bye-Laws laid by town planning authorities and local regulatory bodies for planning various buildings like residential, educational, office buildings and hospital buildings.
2. Know about the techniques for project planning and management.
3. Understand the building drawing standards in various phases of a project.
4. Understand the detailing in building construction.

Course Title: FINITE ELEMENT METHODS IN CIVIL ENGINEERING (Elective-I)
Course Code: CE3419

At the end of the course the learners will be able to
1. Idealize given structure with mathematical modeling and boundary conditions.

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2. Model the given structure with suitable elements.
3. Conceptualize the Finite Element Analysis (FEA) procedure.
4. Apply FEA procedure to 1-dimensional structures bars, trusses, plane stress and plane strain conditions using triangular and rectangular elements.
5. Evaluating the suitability of type of element and methods of discretization.
6. Set up and solve 1-D, 2-D, and 3-D structural problems using contemporary finite element software.
7. Interpret results obtained from FEA software solutions, not only in terms of conclusions but also awareness of limitations.

Course Title: GEOMATICS (Elective-I)   Course Code: CE3420
At the end of the course, the student is able to:
a) Understand the basic concepts of spatial data acquisition procedures
1. Assess the quality of acquired spatial data in a quantitative way
2. Make informed and critical judgments on technical issues relating to the acquisition, storage, management, analysis and display of spatial data.
3. Understand the complexity of spatial data and their relationships with non-spatial information;
4. Appreciate and understand the spatial data and spatial analysis requirements of a remote sensing and/or GIS project;
5. Perform spatial analysis techniques on a varied range of applications in civil engineering

Course Title: BUILDING PLANNING AND AUTOCAD LAB   Course Code: CE3221
At the end of the course student will be able to
1. Create, display, and plot working drawings.
2. Use layering techniques.
3. Construct technical drawings using a standard computer aided drafting program.
4. Identify, operate and adjust input and output devices.
5. Demonstrate file management techniques.

Course Title: TRANSPORTATION ENGINEERING LAB   Course Code: CE3222
At the end of course student will be able to
1. Know the behavior of Road Aggregates
2. Know the behavior of Bituminous materials
3. Know the Traffic volume counts

Department of Civil Engineering B.Tech- 6th Semester
Course Title: ENVIRONMENTAL ENGINEERING   Course Code: CE3423
At the end of the course the learners will be able to

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1. List the factors affecting water supply and wastewater generation
2. Understand the various types of water and wastewater characteristics
3. Design water and wastewater systems
4. Analyze available disposal options and their practical implications

Course Title: FUNDAMENTALS OF SOIL MECHANICS   **Course Code: CE3424**

At the end of the course student will be able to
1. Understand soil as a building material and load bearing member.
2. Understand different procedures for classifying soils.
3. Asses the influence of soil water relationship and analyze engineering behaviour of soils under different load/ drainage conditions
4. Analyze the influence of field conditions on strength and consolidation properties of soils.

Course Title: HYDRAULIC STRUCTURES   **Course Code: CE3425**

At the end of the course students will be able to
1. Design the different water retaining structures.
2. Analyze the parameters needed in the design of weirs/barrages in permeable soils.
3. Analyze and design the Gravity dams and Earth dams with available foundation strata.
4. Design the canal regulation structures and cross drainage structure
5. Understand the design principles of canal fall and Spillway and able to design various components.

Course Title: AIR AND NOISE POLLUTION CONTROL (Elective-II)Course Code: CE3426

At the end of the course the learners will be able to
1. learn the concepts of air pollution and its associated problems on a global scale
2. learn the influence of meteorological aspects on air pollution and its dispersion
3. design the different components of particulate and gaseous control equipment
4. understand problems of noise pollution
5. learn the basics of noise pollution and its control measures

Course Title: PAVEMENT ANALYSIS AND DESIGN (Elective-II)   Course Code: CE3427

At the end of the course the learners will be able to
1. Build knowledge on the various factors affecting in pavement design
2. Design flexible pavement considering sub grade condition and axle loads
3. Design rigid pavement considering sub grade condition and axle loads

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4. Discover pavement failures and their remedies

Course Title: SOLID WASTE AND ENVIRONMENTAL MANAGEMENT (Elective-II)
Course Code: CE3428

At the end of the course students are able to:

1. Understand the implications of the production, resource management and environmental impact of solid waste management;
2. Assimilate the significance of recycling, reuse and reclamation of solid wastes;
3. be familiar with relationships between inappropriate waste management practices and impacts on water, soil and sediment quality;
4. Appreciate the current practices available and implement the systems available in solid waste management;
5. be capable of carrying out an assessment of the relationships between environmental guidelines, human activities and environmental quality of impacted soils and water;
6. Integrate technical solid waste management options and imposed environmental legislation and guidance to develop legal and safe solutions.

Course Title: DISASTER MANAGEMENT (Open Elective) Course Code: CE3429

At the end of the course the learners will be able to:

1. Work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
2. Manage the Public Health aspects of the disasters.
3. Obtain, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.
4. Design and perform research on the different aspects of the emergencies and disaster events while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.
5. Analyze and evaluate research work on the field of emergencies and disaster while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.

Course Title: GEOMATICS LAB   Course Code: CE3230

At the end of course student will be able to

1. Identify the various rocks and minerals based on the physical properties
2. Interpret different geological maps

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3. Solve the various strike and dip problems
4. Work independently on various spatial technologies
5. **Understand** state of the art technologies in Geomatics

Course Title: SOIL MECHANICS LAB   Course Code: CE3231
1. Identify tools, equipment required and familiarity with experimental procedures for determining index and engineering properties of soils
2. Perform field tests for soil investigations.
3. Apply field conditions for computing and analyzing the experimental data.
4. Infer the results and compare.

Department of Civil Engineering   B.Tech- 7th Semester

Course Title: FOUNDATION ENGINEERING   Course Code: CE4432

At the end of the course student will be able to
1. Learn various types and methods of undisturbed and disturbed soil sampling.
2. Perform computations for stability of earthen structures.
3. Use the various properties of soils to design the shallow foundations for different loading conditions.
4. Extend the theory of foundation design for special foundation types namely deep foundations.

Course Title: DESIGN OF REINFORCED CONCRETE STRUCTURES (Elective-IV)
Course Code: CE4433

At the end of the course student will be able to
1. **Design** the cross section and evaluate the amount of reinforcement required in the continuous beam as per IS: 456 codal recommendations for all practical loadings.
2. **Design** the amount of reinforcement required in the continuous slab and stair case as per IS: 456 codal recommendations for all practical loadings.
3. Perform analysis and design of prestressed concrete members and connections
4. Identify and interpret the appropriate relevant industry design codes.
5. Relate with professional and contemporary issues in the design and fabrication of prestressed concrete members.
6. Perform an industry relevant design project in a team setting.

Course Title: EARTHQUAKE RESISTANT DESIGN (Elective – IV)   Course Code: CE4434

On successful completion of this course, it is expected that students should be able to;
1. Analyze the free and forced vibration response of single-degree and multi-degree of freedom and continuous systems.
2. Distinguish between earthquake magnitude and earthquake

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damage (intensity),

3. Understand why earthquakes occur, how they are measured and categorized and the effect they may have on engineering structures. Predict the Dynamic Behavior of simple structural systems,
4. Develop an understanding of structural dynamics of simple systems subject to harmonic, impulse and/or arbitrary loading,
5. Employ the Response Spectrum Analysis Method for Earthquake resistant R/C Buildings,
6. Apply the Basic Principles of Conceptual Design for Earthquake resistant R/C Buildings. Understand the concepts and implementation of IS codes in relation to earthquake design.

Course Title: GROUND WATER HYDROLOGY (Elective-IV)   Course Code: CE4435

At the end of the course, students will be able to

1. Understand the occurrence and movement of ground water in the earth's subsurface.
2. Apply principles of fluid mechanics to understand well behavior in different conditions
3. Identify suitable surface and subsurface investigation techniques for the exploration of ground water
4. Understand the concept of artificial recharge of ground water
5. Apply the different principles to know the interface between saline water and fresh water
6. Understand the various mathematical modeling techniques and management of ground water resources

Course Title: RETROFITING AND REHABILITATION OF STRUCTURES (Elective-IV)

                                                    Course Code: CE4436

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

1. Identify the probable reasons for the deterioration of various structural members
2. Able to assess the severity of damage in the structural members
3. Choose materials and appropriate technologies for repair.
4. Identify the appropriate method for strengthening of existing members.
5. Plan for the monitoring of the new buildings by using sensor technology.

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Course Title: ENVIRONMENTAL HYDRAULICS AND ADVANCED WASTEWATER TREATMENT   (Elective-V)   Course Code: CE4437

At the end of the course students are able to:

1. Comprehends the importance of treatment of Liquid waste from various industries.
2. Identifies liquid waste and characteristics at difference stages in various types of industries.
3. Learn about the manufacturing process of various products in industries and how the waste is treated in various industries.
4. Identifies the design requirements of distribution systems
5. Identifies the suitability of sewerage system for a given site conditions.

Course Title: PRESTRESSED CONCRETE DESIGN Course Code: CE4438

At the end of the course students are able to:

1. Describe the basic properties of prestressed concrete constituents.
2. Analyse the flexural behaviour of simple beams
3. Calculate prestress losses for simple prestressed concrete girders.
4. Design prestressed concrete girders for flexure using current design procedures
5. Recognize the effects of transfer and development length on flexural and shear strengths.
6. Construct moment-curvature and load-deflection curves for a prestressed concrete beam.
7. Analyse and design prestressed concrete members for shear.

Course Title: SOIL DYNAMICS AND MACHINE FOUNDATIONS (Elective-V) Course Code: CE4439

At the end of the course students are able to:

1. Students able to understand the basics of soil dynamics.
2. Student will demonstrate the ability to design machine foundations.

Course Title: TRAFFIC ENGINEERING (Elective-V)   Course Code: CE4440

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

1. identify traffic stream characteristics and studies
2. Build knowledge on traffic capacity and level of service
3. Discover parking problems and measures to accidents
4. Design traffic signal cycle and learn the measures for the traffic-environment problems

Course Title: ENVIRONMENTAL ENGINEERING LAB   Course Code: CE4241

At the end of course student will be able to

1. know how to perform relevant tests in the laboratory to

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determine the major characteristics of water and wastewater
2. Get hands on experience in operating the various equipment/methods available for examining water and wastewater
3. understand the practical significance of the characteristics, the relevant codes of practice for examination and permissible limits for the characteristics of water and wastewater

Course Title: STRUCTURAL MODELING & DESIGN LAB   Course Code: CE4242
At the end of the course the student will be able to
1. Validate the results of analysis and design of portal frame
2. Analyze and Interpret of results of analysis of Steel trusses used in practice
3. Model, analyze and design the components of multi storied RCC framed structure
4. Interpret and cross check the reinforcement provided in the construction sites of buildings.
5. Interpret and cross check the reinforcement provided in the construction sites of retaining walls and water tanks.

Department of Civil Engineering B.Tech- 8th Semester

Course Title: CONSTRUCTION COSTING AND MANAGEMENT   Course Code: CE4443
At the end of the course the learners will be able to

1. Identify, analyze and solve the complex problems that deal with estimation of buildings and pavements.
2. Perform cost analysis of Civil Engineering projects.
3. Establish relationship between cost and quality of the construction process.
4. Manage and administer construction contracts.
5. Estimate the value of existing infrastructure.

Course Title: DESIGN OF STEEL STRUCTURES   Course Code: CE4444
At the end of the course the learners will be able to
1. Apply the basic requirements of the IS design specifications.
2. Apply the concepts of strain compatibility and equilibrium concepts to determine the strength of members made of steel
3. Design for welded connections between steel members
4. Design simple steel members subjected compression, tension bending and their combinations

Course Title: AIRPORT AND HARBOUR ENGINEERING (Elective-IV OR V OR VI) Course Code: CE4445
At the end of the course the learners will be able to

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1. Model the airport layout with all features
2. Design runway based on terrain
3. Model the docks and harbors layout
4. Design structures and non-structures and their maintenance in docks and harbors

Course Title: DESIGN AND DRAWING OF IRRIGATION STRUCTURES
At the end of the course the learners will be able to

1. Identify design components of various irrigation structures
2. Create the drawings of various irrigation structures.
3. Illustrate the component parts of Hydraulic structures
4. Summarize the requirements of irrigation design engineers in large and small consulting firms, and at all levels of government and Private sectors

Course Title: GROUND IMPROVEMENT TECHNIQUES (Elective-IV OR V OR VI)
Course Code: CE4447
At the end of the course the learners will be able to

1. Interpret the concepts behind a range of ground improvement and soil remediation techniques.
2. Find out the advantages, disadvantages, limitations for each ground improvement method discussed.
3. Choose appropriate techniques for a range of ground and site conditions.
4. Identify criteria to determine the applicability of each ground improvement method for a specific project and soil condition under consideration.

Course Title: PAVEMENT MANAGEMENT SYSTEMS   (Elective-IV OR V OR VI)
Course Code: CE4448
At the end of the course the learners will be able to:

1. Obtain a basic Knowledge of the fundamental issues in pavement management system.
2. Gain Knowledge on structural and functional evaluation of pavements.
3. Learn types of distress and surveys done on the pavement
4. Build Knowledge on alternatives in pavement distress management

Department of Electrical & Electronics Engineering B.Tech (EEE) - 3rd semester

(Applicable for 2012 and 2013 admitted batches)

Course Title: CIRCUIT THEROY   Subject code: EEE 2402
After the completion of the course, students are able to

1. Investigate the methods to improve power factor in power system networks.

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2. Design resonant circuits which are used in wireless transmission and communication networks.
3. Understand 3-phase ac circuits for designing and analysis of power system networks.
4. Understand network theorems to simplify the complex networks.
5. Understand transient analysis in electrical circuits and to analyze the power system stability.
6. Evaluate the parameters of two port networks to analyze the performance of transmission lines.
7. Gain the knowledge to solve transmission line networks and apply in designing the transmission lines

Course Title: DC MACHINES Course Code: EEE 2403
After the completion of the course, Students are able to
1. Understand the principle of operation, constructional details of DC machines.
2. Analyze armature reaction which helps in investigating the performance of DC machines.
3. Identify the DC Machine to meet various load requirements by analyzing Load characteristics of shunt, series and Compound machines.
4. Analyze the speed control of D.C. motors by understanding the concepts of back e.m.f., torque developed.
5. Understand the necessity of starters for safe starting of dc motors.
6. Evaluate the performance of DC machine by calculating Losses and Efficiency.
7. Design experimental procedure for testing of DC machines.

Course Title: ELECTRO MAGNETIC FIELD THEORY Subject code: EEE 2404
Upon completion of this course the students are able to:
1. Realize the behaviors of static charge, charge configurations in high voltage engineering.
2. Analyze the electromagnetic field of electrical systems.
3. Apply the field concepts to find the performance of electromagnetic system.
4. Identify the suitable material in order to achieve improved characteristic and performance of an electromagnetic system.
5. Determine the performance characteristics/equations for motor and generator operations.
6. Design different types of capacitors like parallel plate, spherical and co-axial for alternating electric fields.

Course Title: ELECTRONIC DEVICES AND CIRCUITS Course Code: ECE 2401
After undergoing the course, students will be able to
1. Understand the formation and properties of semiconductor materials which forms the basis for the formation of PN diode, zener diode etc
2. Study the behavior of PN diodes, and its applications like rectifier, switch, clippers etc

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3. Understand the construction and operation of transistor and its usage in applications like amplifiers etc
4. Know the need for biasing of transistor for the design of amplifier
5. Understand the construction and operation of FET and MOSFET and its application on communication systems
6. Study the construction, operation and applications of special diodes-Tunnel diode - Varactor diode- LED- Photo diode – UJT- SCR.
7. Design half wave and Full wave rectifiers
8. Design of regulated power supply.

Course Title: BASIC PRIME MOVERS AND PUMPS   Course Code: ME 2416

After the completion of the course, students are able to
1. Understand the concepts of hydrodynamic force of jets on stationary and moving flat inclined and curved vanes.
2. Apply the concepts of momentum equation for finding the forces acting on the vanes of the turbines.
3. Understand the carnot, otto, Diesel, Rankine, Joule Cycles.
4. Apply the otto, Diesel cycles for finding the performance of S.I and C.I engines.
5. Understand the working principle of steam turbines and gas turbines.
6. Evaluate the performance characteristics of steam and gas turbines.
7. Understand the working principle of centrifugal and reciprocating pumps.
8. Evaluate the performance characteristics of centrifugal and reciprocating pumps.

Course Title: ELECTRONIC DEVICES AND CIRCUITS LAB   Course code: ECE 2204
After undergoing this lab course, students will be able to:
1. Students will get the basic concepts of passive components and their configurations and about how to use electronic equipments such as function generator, CRO, regulated power supply etc.
2. Understand applications of a diode and its characteristics and also various parameters such as ripple factor, percentage regulation are calculated for analysis.
3. Understand the behavior of transistor in CB,CE configurations and design of CE self bias circuit
4. The students will be able to know the rectifiers, filters, so that they can design D.C. Regulated power supplies of required voltage and current rating.
5. Emphasis is on the design concepts and the general practical problems encountered. Design concepts are complemented with relevant theory and mathematics. Students will be able to design and fabricate amplifiers

Course Title: Basic Prime Movers and Pumps Lab Course Code: ME 2217 L
After the completion of the course, students are able to
1. To understand the theoretical concepts by doing experiments.

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2. to perform the verification Bernoulli's theorem, finding co-efficient of discharge for the venturimeter, orifice meter and rotameter
3. Finding head loss due to friction in pipes based on Dracy weisbach equation.
4. Analyses the performance characteristics curves of different turbines and centrifugal pump.

Course Title: COMPLEX ANALYSIS   Course Code: MATH 2403

After undergoing the course, Students will be able to understand

1. Apply Knowledge of Linear equations by different methods in image processing problems using matrices
2. Solve problems on eigen values and eigen vectors which are related to pattern recognition and classification in image processing.
3. Solve problems on complex differentiation and integration related to antennas design, microwave engineering, stochastic processes.
4. Compare the real and complex functions and apply the techniques in complex function problems in transmission lines, control systems, signal processing and electromagnetic field theory.
5. Solve problems on complex power series in signal analysis.
6. Solve problems on Singular point concepts useful in control systems, signals and systems.
7. Solve problems on Laurent series - Residue theorem which is applicable in signal processing and communications.
8. Solve problems on Conformal mapping which are useful in image enhancements, image morphing, image slicing etc. in image processing.
9. Solve problems on bilinear transformation which is useful to convert analog transfer functions into digital transfer functions for digital system design in digital signal processing.
10. Able to transform s- domain transfer function into Z- domain transfer function for statistical signal processing, Bio medical signal processing.

Course Title: LINEAR SYSTEM ANALYSIS   Subject code: EEE 2405

After the completion of the course, students are able to

1. Interpret system functions through various time domain and frequency domain analysis.
2. Analyze the concepts of Sampling theorem and Reconstruction of signal.
3. Evaluate different transformation techniques to convert continuous to discrete time system.
4. Emphasize on Fourier spectrum of signal and its application in signal processing.

Course Title: POWER GENERATION & DISTRIBUTION   Course Code: EEE 2406

After the completion of the course, students are able to

Understand the operation of thermal, gas, nuclear power generation.

1. Understand safety issues in nuclear power generation.

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2.   Design parameters of DC and AC power distribution systems.
3.   Analyze different types of equipment used in substation.
4.   Design layout of substation.
5.   Understand the need of Gas Insulated Substations.
6.   Evaluate running , fixed costs of power generation
7.   Design proper methodology for power tariff.

Course Title: TRANSFORMERS AND INDUCTION MACHINES   Subject code: EEE 2407
Upon completion of this course the students are able to:

1.   Apply the three phase induction motor and transformer in the industrial needs like electrical drives and agricultural pumps etc.
2.   Understand parallel operation of transformer to improve the load sharing capabilities and reliability.
3.   Identify three phase transformers and auto transformers used in substations, industries etc.
4.   Analyze equivalent circuits of three phase transformers for power systems analysis.
5.   Investigate different speed control methods of three phase induction motors essential for industrial drives.
6.   Understand the different testing methods for evaluating the efficiency of the transformers and induction motors.

Course Title: DIGITAL ELECTRONICS AND MICROPROCESSORS   Course Code: ECE 2413
After undergoing the course students will be able to:

1.   Differentiate between analog and digital representations.
2.   Convert a number from one number system to its equivalent in of the other Number system.
3.   Understand the difference between BCD and straight binary.
4.   Implement logic circuits using basic AND, OR and NOT gates.
5.   Use De-Morgan's theorem to simplify logic expressions.
6.   Describe the concept of active LOW and active HIGH logic signals.
7.   Use Boolean algebra and K-map as tool to simplify and design logic circuits.
8.   Construct and analyze the operation of flip-flop and troubleshoot various types of flip-flop circuits.
9.   Design the high speed communication circuits using serial bus connection.
10.   Introduce the design of basic I/O hardware and microprocessor interfacing: memory chip
11.   selection, memory expansion, I/O interfacing, different I/O techniques: polling, interrupts,

Course Title: DC Machines Lab   Subject code: EEE 2208
After the completion of the course, students are able to

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1. Apply the practical methods to find the performance of various types of DC machines.
2. Identify a suitable method to find out performance characteristics of a DC machine.
3. Investigate a suitable DC machine based on its performance characteristics.
4. Design the circuits for safe operation of DC Machines.
5. Apply the speed control techniques of DC motors.

Course Title: Electric Circuits & Simulation Lab   Subject code: EEE 2209
Upon completion of this course the students are expected to:
1. Analyze various theorems for linear DC and AC electrical circuits.
2. Evaluate two port network parameters for various electrical circuits.
3. Analyze the transient and steady state behavior of a circuit using MATLAB / PSPICE software.
4. Understand the performance of an ac circuit during resonance conditions.
5. Design the time constants of an electrical circuit for satisfactory performance during transient.

B.Tech- 5th Semester

Course Title: Electrical Measurements & Instrumentation Course code: EEE 3417

   Upon completion of the course, students are able to
1. Outline the basic working principles of various metering instruments
2. Recognize and identify electrical instruments and justify their operating conditions.
3. Compare different metering techniques based on their performance and justify their usage
4. Judge a suitable instrument to obtain accurate readings.
5. Demonstrate the design considerations

Course Title: Electrical Power Transmission Course code: EEE 3418
   Upon completion of this course the students are able to:
1. Calculate the different parameters like   Resistance   ,Inductance Capacitance for different transmission lines
2. Analyze the effect of proximity corona and shunt compensation on the performance of Transmission line
3. Differentiate Transmission lines based on the distance and analyze their performance
4. Select suitable towers insulators and their placement in a transmission line erection
5. Determine and select the different sizes of cables for power transmission.
6. Distinguish types of system transients and termination of lines with different conditions

Course Title: Power Electronics   Course code: EEE 3419

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Upon completion of this course the students are able to:
1. Develop control method for Power Electronic switches.
2. Identify suitable converter based on source and load requirements.
3. Analyze the performance of converters for various loads
4. Propose control technique for a power converter with realistic constraints

Course Title: Synchronous and Special Machines Course code: EEE 3420

Upon completion of this course the students are able to:
1. Suggest appropriate single phase induction motor for commercial needs.
2. Comprehend operational characteristics and regulation methods of synchronous machine.
3. Evaluate load performance or synchronization of a synchronous machine connected to an infinite bus
4. Make use of starting methods of synchronous motors and the circle diagrams to analyses their performances.
5. Suggest a special electrical machine for commercial and industrial needs.

Course Title: Computer Networks   Course Code: IT 3410

At the end of the course students are able to:
1. Suggest appropriate network model for data communication.
2. Know how reliable data communication is achieved through data link layer.
3. Propose appropriate routing algorithm for data routing.
4. Connect internet to the system and knowledge of trouble shooting.

Course Title: Database Management Systems   Course Code: IT 2405
At the end of the course students will be able to:
1. Identify and define the data models needed to design a database
2. Create conceptual and logical database design for Large enterprises
3. Apply Integrity constrains over the relations
4. Apply normalization process on existing database for eliminating redundancy
5. Apply the recovery techniques for managing the database effectively to avoid the data lose

Course Title: Software Engineering   Course Code: CSE 3409

At the end of the course students are able to
1. Design and develop real-time software projects with effective cost estimation and plan
2. Make feasibility study of a project
3. Specify the design and architectural style of the software products
4. Propose testing strategy for a given software

Course Title: AC Machines & Transformers lab   Course code: EEE 3221

Upon completion of this course the students are able to:
1. Evaluate various methods of finding voltage regulation in alternators at different load power factors for finding their performance.
2. Investigate the efficiencies of single phase transformer and induction motors through various tests.

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3. Analyze the performance of synchronous motors through V and inverted V curves.
4. Synthesize three phase system from two phase system and vice versa using Scott connection of transformers.
5. Analyze the temperature rise in a transformer and validate the efficiency of cooling method

B.Tech- 6th Semester

Course Title: Control Systems   ourse code: EEE 3416

Upon completion of this course the students are able to:

1. Develop transfer function and state space models of control systems in continuous time.
2. Describe and simplify a control system using block diagram and signal flow graph techniques.
3. Analyze the transient and steady state performances of control systems.
4. Investigate the stability of a system using time domain and frequency domain techniques.
5. Design different compensators and controllers in time/frequency domain.
6. Examine the controllability and observability of control systems

Course Title: Electrical Drives   Course code: EEE 3422

Upon completion of this course the students are able to:

1. Analyze speed control and braking methods of electrical drives for different applications
2. Propose various control techniques of electrical drives for industrial applications
3. Design power electronic circuits to control the electrical drives.
4. Summarize the performance characteristics of converter fed DC motors to justify their applications.
5. Apply the knowledge of control theory to induction and synchronous motor drives

Course Title: Switch Gear & Protective Devices   ourse code: EEE 3423

Upon completion of this course the students are able to:

1. Apply the electromechanical energy conversion principles for the protection of power system equipments through relay and breakers
2. To explain working of different types of relays and circuit breakers in a power system
3. Propose suitable protection schemes for different electrical equipment against different faults
4. Analyze the different grounding techniques at different locations in a power system
5. Evaluate the influence of over voltages and over currents in a power system

Course Title: Electrical Machine Design   Course code: EEE 3424

Upon completion of this course the students are able to:

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  Engineering (ME) & Information Technology (IT)

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1. Acquire general idea on topics like mechanical, manufacturing and future challenges for machine design.
2. Design of different types of electric machines
3. Design electric machines with reduced loss
4. Calculate the losses and efficiency in the machine.
5. Pursue computer aided machine design.

Course Title: Flexible AC Transmission Systems   ourse code: EEE 3425
Upon completion of this course the students are able to:
1. Apply knowledge of FACTS Controllers.
2. Design of different compensators in power system network with constraints.
3. Identify, formulate and solve real network problems with FACTS controllers
4. Evaluate various controllers for the given power system network.

Course Title: Utilization of Electrical Energy   ourse code: EEE 3426
Upon completion of the course students are able to:
1. Select appropriate electric drive for load characteristics.
2. Design electric heating and welding equipment for industrial applications.
3. Analyze different schemes of speed control and braking in traction system.
4. Design different lighting schemes for different application.

Course Title: Renewable Energy Systems (Open Elective) Course code: EEE 3427
At the end of the semester the student will
1. Apply the principles of various energy systems in day to day life.
2. Recognize the new ways of harnessing Renewable Energy Sources.
3. Analyze the industrial needs and convert theoretical model to practical circuits with wide range of specifications.
4. Judge the importance of the renewable resources of energy as the fossil fuels are depleting in the world very fast.
5. Express the clean and green energy for next generation.

Course Title: Digital Electronics & Microprocessors Lab Course code: ECE 3229
After undergoing the course, students will be able to:
1. Implement logic circuits using basic AND, OR, NOT and universal gates.
2. Construct and analyze the operation of flip-flop circuits.
3. Design various types of sequential circuits like registers, counters
4. Control the stepper motor , traffic lights using 8086
5. Generate different waveforms like saw tooth, triangular, square wave etc

Course Title: Power Electronics lab   Course code: EEE 3228
1. Upon completion of this course the students are able to:
2. Choose power electronic switches based on their characteristics.
3. Evaluate the performance of various firing circuits of SCR.
4. Design the commutation circuits depending on the converter.
5. Design of various converters for real-time applications.

B.Tech- 7th Semester

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Course Title: Engineering Economics & Project Management Course code: HS 3405

At the end of the course students are able to

1. Understand basic principles of engineering economics
2. Evaluate investment proposals through various capital budgeting methods
3. Apply the knowledge to prepare the simple financial statements of a company for measuring performance of business firm
4. Analyze key issues of organization, management and administration
5. Evaluate project for accurate cost estimates and plan future activities

Course Title: Advanced Control Systems   Course code: EEE 4429

Upon completion of this course the students are able to:

1. Develop state-space models.
2. Examine the controllability and observability of control systems
3. Examine stability analysis, state trajectory behavior evaluation for nonlinear systems.
4. Design state feedback controller and state observer
5. Learn nonlinear systems control design, robust and optimal control systems

Course Title: High Voltage Engineering   Course code: EEE 4430

Upon completion of this course the students are able to:

1. Outline the behavior of gas, solids and liquids when they are used as insulation medium. 2.Elucidate the concepts used for the generation of high voltages and currents and design corresponding circuits
3. List out high voltage testing methods and propose suitable testing instruments.
4. Apply numerical methods in calculating electrical parameters related to High voltage Engineering

Course Title: Power System Analysis   Course code: EEE 4431

Upon completion of this course the students are able to:

1. Model and represent system components (ex. Transformers, lines, generators etc.) for positive, negative and zero sequence networks.
2. Build nodal admittance and impedance matrices for the power system network.
3. Understand and modify existing system and design for future expansion of the system or sub systems for load flow study.
4. Learn about power system behavior under symmetrical and unsymmetrical faults, symmetrical component theory.
5. Understand the basic concepts of steady state and transient stabilities and their

Course Title: Reliability Engineering & Application to Power Systems Course code:

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EEE 4432

Upon completion of this course the students are able to:

1. Know basic terminology and concepts for reliability analysis.
2. Analyze a system using Markov modeling, Life time modeling etc. and techniques for reliability analysis
3. Formulate an optimization problem for maintenance planning and propose solution approach.

Course Title: Digital Control Systems   Course code: EEE 4433

Upon completion of this course the students are able to:

1. Apply z-transforms and block-diagram reduction techniques to discrete time systems.
2. Develop pulse transfer function and state space models of the given discrete time system.
3. Investigate controllability, observability and stability of control systems for pole placement at desired locations.
4. Design different controllers in time/frequency domain to improve the system performance.
5. Design full order and reduced order observers for state estimation.

Course Title: Digital Signal Processing   Course code: ECE 3420

At the end of the course students are able to

1. Analyze the system in Time and Frequency domain through its respective tools
2. Demonstrate knowledge of complex number, Fourier series and ability to design electrical and electronics systems, analyze and interpret data
3. Design the digital filter circuits for generating desired signal wave shapes (non sinusoidal) for different applications like computers, control systems and counting and timing systems
4. Design the digital computer or digital hardware for quantizing amplitudes of signals
5. Design the various processing circuits that are necessary in the hardware or interfacing blocks in systems used in radars, satellite etc

Course Title: Programmable Logic Controllers   Course code: EEE 4434

At the completion of this course, the student will:

1. Learn the major components of a Programmable Logic Controller (PLC)
2. Learn the functions of the CPU, input modules, and output modules in a PLC
3. Describe the function and principles of operation of a Programmable Logic Controller (PLC) in industrial applications.
4. Identify and explain different types of network modules used by PLCs.
5. Detail and state the application of logic gates in PLC systems.

Course Title: Electrical Distribution Systems   Course code: EEE 4435

Upon completion of the course students are able to:

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1. Apply power system fundamentals to the design of a system that meet specific needs
2. Prepare a report describing the design process followed
3. Design a power system solution based on the problem requirements and realistic constraints.
4. Use tools such as AutoCAD, Matlab, spreadsheets, and power system analysis software to Complete their designs.

Course Title: Measurements & Control Systems Lab Course code: EEE 4236

After undergoing this lab course, students will be able to
1. Evaluate the performance of different controllers in a closed loop systems applicable to electrical systems
2. Justify the applications of DC Servo motor from the speed torque characteristics.
3. Analyze the efficiency of AC motors and synchronous motors through closed loop transfer functions.
4. Investigate the performance of DC machines through transfer function analysis.
5. Analyze the quality of the metering instruments and find the reasons behind erroneous operation.
6. Check the performance of different electric machines by doing qualitative analysis on the parameters of that machine.

Course Title: Power Systems lab   Course code: EEE 4237

Upon completion of this course the students are expected to:
1. Analyze various characteristics of relays.
2. Evaluate breakdown strength of Oil.
3. Analyze the characteristics of a Fuse.
4. Evaluate the parameters, performance of a long transmission line.
5. Evaluate the efficiency, regulation of a long transmission line.

B.Tech- 8th Semester

Course Title: HV Transmission   Course code: EEE 4438

Upon completion of this course the students are able to:
1. Outline different types of HVDC links and applications of AC and DC Transmission systems.
2. Summarize the converter control characteristics and Reactive power control in HVDC system.
3. Apply Power Flow Analysis in ac and dc systems using simultaneous and sequential methods.
4. Demonstrate types and design of different filters and reduction of harmonics

Course Title: Power System Operation and Control Course code: EEE 4439

Upon completion of this course the students are able to:
1. Outline the concepts of economic operation in thermal & Hydro-thermal

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Power plants.
2. Develop mathematical model of power system components
3. Analyze the performance of power system for given load variations.
4. Design controllers for obtaining desired outputs of a power plant.

Course Title: Electrical Installation, Design & Estimation Course code: EEE 4440

At the end of the course students are able to
1. Estimation and costing of residential and commercial buildings
2. Learn Distribution systems, its types and substations.
3. Condition monitoring and Testing of various electrical equipments
4. Describe substation readings, planning and cost estimation.
5. Identify tools, appliances, special outlets, motors and motor circuits.

Course Title: Machine Modeling & Steady State Analysis   Course code: EEE 4441

Upon completion of this course the students are able to:
1. Equipped with the basic theories and methods for analyzing typical electric machines in both steady and dynamic states and have the ability to apply them to solve the problems arising from engineering reality.
2. Identify, formulate and solve the problems concerning the contemporary issues of practical electric machines and their systems.
3. Solve and analyze electric machinery models.

Course Title: Power System Dynamics and Control   Course code: EEE 4442

Upon completion of this course the students are able to
1. Analyze a power system by knowing the characteristics of major components.
2. Model power system elements such as generators, transmission lines etc.
3. Categorize different types of power system stability based on disturbances.
4. Suggest suitable method of enhancing stability.
5. Control the power system with different control methods and measures.

Course Title: VLSI Design   Course code: ECE 4432

Upon completion of this course the students are able to:
6. Design the various layouts for digital and analog blocks.
7. Understand the steps involved in IC fabrication
8. Design the various Analog and digital IC building blocks like inverters, current
9. Design the various Analog and digital IC building blocks like inverters, current mirrors, current sources, voltage references and all basic building blocks
10. Get the idea behind back end and front end design issues in IC design

Department of Mechanical Engineering B.Tech (ME) - 3rd Semester
Course Title: Engineering Mechanics   Course Code: CE2402

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

1. Identify the significance of centroid/ center of gravity and find centroids of composite figures and bodies.
2. Understand the moment of inertia and method of finding moment of inertia of areas and bodies.
3. Identify the type of frame and analyze for the forces in the members of the truss (frame) by method of joints and method of sections.
4. Understand dynamics of a particle.
5. Interpret the simple given dynamic problems and solve them for positions, velocities and accelerations, etc.,
6. Understand the kinetics of the rigid bodies and solve simple problems using work-energy method.
7. Understand virtual work method and solve simple problems.

Course Title: Engineering Thermodynamics   Course Code: ME2404
At the end of the course students are able to:
1. Gain the knowledge on open, closed or isolated type of thermodynamic systems in the energy perspective Apply the laws of thermodynamics to the practical problems.
2. Analyze the Isobaric, Isochoric, Isothermal, Adiabatic and polytrophic type of flow and non- flow processes.
3. Apply the laws of thermodynamics to the practical problems.
4. Gain the knowledge in relating the performance among heat pump, heat engine and a refrigerator.
5. Gain the knowledge on the concept of entropy
6. Gain the knowledge in analyzing the mixtures of perfect gases.
7. Measure the entropy, enthalpy, internal energy and quality of the steam.
8. Gain the knowledge in estimating the efficiency of the various engines working on Otto, Diesel, Dual Combustion type of cycles

Course Title: Fluid Mechanics   Course Code: ME2405
After the end of the course, Students are able to:
1. Understand the concepts of fluid properties like specific gravity, viscosity, density, surface tension.
2. Determine the pressure head of a fluid in a pipe by using manometer.
3. Understand the friction losses while flowing through a pipe and also used for the designing of pipeline net work.
4. Understand the minor losses and evaluate the performance of a fluid transport system.
5. This study is used for the hydraulicstrictures.
6. This is study is applied for the design of pipes flows
7. Used for the estimation of flows in pipes, open channels and over head tanks.

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8. This study is used for the estimation of shear stress and velocity gradient for the design ofsubmersed bodies.

Course Title:Material Science AndMetallurgy   Course Code: ME2406
At the end of the course students are able to:
1. To get well equipped with basic understanding of structure of metals
2. To develop an understanding of the constitution of alloys
3. To apply the fundamental concepts of equilibrium diagrams
4. To get well equipped with basic understanding of transformations in solid state
5. To appreciate the fundamental concepts of iron-iron carbide equilibrium diagrams and its vast application in metallurgy
6. To get well equipped with basic understanding of heat treatment of alloys
7. To apply the concepts of non-ferrous metals and alloys in metallurgical areas
8. To get well equipped with basic understanding of ceramic and composite materials

Course Title: Production Technology   Course Code: ME2407
The students will be able to:
1. Make the pattern , mould and casting
2. Do the arc the welding, spot welding and brazing
3. Mould the plastics by injection molding

Course Title: Fluid Mechanics And Metallurgy Lab Course Code: ME2208
At the end of the course, Students are able to:
1. Students are able to perform the verification Bernoulli's theorem.
2. Finding head loss due to friction in pipes based on Dracyweisbach equation.
3. The student would appreciate the construction of an optical metallurgical microscope
4. The student will demonstrate the ability to perform the metallography and to prepare coherent reports of his/her findings.
5. The student will demonstrate the ability to compare the practical findings with the theoretical data
6. The student will be able to discuss orally or in writing ethical issues that relate to the experiments
7. The students will demonstrate the ability to synthesize appropriate concepts and methods from different experiment.

Course Title: Production Technology Lab   Course Code: ME2209
The students will be able to:
1. Make the pattern , mould and casting
2. Do the arc the welding, spot welding and brazing
3. Mould the plastics by injection molding)

Course Title: Applied Thermal Engineering   Course Code: ME2410
At the end of the course students are able to:

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1. Gain the knowledge about Working principle of two stroke and four stroke SI and CI Engines
2. Gain the knowledge about engine associated systems such as lubricating system, cooling system, fuel feed system, ignition system , their necessity, requirements, construction details, different types and their working
3. Gain the knowledge the concept of combustion in Spark ignition engine, Pressure Vs crank angle diagrams, and pre-ignition
4. Gain the knowledge the concept of combustion in Compression ignition engine, Pressure Vs crank angle diagrams, Knocking, Detonation
5. Gain the knowledge about performance calculations in I.C.Engine
6. Gain the knowledge about engine pollution and working of catalytic converter
7. Gain the knowledge about working principle of reciprocating compressors and its efficiencies
8. Gain the knowledge about Mechanical details of axial flow compressors and its efficiencies

Course Title: Hydraulic Machines   Course Code: ME2411

1. Knowledge is useful for the selection of type of turbine required with reference to available head of water and also used for Identification of type of turbine with estimated specific speed.
2. This study is also used for the estimation of efficiency and performance of the turbine with the study of characteristics curves.
3. This study is also used for the estimation of efficiency of different pumps and performance of the pumps with the study of characteristics curves.
4. Study is used for the design and planning of Hydroelectric Power plant with the available water resources and requirement of power.

Course Title: Kinematics Of Machinery   Course Code: ME2412
At the end of the course students are able to :
1. Understand the basic principles of mechanisms in mechanical engineering.
2. Apply the kinematic analysis in subsequent courses in the design and analysis of various machine components.
3. Understand the importance of cams, gears and gear trains in real time practice.
4. Explain the role of friction in industrial drives.

Course Title: Machine Drawing   Course Code: ME2413
At the end of the course students are able to :
1. Helping the student in drafting their technical ideas
2. Creating knowledge about the various practices with regard to the dimensioning, sectioning and development of views.

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3. Understanding the importance of the linking functional and visualization aspects in the preparation of the part drawings
4. Preparation of the part or assembly drawings as per the conventions.
5. Interpretation of machine drawings that in turn help the students in the preparation of the production drawings

Course Title: Mechanics Of Solids   Course Code: ME2414

1. Design and conduct experiments on mechanical testing and also could analyze and interpret data
2. Design a component to meet desired needs.
3. Analyze the state of stress and strain at any point in a member.
4. Identify, formulate, and solve structural engineering problems.
5. Learn modern experimental techniques, concepts and tools in mechanical testing of materials.
6. Understand the effect of shape and size of component on stresses and strains.
7. Apply the basic mechanical principles underlying modern approaches for design of various types of structural members subjected to axial load, torsion, bending, transverse shear and combined loading.
8. Apply computational skills to formulate and solve problems related to the determination of the stresses, strains, and deflections produced by loads.

Course Title: Solid Mechanics Lab   Course Code: CE2207

At the end of course student will be able to
1. Estimate compressive strength of wood/Concrete/Brick materials
2. Check the suitability of wood, steel and concrete in construction works.
3. Find the impact resistance of steel used in construction works.
4. Estimate young's modulus of wood/steel materials

Course Title: Flow Measurement And Hydraulic Machinery Lab   Course Code: ME2215

At the end of the course students are able to :
1. After completion of this lab, the students are in a portion to understand the theoretical concepts by doing experiments.
2. The feedback is particularly meaningful from the faculty members who teach the power generation related course that have increased emphasis is on application of basic principles.
3. Finding co-efficient of discharge for the venturimeter, orifice meter and rotameter.
4. They are able to analyses the performance characteristics curves of different turbinesand centrifugal pump.

Course Title: Basic Elements of Machine Design Course Code: ME 3418

1. Understand the design procedure and selection of material for a specific application
2. Design a component subjected static loads based on strength and stiffness criterion.

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3. Design a component when it is subjected variable loads.
4. Provide alternate design solutions based on requirement.

se Title: Dynamics of Machinery   **se Code:**   **419**

1. Interpret the principle of gyroscope and calculate gyroscopic effect for aeroplanes, ships, two wheelers and four wheelers.
2. Perform static and dynamic force analysis of planar mechanisms.
3. Summarize the working of important machine elements like clutches, brakes, flywheels and governors.
4. Examine balancing of rotating and reciprocating masses.
5. Analyze mechanical systems subjected to longitudinal, transverse and torsional vibrations.

Course Title: Metal Cutting & Metrology   ourse Code: ME 3420
At the end of the course students are able :

1. Understand the cutting ol geometry, mechanism of chip formation and mechanics of orthogonal cutting.
2. Identify basic parts and operations of machine ols including lathe, shaper, planer, drilling, boring, milling and grinding machine.
3. Design locating and clamping devices produce a component.
4. Select a machining operation and corresponding machine ol for a specific application in real time.
5. Select a measuring instrument inspect the dimensional and geometric features of a given component.

Course Title: Steam and Gas Turbines   Course Code: ME 3421
At the end of the course students are able :
1. Understand the concept of Rankine cycle.
2. Understand working of boilers including water tube, fire tube and high pressure boilers and determine efficiencies.
3. Analyze the flow of steam through nozzles
4. Evaluate the performance of condensers and steam turbines
5. Evaluate the performance of gas turbines

Course Title: Instrumentation & Control System (Elective-I) Course Code: ME 3422
At the end of the course students are able :
1. Understand working principles of basic measuring instruments
2. Select a transducer for measurement of primary and derived variables.
3. Analyze the response of a measuring instrument.
4. Analyze and design an instrumentation system.
5. Understand temperature, speed and position control systems.

Course Title: Operations Research (Elective-I)   Course Code: ME 3423

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At the end of the course students are able :

1. Formulate a real time situation in a mathematical model.
   1. Assign a right job a right person using job sequencing.
   2. Make right decisions in operations management using game theory, queuing theory and replacement analysis.
   3. Solve non-linear problems using non-linear programming techniques.
   4. Perform optimum problem solving using dynamic programming and simulation techniques.

Course Title: Unconventional Machining Processes (Elective-I) Course Code: ME 3424
At the end of the course students are able :
   1. Understand the need and applications of modern machining processes.
   2. Understand the working principle of modern machining process.
   3. Select a suitable modern machining process for given applications.
   4. Understand the working principle of advanced forming processes.

Course Title: Machine Tools and Metrology Lab   Course Code: ME 3225

At the end of the course students are able :
   1. Measure the bores by internal micrometers and dial bore indicars.
   2. Measure the angle and taper using Bevel protracr and Sine bar.
   3. Measure screw thread parameters.
   4. Perform step turning, taper turning, thread cutting, drilling and tapping operations on lathe.
   5. Perform operations on shaper, planer and milling machines.
   6. Perform alignment tests for the evaluation of machine ol accuracy.

Course Title: Thermal Engineering Lab   Course Code: ME 3226
At the end of the course students are able :
   1. Evaluate the performance of IC engines.
   2. Perform heat balance analysis of IC engines.
   3. Evaluate the performance of a reciprocating air compressor.
   4. Evaluate the performance of refrigeration and air conditioning systems.
   5. Plot Valve and Port timing diagrams of 4-stroke and 2-stroke engines
   6. Compile and present specifications of two and four wheelers.

B.Tech- 6th Semester

Course Title : Engineering Economics and Project Management Course Code : HS 3405
At the end of the course students are able :
   7. Understand basic principles of engineering economics
   1. Evaluate investment proposals through various capital budgeting methods
   2. Apply the knowledge prepare the simple financial statements of a company for measuring performance of business firm

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3. Analyze key issues of organization, management and administration
4. Evaluate project for accurate cost estimates and plan future activities

Course Title: Design of Machine Members Course Code: ME 3427
At the end of the course students are able :

1. Design journal bearings, ball and roller bearings subjected static and dynamic loads.
2. Analyze curved beams subjected static loads.
3. Design engine parts including connecting rod, crank shaft, pisns and cylinders.
4. Design power transmission systems including power screws, belts, pulleys, spur and helical gears.
5. Design machine tool elements including beds guide ways.

Course Title: Heat Transfer   Course Code: ME 3428

At the end of the course students are able :

1. Understand basic modes of heat transfer and compute temperature distribution in steady state and unsteady state heat conduction
2. Analyze heat transfer through extended surfaces
3. Interpret and analyze free & forced convection heat transfer
4. Comprehend the phenomena and flow regimes of boiling and condensation
5. Understand the principles of radiation heat transfer
6. Apply LMTD and NTU methods design heat exchangers

Course Title: Industrial Robotics (Elective-II)   Course Code: ME 3429

At the end of the course students are able :

1. Understand basic parts and configurations of robotic systems.
2. Analyze robotic systems using forward and inverse kinematics.
3. Analyze robotic systems for dynamic performance using Lagrange –Euler and Newn-Euler formulations.
4. Develop a trajectory plan for a given application.
5. Understand actuators and feedback devices used in robotic systems.

Course Title: Mechatronics (Elective-II) Course Code: ME 3430
At the end of the course students are able :

1. Recognize of different sensors, transducers, signal conditioning techniques
2. Develop a system models like Mechanical, Electrical, Fluid & Thermal systems
3. Formulate Transfer function for different Systems.
4. Understand the working principle of different controllers like Proportional, Derivative, Integral, PI, PD, PID.
5. Develop a PLC programming techniques with Microprocessor, ladder diagram for different logic Gates
6. Demonstrate case studies of Mechatronics systems like pick-and-palace robot.

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Course Title: Refrigeration and Air Conditioning (Elective-II) Course Code: ME 3431

At the end of the course students are able :

1. Understand the principles and applications of refrigeration systems
2. Understand vapor compression refrigeration system and identify methods for performance improvement
3. Study the working principles of steam jet, vapor absorption, thermoelectric and vortex tube systems
4. Analyze air conditioning processes using principles of psychometry.
5. Evaluate cooling and heating load in an air conditioning system
6. Identify ecofriendly refrigerants and use P-H charts evaluate the performance of refrigeration systems

Course Title: Principles of Entrepreneurship (Elective-III) Course Code: ME 3432

At the end of the course students are able :

1. Explain the role of entrepreneur in economic development.
2. Demonstrate methods of generating ideas
3. Develop the business plan start their own enterprises
4. Manage various production aspects such as mmanufacturing costs control, marketing management and waste reduction
5. Make financial plan for enterprise
6. Find the institutional support entrepreneurship

Course Title: Heat Transfer Lab Course Code: ME 3233

At the end of the course students are able :

1. Apply the knowledge of heat transfer perform experiments related conduction heat transfer
2. Evaluate heat transfer coefficient in free and forced convection heat transfer situation
3. Determine fin efficiency and emissivity in respective experiments
4. Observe the phenomena of drop and film wise condensation
5. Evaluate the performance of heat exchangers in parallel & counter flow types

Course Title: Instrumentation and Dynamics Lab   Course Code: ME 3234

At the end of the course students are able :

1. Perform calibration on Pressure gauges, temperature detecrs and LVDT.
2. Study the working and calibrate pho and magnetic pickups and seismic pickups.
3. Determine the critical speed using whirling of shaft.
4. Perform balancing of rotating masses.
5. Determine gyroscopic couple.
6. Analyze cam profile.

B.Tech- 7th Semester

Course Title: Geometric Modeling and Computer Aided Manufacturing Course Code: ME

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At the end of the course students are able :

1. Understand the use of computers in product design and manufacturing and their life cycle.
2. Perform basic 2D and 3D geometric Transformations
3. Interpret and develop models of simple curves, surfaces and solids.
4. Understand NC, DNC, CNC, GT, CAPP and FMS
5. Develop CNC part programs for Milling and Turning operations.

1. Explain CAQC,CIM systems

Course Title: Advanced   IC Engines   ourse Code: ME 4436

At the end of the course the learners will be able

1. Analyze engine cycles and the facrs responsible for making the cycle different from the Ideal cycle
2. Apply principles of thermodynamics, fluid mechanics, and heat transfer influence the   engine"s performance
3. Comprehend the delay period and fuel injection system
4. Understanding of the relationships between the design of the IC engine and environmental and social issues

**Course Title: Design for Manufacturing   Course   Code ME 4437
:**

At the end of the course students are able :

1. Understand modern manufacturing operations, including their capabilities, limitations, and how design various components for lowest cost.
2. Gain insight in how   design   a   criterion   for   material   selection interrelationship with process selection and process selection charts.
3. Acquire how analyze products and be able improve their manufacturability and lower costs.
4. Understand the relationship between cusmer desires, functional requirements, product materials, product design, and manufacturing process selection.
5. Examine a product and determine how it was manufactured and why.
6. Comprehend how and why value stream analysis is used lower manufacturing costs.

Course Title: Fracture Mechanics & Fatigue   Course Code: ME 4438

At the end of the course students are able :

1. Understand the mechanism of fracture in ductile and brittle materials
2. Evaluate critical stress intensity facr.
3. Analyze plastic zone shape and size near the crack tip.
4. Estimate crack tip opening displacement (CD) & J- integral.

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5.   Understand micro mechanisms of fatigue & estimate life of a component

Course Title: Non- Conventional Sources of Energy   Course Code: ME 4439

At the end of the course students are able :

1.   Understand the concept of different forms of alternative sources of renewable energy
2.   Explain the solar energy srage methods
3.   Evaluate the design parameters of wind energy and solar energy
4.   Understand the principles of Biomass energy conversion.
5.   Explain the techniques and methods of Tidal, Geothermal and OTEC.
6.   Illustrate the principles of direct energy conversion methods

Course Title: Finite Element Methods   Course Code: ME 4440

At the end of the course students are able :

1.   Apply the concepts of minimum potential energy principles solve structural mechanics problems.
2.   Demonstrate various concepts like tal potential energy principles, weighted residual methods.
3.   Apply the finite element procedure for stress analysis and design of load carrying structures.
4.   Estimate Eigen values and eigenvecrs find natural frequency and mode shapes for simple dynamic systems.

Course Title: Jet Propulsion and Rocket Engineering   ourse Code: ME 4441

At the end of the course students are able :

1.   Understand the basic principles of gas turbine and jet propulsion.
2.   Illustrate and analyze turboprop, turbojet and ramjet engines.
3.   Understand and evaluate the performance of rocket engines.
4.   Apply the rocket technology recent advances such as cryogenics, plasma arc propulsion etc.

Course Title: Nano Technology   Course Code: ME 4442

At the end of the course the learners will be able

1.   Outline the evolution, hisry, applications and impact of nanotechnology.
2.   Compare and discuss different p-down and botm approaches for the synthesis of nanomaterials.
3.   Explain the principles of different structural and microstructural characterization techniques.
4.   Summarize the mechanical, electrical and optical properties of the nano materials.

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5. Understand the interaction between bio-molecules and nano-particle surface and the concepts of nano-medicine development.

Course Title: Production Planning and Control (Elective-V)   Course Code: ME 4443
At the end of the course students are able :

1. Define and relate the tasks of strategic planning, materials requirements planning, aggregate production planning and scheduling.
2. Develop forecasting models for demand forecasting
3. Solve various invenry management problems
4. Specify optimal global manufacturing process and logistics network based on world market options
5. Implement various scheduling techniques schedule shop floor activities of the industry.
6. Develop aggregate production plans weekly assembly quantities for end items

Course Title: CAD LAB   Course Code: ME 4244

At the end of the course students are able:
1. Draw orthographic and isometric views of simple mechanical components using any drafting software as per the BIS standard.
2. Model and assemble 3D objects in Solid modeling software.
3. Prepare a systematic approach for solving FEM problems
4. Solve, analyze and validate the results using ANSYS.

Course Title: CAM & Mechatronics Lab   Course Code: ME 4245
At the end of the course students are able :

1. Write Manual Part programs using G and M codes and simulate those using CNC lathe and milling programs.
2. Perform machining on CNC machines and fabricate simple machine components on Lathe and milling Machines.
3. Develop simple ladder logic programs and run them on PLCs.
4. Understand the basic components of pneumatic circuit and operate those using PLCs.
5. Learn operating various sensors and transducers using PLCs.
6. Write simple programs for controlling basic elements in aumatic systems by using microcontroller.

B.Tech- 8th Semester
Course Code: Aumobile Engineering   Course Code: ME 4446
At the end of the course students are able :

1. Identify different types of aumobile vehicles and their category, engine construction, turbo charging and supercharging.
2. Choose the different components necessity and their working related transmission system.

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3.   Explain the necessity and working of controlling system like steering, suspension, braking and electrical system,
4.   Identify different causes for troubles faced during the operation and their remedies.
5.   Illustrate the engine safety systems and emission control methods

Course Title: Industrial Engineering and Management Course Code: ME 4447
At the end of the course students are able :
1.   Develop the simplest work methods and establish one best way of doing the work.
2.   Select the site and develop a systematic layout for the smooth flow of work without any interruptions
3.   Understand how improve productivity and profitability by implementing work study and SQC methods.
4.   Select and maintain skilled and sufficient manpower perform various functions.
5.   Implement Project Management techniques estimate expected completion time and optimal cost of the projects

Course Title: Advanced Materials   Course Code: ME 4448

   At the end of the course the learners will be able
1.   Understand the need and explain different types of composite materials.
2.   Summarize the various methods for manufacturing of the composite materials.
3.   Distinguish between the properties and uses of different reinforcement fibres.
4.   Explain the principles, types and applications of different functionally graded materials and shape memory alloys.
5.   Infer the reasons for the variation in the properties of nanomaterials in comparison those of bulk materials.

Course Title: Cellular Manufacturing Systems   Course Code: ME 4449
At the end of the course students are able :
1.   Understand the concept and applications of cellular manufacturing system
2.   Distinguish the coding systems, production flow analysis and component flow analysis.
3.   Apply the essential algorithms and data structures on cellular manufacturing systems.
4.   Analyze the facrs in cell design consideration
5.   Analyze the facrs influencing the effective ness, efficiency and utilization for cellular manufacturing and its implementation issues.

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6. Understand the scheduling and production control activities in Cellular manufacturing and its benefits.

Course Title: **Computational Fluid Dynamics**   **Course Code: ME 4450**

At the end of the course, the students will be able :
1. Understand the basic principles of mathematics and numerical concepts of fluid dynamics.
2. Develop governing equations for a given fluid flow system.
3. Adapt finite difference techniques for fluid flow models.
4. Apply finite difference method for heat transfer problems.
5. Solve computational fluid flow problems using finite volume techniques.
6. Get familiarized modern CFD software used for the analysis of complex fluid-flow systems.

Course Title**:** Power Plant Engineering   Course Code: ME 4451

At the end of the course students are able :
1. Describe construction, working principles and advantages of steam and hydroelectric power plants.
2. Describe working principles of diesel and gas turbine power plants
3. Apply the concepts of non-conventional energy sources
4. Outline different technologies adopted in nuclear power plants
5. Apply pollution control techniques, economic analysis in power plants

Engineering B.Tech (Electronics and Communication Engineering)

Course Title: Complex Analysis   **Course Code: MATH 2403**
After completion of the course, students are able to:
1. Apply Knowledge of Linear equations by different methods in image processing problems using matrices
2. Perform complex differentiation and integration.
3. Compare the real and complex functions and apply the techniques in complex function problems.
4. Evaluate definite integrals by the application of theory of complex variables, power series and residue theorem.
5. Find the images of the objects using the standard transformations which can be applied in applications like potential theory.

Course Title: NETWORK ANALYSIS Course Code: EEE 2412
After the completion of the course, students are able to
1. Investigate the methods to improve power factor in power system networks.
2. Design resonant circuits which are used in wireless transmission and communication networks.
3. Understand network theorems to simplify the complex networks.
4. Understand transient analysis in electrical circuits and to analyze the system stability.

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5. Evaluate the parameters of two port networks to analyze the performance of transmission lines.
6. Understand basic filters which are used in communication systems.

Course Title: ELECTRONIC DEVICES AND CIRCUITS   Course Code: ECE 2401
After undergoing the course, students will be able to
1. Apply how the properties of semiconductor materials are used for the formation of PN diode, zener diode etc
2. Apply the diode for various applications like rectifier, switch, clippers
3. Design the various transistor biasing circuits and its usage in applications like amplifiers
4. Distinguish the constructional features and operation of FET and MOSFET and their applications
5. design half wave and Full wave rectifiers for the given specifications
6. design regulated power supply.

Course Title: PROBABILITY THEORY AND STOCHASTIC PROCESSES Course Code: ECE 2402

After undergoing the course, students will be able to
1. Solve problems on conditional , joint probability, density functions and cumulative density functions which is useful in information theory and coding and probability of error estimations in digital communication systems
2. calculate mean and variance of the random signal using probability density function and MGF which are useful in statistical signal processing, Bio medical processing etc
3. Find the relationship between power density spectrum and auto correlation in Radar signal processing tracking and target detection
4. Understand the different noise sources for noise estimation in noisy signals in signal processing and communications

Course Title: SIGNALS AND SYSTEMS   Course Code: ECE 2403
After undergoing the course, Students will be able to
1. demonstrate basic knowledge of signals and systems.
2. be able to represent time-domain signals in frequency-domain using different transforms.
3. understand Sampling theorem for the Applications of Digital communication.
4. be able to characterize the LTI systems and to obtain their output using Convolution method.
5. derive constraints on ROC for various classes of signals by using Laplace-Transform.
6. have an exposure to Digital signal Processing, Analog Communication and Digital Communication.

Course Title: ELECTRONIC DEVICES AND CIRCUITS LAB   Course code: ECE 2204

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After undergoing this lab course, students will be able to:
1. Use various electronic components and test equipments like Multimeter , function generator,CRO etc., in order to measure passive components and observe the waveforms
2. Use diode and transistor for various practical applications .
3. Design the rectifiers, filters and D.C. Regulated power supplies of required voltage and current rating.
4. design amplifier circuit with different biasing techniques

Course Title: NETWORKS & SIMULATION LAB   Course code: EEE 2215
Upon completion of this course the students are expected to:
1. Analyze various theorems for linear DC and AC electrical circuits.
2. Evaluate two port network parameters for various electrical circuits.
3. Analyze the transient and steady state behavior of a circuit using MATLAB / PSPICE software.
4. Understand the performance of an ac circuit during resonance conditions.
5. Design the time constants of an electrical circuit for satisfactory performance during transient.

Course Title: ANALOG COMMUNICATIONS Course Code: ECE 2405
After undergoing the course, students will be able to:
1. analyze the nature of signals during the transmission & reception.
2. apply the theory in OFDM in Wireless communications
3. analyze the percentage of modulation in FM systems
4. analyze spectrum of FM signal
5. describe the pulse modulation nature in digital communication
6. describe signal power by using power spectral characteristics in AM and FM systems
7. analyze noise characteristics in the channel communications
8. design low power AM and FM transmitters
9. design low power AM and FM transmitters receivers

Course Title: DIGITAL LOGIC DESIGN   Course Code: ECE 2406 After undergoing the course students will be able to:
1. Differentiate between analog and digital representations.
2. Convert a number from one number system to its equivalent in of the other Number system.
3. Realize and Implement logic circuits by using Universal gates.
4. Use Boolean algebra and K-map as tool to simplify and design logic circuits.
5. Construct and analyze the operation of Combinational and Sequential Circuits.
6. Design various types of sequential circuits like counters and universal Shift Registers
7. Able to Differentiate between Mealy and Moore machines.
8. Able to Modify traditional design techniques to yield innovative designs

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Course Title: ELECTROMAGNETIC WAVES AND TRANSMISSION LINES Course Code: ECE 2407

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

1. Apply the fundamentals of vector calculus, differentiation, integrations, and different coordinate systems
2. Apply Coulomb's law and Gauss law to different charge distributions
3. Apply the knowledge of Laplace's and Poisson's equations to solve different capacitance problems
4. Apply knowledge to Antennas and wave propagation, Microwaves and communication subjects.
5. Implement applications of Maxwell's equations in plane waves and their propagation in different media.
6. Apply power concept associated with waves. The knowledge is used to study the behavior of transmission lines & their parameters.
7. Apply concept of waveguides and their significance in microwave range applications.

Course Title: ELECTRONIC CIRCUIT ANALYSIS   Course Code: ECE 2408

After undergoing the course students will be able to:

1. Analyze and design single stage amplifiers at low frequencies using transistors and FETs.
2. Analyze and design single stage amplifiers at high frequencies using transistors and FETs
3. Analyze and design multistage amplifiers at low frequencies using transistors and FETs.
4. Analyze and design multistage amplifiers at high frequencies using transistors and FETs.
5. Design of feedback amplifiers.
6. Design of sinusoidal Oscillators for a given frequency.
7. Estimate the requirements and design the power amplifier in real time applications such as transmitters in communication systems. .

Course Title: PULSE AND DIGITAL CIRCUITS   Course Code: ECE 2409

1. Design the circuits for generating desired wave shapes(non-sinusoidal) for different applications like computers, control systems and counting and timing systems
2. Design RC circuits for triggering
3. Design the switching circuits in VLSI
4. Design the memory element
5. Design free running oscillators
6. Design logic circuits for VLSI

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Course Title: ANALOG COMMUNICATIONS LAB   Course Code: ECE 2210

After undergoing the lab course students will be able to:

1. Design and simulate modulation and demodulation circuits such as AM,DSB-SC,FM.
2. Construct pre-emphasis and de-emphasis at the transmitter and receiver respectively
3. Construct diode detector and AGC circuit that are necessary for good reception of the signal
4. Design and simulate the PAM,PWM&PPM

Course Title: ELECTRONIC CIRCUITS SIMULATION LAB   Course Code: ECE 2211

After undergoing the lab course students will be able to:

1. Design the Common Emitter and Common Source amplifiers for different applications.
2. Analyse the frequency response of two stage RC coupled amplifier.
3. Design of different negative feedback amplifiers.
4. Design sinusoidal oscillators for a given frequency.
5. Design of class-A and class-B power amplifiers.
6. Implement the respective filters using HP and LP circuits.
7. Design and verify the Clipping and clamping circuits

Course Title: ANTENNAS AND WAVE PROPAGATION   Course Code: ECE 3414

At the completion of the course, students should be able to:

1. Explain how an antenna radiates and capture radio wave energy from the concepts of radiation.
2. Distinguish the properties and parameters of an antenna.
3. Apply the Friis transmission expression to predict the received powers in a system consisting of transmit and receive antenna.
4. Design an antenna system, including the shape of the antenna, the requirement on the arrangement of the radiating elements in an array for the given specifications.
5. Interpret various procedures for measuring antenna parameters like gain, directivity etc.
6. Describe the mechanism of the atmospheric effects on radio wave propagation.

Course Title: DIGITAL COMMUNICATIONS Course Code: ECE 3415

After undergoing the course students will be able to:

1. Understands the principle features of digital communication systems and their current and future applications

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2. Understands the baseband pulse transmission, and provide tools to analyze the performance of different PCM waveform in noise

3. Compute the bandwidth and transmission power by analyzing time and frequency domain spectra of signal required under various modulation schemes.

4. Understand Band pass digital modulation and demodulation (binary and M-level; ASK, PSK and FSK), and provide tools to analyze the performance in noise.

5. Characterize error-control coding techniques and explain the working of Viterbi algorithm, for the reliable transmission of digital information over the channel.

6. Identify and describe different techniques in digital communications, and judge the applicability of different techniques in different situations.

Course Title: ELECTRONIC DESIGN AUTOMATION USING HDL Course Code: ECE 3416

After undergoing the course students will be able to

1. know the importance of EDA tools and its flow for VLSI designs
2. demonstrate the architectural details of FPGA and CPLD
3. design and implement the fundamental digital logic circuits using verilog HDL
4. perform system level design
5. Implement Design rule checks and timing parameters
6. Draw the Digital circuits using SM charts

Course Title: LINEAR AND DIGITAL IC APPLICATIONS   Course Code: ECE 3417

After undergoing the course students will be able to**:**

1. Acquaint with a wide variety of op-amp and linear IC applications and design different signal conditioning circuits like filters, A/D and D/A converters, low signal amplifiers, rectifiers, clampers, clippers, peak detectors etc.
2. Design Pulse generator circuits of required frequency and PLL circuits.
3. Design CMOS logical gates and understand the issues with respect to fan-in, fan-out and power dissipation
4. Build various combinational and sequential logics using commercial IC's and verify the functionality as per logic.
5. Originate a simple ROM memory and analyze the working principles of RAM, SRAM and DRAM

Course Title: COMPUTER NETWORKS (ELECTIVE-I) Course Code: IT 3410

At the end of the course students are able to:

1. recommend appropriate network model for data communication.
2. be familiar with how reliable data communication is achieved through data link layer.
3. intend appropriate routing algorithm for data routing.

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4.   Connect internet to the system and knowledge of trouble shooting.

Course Title: CONTROL SYSTEMS (Elective-I)   Course code: EEE 3416

Upon completion of this course the students are able to:
1.   Develop transfer function and state space models of control systems in continuous time.
2.   Describe and simplify a control system using block diagram and signal flow graph techniques.
3.   Analyze the transient and steady state performances of control systems.
4.   Investigate the stability of a system using time domain and frequency domain techniques.
5.   Design different compensators and controllers in time/frequency domain.
6.   Investigate the controllability and observability of control systems

Course Title: DATA STRUCTURES (ELECTIVE-I)   Course Code: IT 2401

At the end of the course students are able to:
1.   Create and manage data structures for developing real world applications.
2.   Use algorithms and data structures in well-written modular code in an adequate and optimal way.
3.   Apply the data structure array for various list processing operations such as searching and sorting.
4.   Decide to use array or linked-list for solving a given problem.
5.   Differentiate between linear and non-linear data structures.

Course Title: DIGITAL COMMUNICATIONS LAB   Course Code: ECE 3218

After undergoing the course students will be able to:
1.   Understand, analyze, and design fundamental digital communication systems.
2.   Identify and describe different techniques in modern digital communications, in particular in source coding, modulation and detection, carrier modulation, and channel coding.
3.   Understand the basics of information theory and error correcting codes
4.   Apply suitable modulation schemes and coding for various applications
5.   Understand the design issues in a digital communication system.

Course Title: LINEAR AND DIGITAL IC APPLICATIONS LAB   Course Code: ECE 3219

After completion of the course, students will be able to
1.   Design op-Amp circuits for various applications.
2.   Get the practical exposure on various linear and digital ICs
3.   Design and implement the pulse generator using 555 timer
4.   Design and construct the various first order filters like LPF, HPF, BPF and BRF.
5.   Know the usage of various digital ICs for combinational and sequential logic applications

B.Tech- 6th Semester

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Course Title: MICROPROCESSORS AND MICROCONTROLLERS Course Code: ECE 3421

At the end of the course students are able to :

1. Recognise the operational modes of microprocessors, microcontrollers and gains the knowledge of machine level, assembly level programming, interfacing techniques.
2. Differentiate the peripherals and their features and also interpret various microcontrollers that allow certain important multiprogramming and multiprocessing.
3. Familiarize with the architecture of 8086 processor, assembling language programming and interfacing with various modules.
4.   Learn to Interface various I/O peripherals like ADC, DAC, Keyboard, stepper motor etc., with microprocessors using 8255 PPI.
5. Do any type of industrial and real time applications by knowing the concepts of Microprocessors and Microcontrollers.
6. Understand of 8051 Microcontroller concepts, architecture, programming and microcontroller based systems

Course Title: MICROWAVE ENGINEERING   Course Code: ECE 3422

At the completion of the course, students should be able to:
1. Understand the basic knowledge of microwaves and waveguides.
2. Examine microwave components and ferrite devices.
3. Interpret the basics of S parameters and use them in describing the components.
4. Analyze the working principle and performance of the microwave tubes and microwave semiconductor devices.
5. Distinguish between the linear and cross field electron beam microwave tubes.

Course Title: DATABASE MANAGEMENT SYSTEMS (Elective-II) Course Code: IT 2405

At the end of the course students are able to :
1. Write queries to retrieve data from multiple tables
2. Explore different database tools
3. Design a database for business information problems
4. Maintain a database management system
5. Develop projects using acquired knowledge of database concepts

Course Title: OBJECT ORIENTED PROGRAMMING THROUGH JAVA Course Code: IT 2402

 At the end of the course, the students can:
1. Know the concepts of classes, objects, members of a class and the relationships among them
2. Implement Applications using Packages
3. Handle runtime errors using Exceptions handling mechanism.

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4. Develop application for concurrent processing using Thread concepts
5. Design interactive applications for use on internet.
6. Design applets that take user response through various peripheral devices such as mouse and keyboard by event handling mechanism

Course Title: TELECOMMUNICATION SWITCHING SYSTEMS Course Code: ECE 3423 AND NETWORKS (Elective-II)

After undergoing the course students will be able to:

1. Understand the need for switching systems and their evolution from analogue to digital.
2. Understand various signaling techniques used in telecommunication systems.
3. Familiarize with functions of OSI-ISO layers, switching at network layer, connecting devices at physical layer.
4. Understand integrated networks and protocol frame formats of these networks.

Course Title: Fundamentals of Global Positioning System –Elective-III(Open elective) Course Code: ECE 3424

After undergoing the course students will be able to:

1. Explain the history of GPS and new trends in the activity.
2. Calculate GPS satellite orbit positions and velocities.
3. Define the fundamental working principle of GPS and outline its development
4. Describe global satellite navigation systems, satellite orbital characteristics, and satellite signal structure
5. Define coordinates systems likely to be encountered by GPS users and calculate and discuss GPS coordinates

Course Title: HDL laboratory   Course Code: ECE 3225

After undergoing the course, students will be able to

1. Design and implement the fundamental digital logic circuits using verilog HDL.
2. Perform system level design for functionality.
3. Implement design rule checks and timing parameters.
4. Know the resources consumed by the design on FPGA.
5. Design digital IC

Course Title: MICROPROCESSORS AND MICROCONTROLLERS LAB Course Code: ECE 3226

After completing the course the students will able to:

1. Understand the full internal workings of a typical simple CPU including the utilization of the various Hardware resources during the execution of instructions
2. Design computers like desktops, laptops using various processors.

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3. Design the high speed communication circuits using serial bus connection for computers.
4. Design Traffic light signals using Microprocessors and Microcontroller chips.
5. Introduce the design of basic I/O hardware and microprocessor interfacing: memory chip selection, Memory expansion, I/O interfacing, different I/O techniques.

B.Tech- 7th Semester

Course Title: ENGINEERING ECONOMICS AND PROJECT MANAGEMENT Course Code: HS 3405

At the end of the course students are able to:

1. comprehend basic principles of engineering economics
2. Evaluate investment proposals through various capital budgeting methods
3. Apply the knowledge to prepare the simple financial statements of a company for measuring performance of business firm
4. Analyze key issues of organization, management and administration
5. Evaluate project for accurate cost estimates and plan future activities

Course Title: BIOMEDICAL ENGINEERING   Course Code: ECE 4429

After undergoing the course students will be able to:

1. Be familiar with the principle operation, design and the background knowledge of biomedical instruments and specific applications of biomedical engineering.
2. Recognize human physiology system.
3. Distinguish between the various methods used for information gathering, Diagnosis, evaluation.
4. Apply concepts of physiology and the Electrical Components of a biomedical system.
5. Classify the elements of patient care and monitoring and understand the measurements using therapeutic and prosthetic devices.
6. Demonstrate monitors, recorders and identify shock hazards and accident prevention methods.

Course Title: OPTICAL COMMUNICATIONS   Course Code: ECE 4430

After undergoing the course students will be able to:
1. comprehend about optical fiber communication system and fiber optic devices
2. Classify the Optical sources and detectors and to discuss their principle.
3. Identify the difference between single mode/multimode fibers as well as step index and graded index fibers.
4. Apply fundamental physics principles to the operation of common optoelectronic devices.

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5.   Analyze the significance of various components involved in optical fiber communication system design
6.   Design a basic optical fiber link

Course Title: R.F. CIRCUITS DESIGN   Course Code: ECE 4441

At the end of the course students are able to
1.   Know about design techniques and current applications in RF Circuit Design.
2.   Draw Smith chart for basic transmission line calculations.
3.
4.   Apply differential and complex calculus to obtain analytical and numerical solutions for RF circuits.
5.   design RF Transistor Amplifiers.
6.   Analyzes needs to produce problem definition for passive and active RF circuits, systems, and components.
7.   Evaluate various Oscillators and mixers.

Course Title: VLSI Design   Course Code: ECE 4432

After undergoing the course students will be able to:
1.   narrate IC Production process, various fabrication processes, BiCMOS Technology, MOS device operation and overview of PLDs.
2.   reveal device properties, circuit design processes, scaling.
3.   illustrate stick diagrams, layouts for CMOS circuits and compute delays of CMOS circuits.
4.   Minimize the scaling effects of MOS circuits.
5.   Determine different levels of testing of IC

Course Title: DIGITAL IMAGE PROCESSING   Course Code: ECE 4433

After undergoing the course students will be able to
1.   appreciate image manipulations and different digital image processing techniques in various fields.
2.   Perform basic operations like – Enhancement, Image transform and restoration techniques on image.
3.   make use of image segmentation, compression for various applications.
4.   Analyze pseudo and full color image processing techniques.
5.   Apply the various image transforms used in image processing
6.   apply MATLAB to implement the image processing techniques.

Course Title: EMBEDDED SYSTEMS Course Code: ECE 4434

After undergoing the course, students will be able to
1.   Define differences between embedded system and general purpose systems.
2.   Describe embedded system with the help of various components.
3.   Analyze the design of embedded system with respect to quality attribute and can demonstrate the up gradations for real time application.
4.   Know the hardware software co design of embedded system.

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5. Explore different IDEs to design and implementation of embedded system and able to create real time applications.

Course Title: RADAR ENGINEERING   Course Code: ECE 4435

After undergoing the course students will be able to:
1. Explain the operation of CW, FM-CW, MTI and Pulse Doppler radar.
2. Describe the range ambiguities and various system losses.
3. Explain parameters of radar receivers like noise figure, noise temperature.
4. Explain radar displays and types of duplexers.

Course Title: TESTING AND TESTABILITY OF DIGITAL SYSTEMS Course Code: ECE 4436

After undergoing the course, students will be able to
1. Apply knowledge of design of digital logic circuits.
2. Understand concepts of reduction of state tables and state assignments.
3. Illustrate various fault models in digital design and identify the faults in a given digital logic circuit.
4. Apply knowledge of fault diagnosis of designed combinational circuits using conventional methods
5. Realize concepts of design for testability and compression techniques of digital circuits.
6. Apply knowledge of BIST concepts and test Pattern generation.

Course Title: DIGITAL SIGNAL PROCESSING LAB   Course Code: ECE 4237

At the end of the course students are able to :
1. design the digital filter circuits for generating desired signal wave shapes (non sinusoidal) for different applications like digital signal processing
2. analyze the system in Time and Frequency domain through its respective tools.
3. design the digital computer or digital hardware for quantizing amplitudes of signals.
4. design the various processing circuits that are necessary in the hardware or interfacing blocks in systems used in control systems ,CODEC, communications and signal processing

Course Title: MICROWAVE LAB   Course code: ECE 4238

At the end of the course students are able to:
1. Determine isolation and insertion losses for different components like isolator, circulator, and directional coupler etc.
2. Select components that can be used in microwave transmission.
3. Measure the various parameters at microwave frequencies.
4. Analyze how the radiation intensity, radiation pattern and Gain of Horn antenna.
5. Measure the numerical aperture of optical fiber.

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6. Outline the V-I characteristics of LED's and LASER to understand the benefits of optical fiber communication.

B.Tech- 8th Semester

Course Title: CELLULAR AND MOBILE COMMUNICATIONS Course Code: ECE 4439

After undergoing the course students will be able to:
1. Analyze and design wireless and mobile cellular systems.
2. Explain the concepts of handoff, frequency reuse, and operation of cellular systems
3. Understand the types of interference, its management.
4. Design the antenna system, parameters, and their effects in the reduction of C/I ratio.
5. Calculate the path loss slope and analyze the propagation effects of signal under various environment conditions.
6. Analyze and design digital cellular systems

Course Title: SATELLITE COMMUNICATIONS   Course Code: ECE 4440

At the end of the course students are able to :
1. Locate satellite in the orbit and assess the orbital effects on satellite communications
2. Understand the functioning of attitude and orbit control system, Telemetry, tracking and command, Power Systems, Communication Subsystems, Spacecraft antennas and TDMA, FDMA and CDMA techniques
3. Perform and verify link budget calculations
4. Understand the generation of PN sequence and the concepts of direct sequence spread spectrum and frequency hopping spread spectrum
5. Understand the GPS Signal Structure and Operation of GPS receiver

Course Title: ANALOG I.C. DESIGN   Course Code: ECE 4441

After undergoing the course students will be able to:
1. Describe MOS structures, operation and second order effects
2. Explain the basic analog IC blocks like mirrors, basic amplifiers and differential amplifiers
3. Demonstrate the internal circuits and topologies of Opamp
4. Implement frequency compensated and gain boosting operational amplifier
5. Analyze noise analysis of opamp
6. Analyze the switched capacitors

Course Title: INFORMATION SECURITY   Course Code: CSE 3414

At the end of the course students are able to:
1. Analyze a given system with respect to security of the system.
2. Create an understanding of Authentication functions the manner in which Message
3. Authentication Codes and Hash Functions works.

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4. Examine the issues and structure of Authentication Service and Electronic Mail Security
5. appreciate conventional and public key cryptographic approaches used in message encryption.
6. identify various types of attacks and its effect over the networks.

Course Title: REAL TIME OPERATING SYSTESMS   Course Code: CSE 3416
At the end of the course students are able to:
1. Present the mathematical model of the system and to develop real time algorithm for task scheduling.
2. Understand capabilities Handling Resource Sharing and dependencies among Real-time Tasks
3. Generate a high-level analysis for Scheduling Real-time tasks in multiprocessor and distributed systems
4. Understand the working of real time operating systems and real time database.

Course Title: WIRELESS SENSOR NETWORKS   Course Code: ECE 4442
After undergoing the course, students will be able to:
1. List various applications for sensor networks, describe key concepts and emerging trends in sensor networks.
2. Architect sensor networks for various application setups.
3. Solve problems in sensor node and transceiver design.
4. Determine suitable medium access protocols, routing protocols, security protocols and radio hardware.
5. Prototype sensor networks using commercial components.

Department of Computer Science & Engineering B.Tech (CSE)
Course Title: MATHEMATICAL METHODS
At the end of the course students are able to:
1. Apply Linear system of equations in animation and simulation techniques used in applications like Gaming and Prototype Modeling for incorporating simulated physical phenomena such as quality, collision, friction, fluid flow etc.
2. Understand the use of the concept of linear equations in the study of "Computer Vision", used in areas such as Artificial Intelligence, Industrial Robotics, Human Computer Interaction, Video Tracking etc.
3. Understand the use of the concepts of Linear system of equations, Eigen values & vectors in the study of Pattern Recognition, Document Clustering and Classification, etc.
4. Apply the concepts of curve fitting in data clustering and classification studied in Data Mining
5. Solve problems using Lagrange method of interpolation

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6. Use Newton divided difference interpolation in Information Security for securing the message (message is converted into polynomial)
7. Apply Lagrange interpolation techniques in group key generation, key agreement and key management
8. Use interpolation with evenly spaced points in 3D Computer Graphics
9. Apply numerical integration techniques in applications such as Simulation for Prototyping
10. Simulate real world phenomena and events
11. Analyze and solve science & engineering problems applying the mathematical methods.

Course Title: COMPUTER ORGANIZATION

At the end of the course students are able to:

1. Know the different components of the computer system, their functions and their interconnections.
2. Know the various instruction formats that the processor follows.
3. How the control unit generates control signals to execute a particular instruction.
4. Understand how the memory system can be suitably designed to improve the performance of the computer.
5. Know how high speed computers can be designed by using the pipelining and multiprocessor concepts.

Course Title: DATA STRUCTURES

At the end of the course students are able to:
1. Create and manage data structures for developing real world applications.
1. 2. Use algorithms and data structures in well-written modular code in an adequate and optimal way.
2. Apply the data structure array for various list processing operations such as searching and sorting.
3. Decide to use array or linked-list for solving a given problem.
4. Differentiate between linear and non-linear data structures.
5. Use appropriate Data Structure for implementation of various algorithms in subsequent course of the study.

Course Title: DIGITAL LOGIC DESIGN   Course Code: ECE 2406

After undergoing the course students will be able to:
1. Differentiate between analog and digital representations.
2. Convert a number from one number system to its equivalent in of the other Number system.
3. Understand the difference between BCD and straight binary.
4. Implement logic circuits using basic AND, OR and NOT gates.
5. Use De-Morgan's theorem to simplify logic expressions.
6. Describe the concept of active LOW and active HIGH logic signals.

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7. Use Boolean algebra and K-map as tool to simplify and design logic circuits.
8. Design simple logic circuits without the help of truth tables.
9. Construct and analyze the operation of flip-flop and troubleshoot various types of flip-flop circuits.
10. Understand the internal logic diagrams of Integrated circuits

Course Title: DISCRETE STRUCTURES AND GRAPH THEORY

At the end of the course students will be able to:
1. Apply the concept of logical equivalence and its relationship to logic circuits and Boolean functions.
2. Use Concepts of graph theory to provide solutions for routing applications in computer networks.
3. Use concepts of functions for data retrieval in database applications.
4. Apply concepts of counting and probability in data mining.
5. Apply the recurrence relation for analyzing recursive algorithms.

Course Title: DATA COMMUNICATIONSYSTEMS

At the end of the course students will be able to:
1. Acquire knowledge of fundamental concepts of data transmissions standards and to learn the fundamental digital techniques for Communication.
2. Understand the design, operation and capabilities of optical fiber systems.
3. Acquire knowledge of various digital transmissions(PCM)&multiplexing of FDM and TDM
4. Design a system, component or process as per needs and specification.
5. Develop applications by analyzing the requirements of software.
6. Understand the technical specifications of electronic communication design.
7. Know the concepts of Mobile Communications.
8. Explore the knowledge of various error detection and correction techniques.
9. Design and analyze the experiment and interpret data.

Course Title: DATABASE MANAGEMENT SYSTEMS

At the end of the course students will be able to:
1. recovery techniques for managing the database effectively to avoid the data lose
2. Identify and define the data models needed to design a database
3. Create conceptual and logical database design for Large enterprises
4. Apply Integrity constrains over the relations
5. Apply normalization process on existing database for eliminating redundancy

Course Title: OBJECT ORIENTED PROGRAMMING THROUGH

At the end of the course students will be able to:
1. Know the concepts of classes, objects, members of a class and the relationships among them
2. Implement Applications using Packages

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3. Handle runtime errors using Exceptions handling mechanism.
4. Develop application for concurrent processing using Thread concepts
5. Design interactive applications for use on internet.
6. Design applets that take user response through various peripheral devices such as mouse and keyboard by event handling mechanism

Course Title: OPERATING SYSTEMS

At the end of the course students will be able to:
1. Understand the various concepts of process
2. Implement concurrency mechanisms
3. Implement Bankers Algorithms to handle deadlocks
4. Design and analyze mechanisms used in memory management
5. Develop processor scheduling, Paging technique Algorithms

Course Title: THEORY OF COMPUTATION

At the end of the course students will be able to:
1. Know the regular expressions and regular grammars that produce regular languages
2. Analyze and solve Chomsky and Greibach normal forms.
3. Design deterministic and nondeterministic finite automata that recognize regular languages.
4. Develop push down automata for context free grammars.
5. Design Turing machines those recognize recursively enumerable languages.

B. Tech- 5th Semester

Course Title: COMPUTER NETWORKS   Course Code: IT 3410

At the end of the course students are able to:
1. Suggest appropriate network model for data communication.
2. Know how reliable data communication is achieved through data link layer.
3. Propose appropriate routing algorithm for data routing.
4. Connect internet to the system and knowledge of trouble shooting.

Course Title: DESIGN AND ANALYSIS OF ALGORITHMS   Course Code: IT 2406

At the end of the course students are able to:
1. Analyze the asymptotic runtime complexity of algorithms for real world problems developed using different algorithmic methods.
2. Find the optimal solutions by using advanced design and analysis of algorithm techniques like greedy method and dynamic programming.
3. Apply the search space and optimization problem techniques like backtracking and branch and bound method to solve problems optimally where advanced algorithm design techniques fail to find solution.
4. Distinguish the problems and its complexity as polynomial and NP problems and can formulate some real world problems to abstract mathematical problems.

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Course Title: WEB TECHNOLOGIES   **Course Code: IT 3415**

At the end of the course students are able to:
1. Choose, understand, and analyze any suitable real time web application.
2. Integrate java and server side scripting languages to develop web applications.
3. To develop and deploy real time web applications in web servers and in the cloud.
4. Extend this knowledge to .Net platforms.

Course Title: SOFTWARE ENGINEERIN   **Course Code: CSE 3409**

At the end of the course students are able to:
1. Design and develop real-time software projects with effective cost estimation and plan
2. Make feasibility study of a project
3. Specify the design and architectural style of the software products
4. Propose testing strategy for a given software

Course Title: MICROPROCESSORS AND INTERFACING   **Course Code: ECE 3428**

After undergoing the course, students will be able to :
1. Understand the full internal workings of a typical simple CPU including the utilization of the various hardware resources during the execution of instructions.
2. Introduce the design of basic I/O hardware and microprocessor interfacing: memory chip selection, memory expansion, I/O interfacing.
3. Interface input and output devices like LCD, LED, Keyboards ADC, DAC and stepper motor to microprocessors.
4. Design the home appliances and toys using Microprocessor chips.

Course Title: ADVANCED DATABASES   **Course Code: CSE 3410**

At the end of the course students are able to:
1. Design an architectural model for distributed database management system.
2. Analyze Query processing and query optimization methods.
3. Implement transaction management and database reliability for real world scenario.
4. Use object-oriented distributed data model for data

Course Title: COMPUTER GRAPHICS   **Course Code: CSE 3411**

At the end of the course students are able to:
1. Be familiarized with contemporary graphics hardware, the actual methodology and techniques to draw computer graphics, animations etc. for the real world presentation and how it is implemented in Computer graphics software

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2. Develop new kinds of graphics and animations.
3. Design and develop graphics applications with the implementation of advanced methods such as ray tracing, texture mapping, illumination and shading and be able to build interactive user interface to manipulate objects in a 3D scene and also in the development of Web pages.
4. Demonstrate the ability to develop an animation movie.

Course Title: COMPUTER NETWORKS LAB   **Course Code: IT 3211**

At the end of the course students are able to:
1. By learning models students suggest appropriate network model for data communication.
2. Know how reliable data communication is achieved through data link layer.
3. Suggest appropriate routing algorithm for the network.
4. Provide internet connection to the system and its installation.

Course Title: WEB TECHNOLOGIES LAB   **Course Code: IT 3220**

At the end of this course the student can answer how to:
1. Integrate frontend and backend web technologies in distributed systems.
2. Facilitate interface between frontend and backend of a web application.
3. Debug, test and deploy web applications in different web servers.
4. Migrate the web applications to the other platforms like .Net

Course Title: DATA ENGINEERING   **Course Code: CSE 3412**

At the end of the course students will be able to:
1. Apply relevant preprocessing techniques on different data sets for mining.
2. Implement Association rule mining concept and generate association rules.
3. Apply classification/clustering techniques on different types of data and analyze patterns.
4. Suggest appropriate data mining techniques to mine different types of data.

Course Title: OBJECT ORIENTED ANALYSIS AND DESIGN   **Course Code: IT 3414**

At the end of the course students are able to:
1. Understand the use of unified modeling language for object oriented analysis and design
2. Know the syntax of different UML diagrams.
3. Develop different models for a software system.
4. Apply object oriented analysis and design to build a software system
5. Apply forward and reverse engineering for a software system.

Course Title: LANGUAGE PROCESSORS   **Course Code: CSE 3413**

At the end of the course, students are able to:
1. **Deal with different translators and to acquire the knowledge of compiler and its Phases.**
2. **Use of formal grammars for specifying the syntax and Semantics of programming languages**

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3.   **Build symbol tables and generate intermediate code for a given program.**
4.   **Apply the code optimization techniques to improve the performance of a program in terms of speed and space.**
5.   **Design a compiler for a concise programming language.**

Course Title: DIGITAL SIGNAL PROCESSING   Course Code: ECE 3420

At the end of the course students are able to :

1. Analyze the system in Time and Frequency domain through its respective tools.
2. Demonstrate knowledge of complex number, Fourier series and ability to design electrical and electronics systems, analyze and interpret data.
3. Design the digital filter circuits for generating desired signal wave shapes (non sinusoidal) for different applications like computers, control systems and counting and timing systems.
4. Design the digital computer or digital hardware for quantizing amplitudes of signals.
5. Design the various processing circuits that are necessary in the hardware or interfacing blocks in systems used in radars, satellite etc

Course Title: INFORMATION SECURITY   Course Code: CSE 3414

At the end of the course students are able to:

1. Analyze a given system with respect to security of the system.
2. Create an understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works.
3. Examine the issues and structure of Authentication Service and Electronic Mail Security Understand conventional and public key cryptographic approaches used in message encryption.
4. Able to identify various types of attacks and its effect over the networks.

Course Title: MOBILE COMPUTING   Course Code: CSE 3415

At the end of the course students are able to:

1. Demonstrate knowledge of different voice and data communication standards
2. Analyze the need for optimizations in Mobile IP
3. Distinguish between proactive and reactive routing in an Ad hoc network
4. Develop simple app using Android

Course Title: REAL TIME OPERATING SYSTEM   Course Code: CSE 3416

At the end of the course students are able to:

1. Present the mathematical model of the system and to develop real time algorithm for task scheduling.
2. Understand capabilities Handling Resource Sharing and dependencies among Real-time Tasks
3. Generate a high-level analysis for Scheduling Real-time tasks in multiprocessor and distributed systems

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4.   Understand the working of real time operating systems and real time database.

Course Title: SOFT COMPUTING   **Course Code: CSE 3417**

At the end of the course students are able to:
1.   Identify and describe soft computing techniques and their roles in building intelligent machines.
2.   Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems
3.   Apply neural networks to pattern classification and regression problems.
4.   Evaluate and compare solutions by various soft computing approaches for a given problem.

Course Title: OBJECT ORIENTED ANALYSIS AND DESIGN LAB   **Course Code: IT 3219**

After undergoing the course students are able to:
1.   Know the syntax of different UML diagrams.
2.   Create different UML diagrams for a software system
3.   Identify appropriate models to represent a software system.
4.   Analyze and design a software system in an object oriented style using tools like Rational Rose.

Course Title: LANGUAGE PROCESSORS LAB   **Course Code: CSE 3218**

At the end of the course students are able to:
1.   Apply the knowledge of LEX tool to develop a scanner.
2.   Compute the first and follow of non-terminals of a grammar.
3.   Apply the knowledge of YACC tool to develop a parser.
4.   Design top-down and bottom-up parsers

Course Title: DESIGN PATTERNS   **Course Code: IT 4425**

: At the end of the course students are able to:

1. Classify and document design patterns

2. Understand patterns to manage algorithms and assign responsibilities to objects

3.   Apply patterns to solve design problems
4.   Create new design patterns

Course Title: DISTRIBUTED SYSTEMS   **Course Code: CSE 4419**

Course Outcomes: At the end of the course students are able to :
1.   Learn the core concepts underlying distributed systems designs.
2.   Identify entities and resources in distributed systems and examine the naming conventions
3.   Apply and compare the various communication mechanisms in distributed systems.
4.   Identify issues on how to coordinate and synchronize multiple tasks in a distributed system.

Course Title: HUMAN COMPUTER INTERACTION   **Course Code: CSE 4420**

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At the end of the course students are able to:
1. Explain the human components functions regarding interaction with computer
2. Demonstrate Understanding of Interaction between the human and computer components.
3. Implement Interaction design basics
4. Use HCI in the software process and Apply Design rules
5. Use Evaluation techniques

Course Title: MIDDLEWARE TECHNOLOGIES   Course Code: CSE 4421

Course Outcomes: At the end of the course students are able to:
1. Choose appropriate client server computing model for given problem.
2. Design a dynamic remote application with RMI and JDBC Connectivity.
3. Develop client server applications using C#.net
4. Select appropriate language for homogeneous and heterogeneous objects.
5. Develop real time projects by combining CORBA and database interfacing

Course Title: SOFTWARE PROJECT MANAGEMENT   Course Code: CSE 4422
 At the end of the course students are able to:
1. Apply and practice Project Management principles while developing a software.
2. Defining and implementing software project planning.
3. Analyzing software risks and risk management strategies
4. Defining the concepts of software quality and reliability on the basis of international quality standards.
5. Knowing and implementing the software project management tools

Course Title: DIGITAL IMAGE PROCESSING   Course Code: ECE 4433
Course Outcomes: After undergoing the course students will be able to

1. Appreciate image manipulations and different digital image processing techniques in various fields.
2. Perform basic operations like – Enhancement, Image transform and restoration techniques on image.
3. Make use of image segmentation , compression for various applications.
4. Analyze pseudo and full color image processing techniques.
5. Apply the various image transforms used in image processing
6. Apply MATLAB to implement the image processing techniques.

Course Title: BIG DATA ANALYTICS   Course Code: CSE 4423
At the end of the course students are able to:
1. Identify the need for big data analytics for a domain.
2. Apply big data analytics for a given problem.
3. Suggest areas to apply big data to increase business outcome.
4. Use Hadoop, Map Reduce Framework handle massive data

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Course Title: MULTIMEDIA SYSTEMS **Course Code: CSE4424**

At the end of the course students are able to:
1. Use different realizations of multimedia tools.
2. Implement various multimedia applications and Action scripts.
3. Analyze various storage technologies.
4. Apply video compression Techniques for real time applications.

Course Title: WIRELESS AD HOC NETWORKS **Course Code: CSE 4425**

At the end of the course students are able to:
1. Analyze MAC protocols for Ad Hoc Wireless Networks
2. Analyze Routing protocols for Ad Hoc Wireless Networks
3. Understand the need for Energy Management in Ad Hoc Wireless Networks
4. Understand the issues and challenges in Wireless Network security

Course Title: DATA ENGINEERING LAB. **Course Code: CSE 4226**

At the end of the course students are able to:
1. Implement the algorithms to solve data mining problem using WEKA tool
2. Identify an appropriate method to apply in a given situation
3. Communicate results in terms relevant to science, business etc.
4. Apply different clustering techniques to characterize subgroups.

Course Title: DESIGN AND ANALYSIS OF ALGORITHMS LAB **Course Code: CSE 4227**

At the end of the course students are able to:
1. Implement searching and sorting techniques efficiently to retrieve data.
2. Put into practice algorithms using greedy strategy and dynamic programming optimally.
3. Design and execute the algorithms using search space and optimization problem techniques for finding globally best solution.
4. Realize basic computability concepts and the complexity and to implement number theoretic algorithms to work in information security.

Course Title: ENGINEERING ECONOMICS AND PROJECT MANAGEMENT Course Code: HS 3405

At the end of the course students are able to:
1. Understand basic principles of engineering economics
2. Evaluate investment proposals through various capital budgeting methods
3. Apply the knowledge to prepare the simple financial statements of a company for measuring performance of business firm
4. Analyze key issues of organization, management and administration
5. Evaluate project for accurate cost estimates and plan future activities

Course Title: OBJECT ORIENTED SOFTWARE ENGINEERING **Course Code: CSE 4428**

At the end of the course students are able to:
1. Relate the object oriented methodology and implementation of software and the management of the software project.
2. Apply the knowledge of object oriented design tools including use cases, UML, Java and the JDK.

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3. Study and experiment with alternative models of the software development process from the Prototyping method to dynamic modeling.
4. Practice the principles and techniques by developing a "real world" software system.

Course Title: NETWORK PROGRAMMING   Course Code: IT 4423
At the end of the course students are able to:
1. Comprehend Networking concepts.
2. Differentiate various network protocols like TCP, UDP etc.
3. Compare SOCKETs in IPV4, IPV6 & ICMPV6
4. Implement different types of communications in LAN.
5. Demonstrate Inter Process Communication.

Course Title: BIO-INFORMATICS   Course Code: CSE 4429
At the end of the course students are able to:
1. Extract information from different types of bioinformatics data (gene, protein, disease, etc.), including their biological characteristics and relationships
2. Analyze processed data with the support of analytical and visualization tools
3. Carry out bioinformatics research under advisement, including systems biology, structural bioinformatics and proteomics
4. Manipulate DNA and protein sequences using stand-alone PC programs and programs available on the WWW

Course Title: E – COMMERCE   Course Code: CSE 4430
Course Outcomes: At the end of the course students are able to:

1. Examine some typical distributed applications.

2. Detail some of the problems that are encountered when developing distributed applications.

3. Understand some of the technologies that are used to support distributed applications.

4. Illustrate some of the business models used in the internet.

Course Title: PATTERN RECOGNITION   Course Code: CSE 4431
Course Outcomes: At the end of the course students are able to:
1. Implement decision functions
2. Analyze tradeoffs involved in various classification techniques
3. Apply various dimensionality reduction methods whether through feature selection or feature extraction
4. Develop model for solving problems in more specialized areas such as speech
5. Recognition, optical character recognition etc.,

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Department of Chemical Engineering
B.Tech- 5th Semester

Course Title: Chemical Reactor Theory   **Subject code: CHEM 3412**

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

1. Analyze and interpret experimental data from batch reactors and determine the order of simple chemical reactions.
2. Compare ideal reactor types (batch, CSTR and PFR) and apply quantitative methods to design and size reactors for simple chemical reaction schemes.
3. Determine optimal ideal reactor design for multiple reactions for yield or selectivity.
4. Predict reactor performance for reactors when the temperature is not uniform within the reactor.

Title: **Chemical Technology**   Course code: **CHEM 3413**

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

1. Make a neat and easy to understand the plant process flow sheet.
2. Keeps up the productivity while maintaining all safety norms stipulated, during their job.
3. Solve Engineering problems that are likely to come across during the operation of plants.
4. Suggest alternative manufacturing process in terms of Economic viability of the product.

Course Title: Principles of Mass Transfer   **Course code:** CHEM 3414

At the end of the course students are able to:

1. Recognize the various modes of mass transfer, Determine mass transfer rates using Fick's Law
2. Estimate diffusion coefficients, Solve unsteady state diffusion problems
3. Determine convective mass transfer rates, Determine convective mass transfer coefficients
4. Determine the number of transfer units and height requirements for a packed column
5. Differentiate various membrane process and their applications

Course Title: Process Dynamics & Control   **Course code:** CHEM 3415

After taking this course, students should be able to:

1. Comprehend the basic concepts of process control and outline the importance in process operation and the role of process control engineers.
2. Develop mathematical models of various systems by writing unsteady-state mass and energy balances.
3. Analyze linear dynamical systems using Laplace transforms.
4. Design and tune feedback controllers on real systems as well as simulated systems.
5. Apply different methods to verify the stability and performance of feedback loops using Laplace and frequency domain techniques.
6. Understand the need of advanced control strategies and decide under which

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Course Title: Fertilizer Technology   **Course code:** CHEM 3416
Upon successful completion of the course, the students will be able to:
1. Define the characteristics of a good fertilizer
2. Explain types of fertilizer and raw materials available.
3. Discuss the production methods for various fertilizers.
4. Draw the production flow sheet and explain the equipments used in production process.
5. Explain about Controlled Released fertilizers.

Course Title: Industrial Pollution Control Engineering   **Course code:** CHEM 3417
At the end of the course, the students will be able to:
1. Understanding of different types of pollution and apply knowledge for the protection and improvement of the environment
2. Select and use suitable wastewater treatment technique
3. Identify suitable sampling, analysis and equipment for air pollutants.
4. Apply their knowledge in controlling the pollution in process industries

Course Title: Polymer Technology   **Course code:** CHEM 3418
At the end of the course students will be able to:
1. Identify chemical formulas for common polymers and distinguish whether a polymer was likely synthesized via a condensation (step growth) or addition (chain) polymerization reaction.
2. Calculate the extent of reaction required to reach a particular degree of polymerization reaction and the time required to reach that extent of reaction given appropriate rate constants.
3. Determine the solubility of a polymer in a solvent given the Flory-Huggins interaction parameter.
4. Identify and analyze data from experimental methods of measuring the radius of gyration, different molecular weight averages, and second virial coefficient for polymer solutions.
5. Determine the volume fraction of crystallinity for a polymer sample and measure the glass transition temperature.

Course Title: Computer Application in Chemical Engineering Lab   **Course code:** CHEM 3219
At the end of the laboratory course, the students will be able to:
1. Understand the process flow sheets and how it gives the result.
2. Select proper operating tool to meet process needs and run the program based on the data & method.
3. Understand the application of artificial intelligence based modeling methods using Excel, C Language /MAT Lab/Aspen Plus.
4. Understand the industrial usage of process modeling and simulation.
5. Understand the simulation of steady state lumped, modeling of chemical process
6. equipments like mixers, reactors, distillation, absorption, extraction columns, evaporators, and heat exchangers etc.

Course Title: Process Dynamics & Control   Lab   Course code: CHEM 3220

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At the end of the course, the students will be able to:
1. Estimate the dynamic behavior of the control systems
2. Understand the controllability, speed of response the control systems.
3. Select proper control valve to meet process needs.
4. Understand direct digital control systems handling and operation.
5. Tuning of a PID control via manual and automatic tuning.
6. Choose PID modes that effect controllability, speed of response the control systems

B.Tech - 6th semester

Course Title: Applications of Mass Transfer   **Course code:** CHEM 3421
At the end of the course students will be able to:
1. Describe and differentiate various separation processes
2. Design multistage separation systems for specific operations involving absorption, extraction, leaching, drying and adsorption.
3. Construct McCabe-Thiele, Ponchon-Savarit diagrams for distillation
4. Construct triangular diagrams for multiple contact or counter current liquid-liquid extraction
5. Analyze and design constant rate drying systems

Course Title: Chemical & Catalytic Reaction Engineering   **Course code:** CHEM 3422
At the end of the course, the students will be able to:
1. Predict reactor performance under non-ideal flow situations using RTD data.
2. Develop rate equation for heterogeneous reactions.
3. Estimate the effects of diffusion, mass and heat transfer in catalyst pellet on reaction rates.
4. Develop the rate-controlling model for heterogeneous catalytic reactions.

Course Title: Chemical Process Economics & Equipment Design   Course code: CHEM 3423
At the end of the course, the students will be able to:
1. State the basic concepts of process design development and general design considerations.
2. Perform economic analysis for process to calculate equipment cost, and profitability for process.
3. Design internal pressure vessels and external pressure vessels
4. Design of shell & tube heat exchanger
5. Design of sieve tray distillation column.

Course Title: Material Science for Chemical Engineers **Course code:** CHEM 3424 Students would have knowledge about the existence of new materials and their properties.
1. The students will be able to choose appropriate material for process equipment.
2. Understand the failure analysis and select appropriate materials or relevant corrosion protection schemes for corrosion resistance; and
3. Understand the basic aspects of advanced materials and their applications.

Course Title: Petroleum refining and petrochemicals   **Course code:** CHEM 3425
At the end of the course students are able to:

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1. Describe the formation of crude oil, its refining techniques.
2. Describe the chemical composition and physical properties of crude oil
3. Understand various processes employed in petroleum refinery such that we can meet customer demand in terms of quality & quantity.
4. Demonstrate the different methods available for removal of impurities from crude and products manufacture
5. Understand, draw and describe the process flow diagrams of various refinery processes like distillation, cracking and reforming etc.,

Course Title: Pharmaceuticals and Fine chemicals   **Course code:** CHEM 3426

At the end of the course, the students will be able to:
1. Learn the principles of limit test for pharmaceuticals and sources of impurities in chemicals.
2. Preparation outlines for the manufacture of pharmaceuticals and fine chemicals.
3. Design various unit operations pertinent to fine chemicals and pharmaceuticals sectors
4. Investigate environmental impacts in the field of pharmaceuticals and fine chemicals

Course Title: Industrial Safety and Hazard Management   **Course code:** CHEM 3427

At the end of the course students will be able to:
1. Understand the safety and ethical issues that may arise from industrial processes.
2. Understand and be able to communicate the importance of Safety in chemical engineeringpractice— both in ethical and economic terms.
3. Evaluate hazards both qualitatively, using techniques like "what if" and "HAZOP" analyses, andquantitatively, using techniques like fault tree and event tree analyses.
4. Understand and be able to communicate the difference between Hazard and Risk. Be able toexpress Safety in terms of Risk and to recognize unacceptable/inappropriate levels of Risk.
5. Understand hazards arising from runaway reactions, explosions and fires, and how to deal withthem.
6. Understand the behavior of accidental releases of hazardous materials from industrial chemicalprocesses, including consequences related to health and property.

Course Title: Chemical Reaction Engineering Lab   **Course code:** CHEM 3228

At the end of the laboratory course, the students will be able to:
1. Estimation of rate constant by applying Arrhenius theorem.
2. Understand the estimation of rate law parameters for a given reaction in a batch reactor by using two different methods.
3. Determine the rate law parameters in a Mixed Flow Reactor for a given reaction.

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4.   Estimation of residence time distribution in a Plug Flow Reactor for a given reaction.
5.   Find the residence time distribution by applying Non-ideal dispersion model in CSTRs in series.
6.   Estimation of mass transfer coefficients in mass transfer with and with-out chemical reactions.

Course Title: Mass Transfer Operations Lab   **Course code:** CHEM 3229

At the end of the course students are able to:
1.   Perform experiments in relation to the Mass Transfer fundamentals.
2.   Find out diffusivity and mass transfer coefficients.
3.   Compare the equilibrium data developed with the theoretical data.
4.   Evaluate the effectiveness of different separation techniques.

B.Tech - 7th semester

Course Title: Engineering Economics and Project Management   **Course code: HS 3405**

At the end of the course students are able to:
1.   Understand basic principles of engineering economics.
2.   Evaluate investment proposals through various capital budgeting methods.
3.   Analyze key issues of organization, management and administration.
4.   Evaluate project for accurate cost estimates and plan future activities.

Course Title: Computational Fluid Dynamics   **Course code: ME 4450**

At the end of the course, the students will be able to:
1.   Understand the basic principles of mathematics and numerical concepts of fluid dynamics.
2.   Develop governing equations for a given fluid flow system.
3.   Adapt finite difference techniques for fluid flow models.
4.   Apply finite difference method for heat transfer problems.
5.   Solve computational fluid flow problems using finite volume techniques.
6.   Get familiarized to modern CFD software used for the analysis of complex fluid-flow systems.

Course Title: Numerical Methods in Chemical Engineering   **Course code:** CHEM 4430

At the end of the course, the students will be able to:
1.   Perform an error analysis for a given numerical method
2.   Solve a linear system of equations and non-linear algebraic or transcendental equation using an appropriate numerical method
3.   Approximate a function using an appropriate numerical method
4.   Calculate a definite integral   and evaluate a derivative at a value using an appropriate numerical method
5.   Solve an Ordinary differential equation using an appropriate numerical method
6.   Solve partial differential equations using an appropriate numerical method

Course Title: Scale-up methods in Chemical Engineering   **Course code:** CHEM 4431

At the end of the course, the students will be able to:
1.   Understand any given chemical process and develop flow chart

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2. Develop scale up equations based on physical and chemical laves to design appropriate equipment
3. Test the scale up design and suggest the design of equipment
4. Address the problems related to environmental challenges
5. **Evaluate the material and energy requirements**

Course Title: Thermodynamic Properties of Crudes and Refinery Design   **Course code:** CHEM 4432

At the end of the course, the students will be able to:
1. Get conversant the basic separation and conversion processes used in refining crude oil
2. Apply chemical engineering principles to the analysis of safe and efficient refinery operations
3. Use the Fenske Underwood and Gilliand method in designing oil-water separators, Design of light end units.
4. **Design ADU/VDU and absorbers**

Course Title: Biochemical Engineering   **Course code:** CHEM 4433

At the end of the course, the students will be able to:
1. Understand the different cells and their use in biochemical processes
2. Understand the role of enzymes in kinetic analysis of biochemical reaction
3. Apply the basic concepts of thermodynamics, mass and energy balances, reaction kinetics and reactor design for biochemical processes
4. Analyze bioreactors, upstream and downstream processes in production of bio-products
5. Demonstrate the fermentation process and its products for the latest industrial revolution

Course Title: Clean Process Technology   **Course code:** CHEM 4434

Upon completion of this course, the students will be able to:
1. Understand the concept of environmental sustainability, and the difference between pollution prevention vs. pollution control.
2. Describe cleaner production activities and its benefit.
3. Describe the function of process internal solutions to minimize air pollution emissions (flue gas pollutants and VOC) and emissions through waste water discharges.
4. Explain the function of different process external methods to minimize pollutions to air or water.
5. Explain the concept of industrial ecology and its benefit.

Course Title: Corrosion Engineering   **Course code:** CHEM 4435

At the end of the course, the students will be able to:
1. Understand the electrochemical and metallurgical behavior of corroding systems.
2. Apply the electrochemical and metallurgical aspects of combating eight forms of corrosion.
3. Select or choose the testing procedures for corroding systems.

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4.   Evaluate the polarization behavior of corroding systems.
5.   Design of suitable materials, methods to combat corrosion.
6.   Predict the function of corrosion inhibitors.

Course Title: Fluidization Engineering   **Course code:** CHEM 4436

At the end of the course, the students will be able to:
1.   Understand the fluidization behavior.
2.   Estimate pressure drop, bubble size, voidage, heat and mass transfer rates for the fluidized beds.
3.   Write model equations for fluidized beds.
4.   Design gas-solid fluidized bed reactors.

Course Title: Process Equipment Design and Drawing Lab   **Course code:** CHEM 4437

At the end of the course, the students will be able to:
1.   Identify equipment and process involved in process flow diagrams.
2.   Demonstrate process from process flow diagrams.
3.   Explain the different control strategies employed in the process from the instrumentation diagrams
4.   State the IS Codes used in the mechanical design.
5.   Design and draw fabrication diagrams by scaling.

Course Title: Process Simulation Lab   **Course code:** CHEM 4238

At the end of the course, the students will be able to:
1.   Identify MATLAB as a simulating tool to solve chemical engineering problems
2.   Solve steady state chemical engineering problems using MATLAB
3.   Use the commercial simulation tools like ASPEN PLUS
4.   Develop solutions for different ideal reactor systems
5.   Simulate basic Heat transfer and Mass transfer equipment

B.Tech - 8th semester

Course Title: Process Modeling &Simulation   **Course code:** CHEM 4439

At the end of the course, the students will be able to:
1.   Understand the stages involved in the development of a process model.
2.   Formulate a chemical engineering problem as a mathematical model from basic engineering principles.
3.   Identify the appropriate numerical solutions used in solving the models
4.   Apply various simulation tools for solving the chemical engineering models developed.
5.   Understand the solution techniques for solving ODEs.

Course Title: Transport Phenomena   **Course code: CHEM 4440**

:At the end of the course, the students will be able to:
1.   Use the general equations of change for specific applications.
2.   Analyze advanced transport problems in heat, mass, and momentum, both macroscopic and microscopic.
3.   Formulate simultaneous energy and mass balances in chemical processes.
4.   Solve simple linear partial differential equations arising in transport problems.

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5. Recognize initial-value versus boundary-value problems and how to solve them either analytically or numerically.

Course Title: Design and Analysis of Experiments   Course Code: **CHEM 4441**
At the end of the course, the students will be able to:
1. Predict how many numbers of experiments are to be carried out, given the number of important factor
2. Design an experiment and calculate the factor levels that optimize a given objective.
3. Use response surface methodology to optimize the process, by considering curvature effects.
4. Understand strategy in planning and conducting experiments
5. Choose an appropriate experiment to evaluate a new product design or process improvement

Course Title: Novel Separation Techniques   **Course code: CHEM 4442**
At the end of the course, the students will be able to:
1. Explain different types of adsorptive separations and derive the equations for the same.
2. Design the chromatographic columns
3. Develop design equations for membrane separation processes such as RO&UF.
4. Explain concepts of surfactant based separations
5. Explain physico chemical aspects and applications of Super critical fluid extraction
6. Explain the applicability of electric, magnetic and centrifugal separation processes for practical situations

Course Title: Process Intensification   **Course Code: CHEM 4443**
At the end of this course, students are able to:
1. Assess the values and limitations of process intensification, cleaner technologies and waste minimization options
2. Measure and monitor the usage of raw materials and wastes generating from production and frame the strategies for reduction, reuse and recycle.
3. Obtain alternative solutions ensuring a more sustainable future based on environmental protection, economic viability and social acceptance.
4. Analyze data, observe trends and relate this to other variables.
5. Plan for research in new energy systems, materials and process intensification.

Course Title: Process Optimization   **Course Code: CHEM 4444**
At the end of the course, the students will be able to:
1. Apply the knowledge of optimization to formulate the problems
2. Analyze the optimization criterion for solving problems
3. Apply different methods of optimization and to suggest a technique for specific problem
4. Apply simplex method for linear optimization problems

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5. Understand advanced optimization techniques like Genetic algorithms
6. Understand how optimization can be used to solve the industrial problems of relevance to the chemical industry

Department of Information Technology B.Tech (IT) - 3rdSemester

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
At the end of the course the learners will be able to

1. Explain the application of Managerial Economics in various aspects of decision making.
2. List determinant factors of Elasticity of Demand and carry out Demand Forecasting.
3. Discuss the production functions and outline concepts of cost functions.
4. Outline classification of markets and Contrast price determination in various market situations.
5. Understand the things that are important to them in order to start the business organization.
6. Understand the key elements of the capital budgeting and evaluating investment proposals.
7. List the basic requirements and formats of financial statements.
8. Appreciate analysis and interpretation of Financial Statement through ratios.

Course Title: DATA STRUCTURES   Course Code: IT 2401 L
At the end of the course students are able to:
1. Create and manage data structures for developing real world applications.
2. Use algorithms and data structures in well-written modular code in an adequate and optimal way.
3. Apply the data structure array for various list processing operations such as searching and sorting.
4. Decide to use array or linked-list for solving a given problem.
5. Differentiate between linear and non-linear data structures.
6. Use appropriate Data Structure for implementation of various algorithms in subsequent course of the study.

Course Title: DIGITAL LOGIC DESIGN   Course Code: ECE 2406 After undergoing the course students will be able to:
1. Differentiate between analog and digital representations.
1. 2. Convert a number from one number system to its equivalent in of the other Number system.
2. Understand the difference between BCD and straight binary.
3. Implement logic circuits using basic AND, OR and NOT gates.
4. Use De-Morgan's theorem to simplify logic expressions.

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5. Describe the concept of active LOW and active HIGH logic signals.
6. Use Boolean algebra and K-map as tool to simplify and design logic circuits.
7. Design simple logic circuits without the help of truth tables.
8. Construct and analyze the operation of flip-flop and troubleshoot various types of flip-flop circuits.
9. Understand the internal logic diagrams of Integrated circuits
10. Design various types of sequential circuits like counters, state machines etc

Course Title: DISCRETE STRUCTURES AND GRAPH THEORY   Course Code: CSE 2404
At the end of the course students will be able to:

1. Apply the concept of logical equivalence and its relationship to logic circuits and Boolean functions.
2. Use Concepts of graph theory to provide solutions for routing applications in computer networks.
3. Use concepts of functions for data retrieval in database applications.
4. Apply concepts of counting and probability in data mining.
5. Apply the recurrence relation for analyzing recursive algorithms.

Course Title: OBJECT ORIENTED PROGRAMMING THROUGH JAVA Course Code: IT 2402
At the end of the course students will be able to:
1. Know the concepts of classes, objects, members of a class and the relationships among them
2. Implement Applications using Packages
3. Handle runtime errors using Exceptions handling mechanism.
4. Develop application for concurrent processing using Thread concepts
5. Design interactive applications for use on internet.
6. Design applets that take user response through various peripheral devices such as mouse and keyboard by event handling mechanism

Course Title: PROBABILITY and STATISTICS   Course Code: MATH 2405
After undergoing the course, Students will be able to understand

1. Solve problems related to conditional and joint probability for information theory and coding
2. Solve problems on density functions and cumulative density functions which is useful in probability of error estimations in digital communication systems
3. calculate mean and variance of the random signal using probability density function and MGF which are useful in stastical signal processing, Bio medical processing etc
4. Able to transform of random variables in one domain to another domain for statical signal processing, Bio medical processing
5. Identify the signals stationary or non stationary useful for biomedical signal processing

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6. Find the auto correlation and cross correlation of any two similar random signals in signal processing and communication
7. Understand the different noise sources for noise estimation in noisy signals in signal processing and communication
8. Find the relationship between power density spectrum and auto correlation in Radar signal processing tracking and target detection

Course Title: COMPUTER ORGANIZATION   Course Code: CSE 2403
At the end of the course students are able to:
1. Know the different components of the computer system, their functions and their interconnections.
2. Know the various instruction formats that the processor follows.
3. How the control unit generates control signals to execute a particular instruction.
4. Understand how the memory system can be suitably designed to improve the performance of the computer.
5. Know how high speed computers can be designed by using the pipelining and multiprocessor

Course Title: DATABASE MANAGEMENT SYSTEMS Course Code: IT 2405
At the end of the course students will be able to:

1. Identify and define the data models needed to design a database
2. Create conceptual and logical database design for Large enterprises
3. Apply Integrity constrains over the relations
4. Apply normalization process on existing database for eliminating redundancy
5. Apply the recovery techniques for managing the database effectively to avoid the data lose

Course Title: DESIGN ANALYSIS AND ALGORITHMS   Course Code: IT 2406
At the end of the course students will be able to:

1. Analyze the algorithms for best and worst case performances
2. Demonstrate the ability to develop efficient and fast algorithms using divide and conquer design method.
3. To apply the concepts of disjoint sets and its operations in field of data structure.
4. To find optimal solutions by applying various optimal problems using greedy algorithm.
5. To apply the dynamic programming method for solving complex problems with the help of divide and conquer design method.
6. To apply the backtracking approaches to find various solutions for a given problem.

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7. To apply the knowledge of branch and bound method to solve problems optimally where advanced algorithm design techniques failed.
8. To distinguish the problems and its complexity as polynomial and NP problems.
9. To apply the knowledge of all designing methods to develop applications in computer science and engineering.

Course Title: OPERATING SYSTEMS Course Code: CSE 2407
At the end of the course students will be able to:

1. Understand the various concepts of process
2. Implement concurrency mechanisms
3. Implement Bankers Algorithms to handle deadlocks
4. Design and analyze mechanisms used in memory management
5. Develop processor scheduling, Paging technique Algorithms

Course Title: DESIGN AND ANALYSIS OF ALGORITHMS LAB   Course Code: IT 2208

After undergoing the course, Students are able to
1. To understand the methods for analyzing the efficiency and correctness of algorithms.
2. To analyze the running time of the basic algorithms for the classic problems in various domains.
3. To design algorithms using the dynamic programming, greedy method, Backtracking, Branch and Bound strategy .
4. To choose appropriate algorithmic design techniques to present an algorithm that solves a given problem.
5. To develop an efficient algorithms for the new problem with suitable designing techniques.

B. Tech- 5 th Semester
Course Title: SOFTWARE ENGINEERING   Course Code: CSE3409
At the end of the course students are able to :
1. Design and develop real-time software projects with effective cost estimation and plan Make feasibility study of a project
2. Specify the design and architectural style of the software products Propose testing strategy for a given software

Course Title: COMPILER DESIGN   Course Code: IT3409
At the end of the course the students are able to:
1. Understand the requirement of compiler design.
2. Apply working skills in theory and application of finite state machines, recursive descent, production rules, parsing, and language semantics.
3. Understand about powerful compiler generation tools.
•

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4. Apply the ideas, the techniques, and the knowledge acquired for the purpose of other software design.

Course Title : Management Science   **Course Code: HS3406**

At the end of the course students are able to:

1. Plan, organize, direct and control the functions and forms of an organization
2. Apply the knowledge of work study and its application in the day-to-day life
3. Synthesize information regarding the effectiveness of recruiting methods and the validity of selection procedure, and make appropriate staffing decisions
4. Analyze companies' internal and external resources and capabilities
5. Evaluate a project, develop the scope of work, provide accurate cost estimates and to plan the various activities

Course Title: COMPUTER NETWORKS   **Course Code: IT3410**

At the end of the course students are able to:

6. Suggest appropriate network model for data communication.
7. Know how reliable data communication is achieved through data link layer. Propose appropriate routing algorithm for data routing.
   Connect internet to the system and knowledge of trouble shooting.

Course Title: MICROPROCESSORS AND INTERFACING   **Course Code: ECE 3429**

After undergoing the course, students will be able to

1. Understand the full internal workings of a typical simple CPU including the utilization of the various hardware resources during the execution of instructions.
2. Introduce the design of basic I/O hardware and microprocessor interfacing: memory chip selection, memory expansion, I/O interfacing.
3. Interface input and output devices like LCD, LED, Keyboards ADC, DAC and stepper motor to microprocessors.
4. Design the home appliances and toys using Microprocessor chips.

Course Title: COMPUTER GRAPHICS   **Course Code:CSE3412**

At the end of the course students are able to :

1. Be familiarized with contemporary graphics hardware, the actual methodology and techniques to draw computer graphics, animations etc. for the real world presentation and how it is implemented in Computer graphics software
2. Develop new kinds of graphics and animations.
3. Design and develop graphics applications with the implementation of advanced methods such as ray tracing, texture mapping, illumination and shading and be able to build interactive user interface to manipulate objects in a 3D scene and also in the development of Web pages.
4. Demonstrate the ability to develop an animation movie.

Course Title: Real Time Operating System   **Course Code: CSE3430**

At the end of the course students are able to:

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1. Present the mathematical model of the system and to develop real time algorithm for task scheduling.
2. Understand capabilities Handling Resource Sharing and dependencies among Real-time Tasks
3. Generate a high-level analysis for Scheduling Real-time tasks in multiprocessor and distributed systems
4. Understand the working of real time operating systems and real time database.

Course Title: COMPUTER NETWORKS LAB   Course Code:IT3211
At the end of the course students are able to:

1. By learning models students suggest appropriate network model for data communication. Know how reliable data communication is achieved through data link layer.
2. Suggest appropriate routing algorithm for the network. Provide internet connection to the system and its installation.

Course Title: OPERATING SYSTEMS & COMPILER DESIGN LAB Course Code: IT3212

After completion of this course, the students would be able to

1. Determining the reasons of deadlocks, and their remedial measures in an operating system Comparing and analyzing different file systems being used in different operating systems. Understand, and use Context free grammar, and parse tree construction
2. Evaluating the working of lex and yacc compiler for debugging of programs

Tech- 6 th Semester

Course Title: DATA WAREHOUSING AND DATA MINING   Course Code: IT3413

At the end of the course students are able to:
1. Design a data mart or data warehouse for any organization Extract knowledge using data mining techniques
2. Adapt to new data mining tools
3. Explore recent trends in data mining such as web mining, multimedia mining

Course Title: OBJECT ORIENTED ANALYSIS AND DESIGN Course Code: IT3414

After undergoing the course, students will be able to understand:
1. Understand the use of unified modeling language for object oriented analysis and design Know the syntax of different UML diagrams.
2. Develop different models for a software system.
3. Apply object oriented analysis and design to build a software system Apply forward and reverse engineering for a software system.

Course Title: WEB TECHNOLOGIES   Course Code: IT3415

At the end of the course students are able to:
1. Choose, understand, and analyze any suitable real time web application.
   Integrate java and server side scripting languages to develop web applications.

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2. To develop and deploy real time web applications in web servers and in the cloud.
3. Extend this knowledge to .Net platforms.

Course Title: DISTRIBUTED DATABASES   Course Code: IT3416

At the end of the course the student will be able to:
1. Decompose global relations into fragments.
2. Apply DDBMS in Data Warehousing, web-based databases and pull/push based technologies. Analyze the principles applied in contemporary distributed database systems.
3. Evaluation of CORBA architecture for interoperable databases.

Course Title   : **INFORMATION RETRIEVAL SYSTEMS**   Course Code : IT4423

At the end of the course the students are able to:
1. Learn Classical and advanced techniques employed by Web Search engines
2. Know different ways of representation and retrieval of documents.
3. Apply techniques of preprocessing needed for IRS
4. Develop an IRS by using different user search techniques and text search algorithms

Course Title: Information Security   Course Code: CSE 3413

At the end of the course students are able to :
1. To analyze a given system with respect to security of the system.
2. To create an understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works.
3. To examine the issues and structure of Authentication Service and Electronic Mail Security
4. Understand conventional and public key cryptographic approaches used in message encryption.
5. Able to identify various types of attacks and its effect over the networks.

Course Title: CLOUD COMPUTING   Course Code: IT3418

1. Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.
2. Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
3. Identify problems, and explain, analyze, and evaluate various cloud computing solutions. Attempt to generate new ideas, innovations in cloud
4. computing and Collaboratively research and write a research paper, and present the research online.

Course Title: OBJECT ORIENTED ANALYSIS AND DESIGN LAB Course Code: IT3219

1. **Course Outcomes:** At the end of the course students will be able to   Know the syntax of different UML diagrams.
2. Create different UML diagrams for a software system
3. Identify appropriate models to represent a software system.

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4. Analyze and design a software system in an object oriented style using tools like Rational Rose.

Course Title: WEB TECHNOLOGIES LAB   Course Code:IT3220

At the end of this course the student can answer how to:

1. Integrate frontend and backend web technologies in distributed systems. Facilitate interface between frontend and backend of a web application. Debug, test and deploy web applications in different web servers.
2. Migrate the web applications to the other platforms like .Net

B. Tech- 7 th Semester

Subject Name : NETWORK PROGRAMMING Subject code:IT4422

1. After undergoing this course, students will be able to
2. Comprehend Networking concepts.
3. Differentiate various network protocols like TCP, UDP etc.
4. Compare SOCKETs in IPV4, IPV6 & ICMPV6
5. Implement different types of communications in LAN.
6. Demonstrate Inter Process Communication.

Course Title: ARTIFICIAL INTELLIGENCE   Course Code: IT4421

After undergoing the course, Students will be able to:

1. Use the heuristic search techniques for AI related problems. Represent knowledge in suitable forms for computer processing.
2. Apply the natural language processing techniques to solve real life problem. Apply different m/c learning techniques to design computational models .

Course Title: E– Commerce   Course Code: CSE4427

At the end of the course students are able to:

- Examine some typical distributed applications.
- Detail some of the problems that are encountered when developing distributed applications.
- Understand some of the technologies that are used to support distributed applications.
- Illustrate some of the business models used in the internet.

Course Title : **MOBILE COMPUTING** Course Code : CSE4423

At the end of the course students are able to:

1. Demonstrate knowledge of different voice and data communication standards
2. Analyze the need for optimizations in Mobile IP
3. Distinguish between proactive and reactive routing in an Ad hoc network
4. Develop simple app using Android

Course Title: DIGITAL IMAGE PROCESSING Course Code: ECE 4431

After undergoing the course students will be able to

1. appreciate image manipulations and different digital image processing techniques in various fields.
2. Perform basic operations like – Enhancement, Image transform and restoration techniques on image.

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3. make use of image segmentation , compression for various applications.
4. Analyze pseudo and full color image processing techniques.
5. Apply the various image transforms used in image processing
6. apply MATLAB to implement the image processing techniques.

Course Title: Software Project Management   Course Code: CSE 4422

At the end of the course students are able to:
1. Apply and practice Project Management principles while developing a software.
2. Defining and implementing software project planning.
3. Analyzing software risks and risk management strategies
4. Defining the concepts of software quality and reliability on the basis of international quality standards.
5. Knowing and implementing the software project management tools

Course Title: Human Computer Interaction   Course Code: IT4431

At the end of the course students are able to :

• Define problem space and formulate conceptual models

• Interpret social mechanisms used in communication

• Implement user-centered approaches to interaction design

• Develop cognitive and information processing systems

• Deploy product assessments related to market analysis

Course Title: NETWORK PROGRAMMING LAB   Course Code: IT2227

After undergoing this course, students will be able to
1. Develop and implement distributed applications and protocols over intranet using Network Programming concepts.
2. Apply contemporary theories, processes and tools in the development and evaluation of solutions to problems in network programming.
3. Evaluate basic theories, processes and outcomes of network programming.
4. Apply theory, techniques and   relevant   tools   to   the   specification, analysis,   design, implementation and testing of a simple twork programs.
5. Carry out Research and development tasks in networking.

Course Title: Dataw Warehousing and Data Mining LAB Course Code:IT2226

At the end of the course students are able to:
1. Implement the algorithms to solve data mining problem using WEKA tool Identify an appropriate method to apply in a given situation
2. Communicate results in terms relevant to science, business etc. Apply different clustering techniques to characterize subgroups.

B. Tech- 8 th Semester

Course Title: MIDDLEWARE TECHNOLOGIES   Course Code: IT4421

At the end of the course students are able to:

1. Choose appropriate client server computing model for given problem. Design a dynamic remote application with RMI and JDBC Connectivity. Develop client server applications using C#.net
2. Select appropriate language for homogeneous and heterogeneous objects. Develop real time projects by combining CORBA and database interfacing

Course Title: DESIGN PATTERNS   Course Code: IT4430

At the end of the course students are able to:
- Classify and document design patterns
- Understand patterns to manage algorithms and assign responsibilities to objects

- Apply patterns to solve design problems •
   Create new design patterns

Course Title: Multimedia Systems   Course Code: CSE 4424

At the end of the course students are able to:
1. Use different realizations of multimedia tools.
2. Implement various multimedia applications and Action scripts.
3. Analyze various storage technologies.
4. Apply video **compression Techniques for real time applications.**

Course Title: BIO-METRICS   Course Code: IT4428

After undergoing this course, students will be able to

Comprehend the fundamentals of biometrics
1. Analyze the flow of processing in various biometrics modalities
2. Implement some of the biometrics authentication Investigate ways to improve some of the existing techniques Synthesize some of the biometrics authentication systems

Course Title: Network Management Systems   Course Code: IT4429

At the end of the course the students are able to:
1. Understand the fundamentals of telecommunication systems necessary for the effective management of organizations that develop and operate them
2. Take short-term and long-term business and technical decisions
3. Analyze and maintain communication networks
4. Design a network project plan for an organization

Department of Power Engineering

Course Title: ENGINEERING THERMODYNAMICS   Course Code: ME2404

After undergoing the course, Students will be able to understand
1. Gain the knowledge on open, closed or isolated type of thermodynamic systems in the energy perspective Apply the laws of thermodynamics to the practical problems.
2. Analyze the Isobaric, Isochoric, Isothermal, Adiabatic and polytrophic type of flow and non-flow processes.
3. Apply the laws of thermodynamics to the practical problems.

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4. Gain the knowledge in relating the performance among heat pump, heat engine and a refrigerator.
5. Gain the knowledge on the concept of entropy
6. Gain the knowledge in analyzing the mixtures of perfect gases.
7. Measure the entropy, enthalpy, internal energy and quality of the steam.
8. Gain the knowledge in estimating the efficiency of the various engines working on Otto, Diesel, Dual Combustion type of cycles

Course Title: FLUID MECHANICS   Course Code: ME2405

After the end of the course, Students are able to:

1. Understand the concepts of fluid properties like specific gravity, viscosity, density, surface tension.
2. Determine the pressure head of a fluid in a pipe by using manometer.
3. Understand the friction losses while flowing through a pipe and also used for the designing of pipeline net work.
4. Understand the minor losses and evaluate the performance of a fluid transport system.
5. This study is used for the hydraulicstrictures.
6. This is study is applied for the design of pipes flows
7. Used for the estimation of flows in pipes, open channels and over head tanks.
8. This study is used for the estimation of shear stress and velocity gradient for the design ofsubmersed bodies.

Course Title: MECHANICS OF SOLIDS   Course Code: ME2414

After undergoing the course, Students will be able to
1. Design and conduct experiments on mechanical testing and also could analyze and interpret data
2. Design a component to meet desired needs.
3. Analyze the state of stress and strain at any point in a member.
4. Identify, formulate, and solve structural engineering problems.
5. Learn modern experimental techniques, concepts and tools in mechanical testing of materials.
6. Understand the effect of shape and size of component on stresses and strains.
7. Apply the basic mechanical principles underlying modern approaches for design of various types of structural members subjected to axial load, torsion, bending, transverse shear and combined loading.
8. Apply computational skills to formulate and solve problems related to the determination of the stresses, strains, and deflections produced by loads.

Course Title: ELECTRICAL CIRCUIT AND FIELD THEROY   Course Code: EEE2411

After the completion of the course, students are able to
1. Investigate the methods to improve power factor in power system networks.

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2. Understand 3-phase ac circuits for designing and analysis of power system networks.
3. Understand network theorems to simplify the complex networks.

Course Title: Solid Mechanics Lab Course code: CE 2207

At the end of course student will be able to
1. Estimate compressive strength of wood/Concrete/Brick materials
2. Check the suitability of wood, steel and concrete in construction works.
3. Find the impact resistance of steel used in construction works.
4. Estimate young's modulus of wood/steel materials

Course Title: Circuits & Simulation Lab   Course code: EEE 2213
1. Understand the performance of an ac circuit during resonance conditions.
2. Design the time constants of an electrical circuit for satisfactory performance during transient

Course Title: APPLIED THERMAL ENGINEERING   Course Code: ME2410

At the end of the ourse students are able to:
1. Gain the knowledge about Working principle of two stroke and four stroke SI and CI Engines
2. Gain the knowledge about engine associated systems such as lubricating system, cooling system, fuel feed system, ignition system , their necessity, requirements, construction details, different types and their working
3. Gain the knowledge the concept of combustion in Spark ignition engine, Pressure Vs crank angle diagrams, and pre-ignition
4. Gain the knowledge the concept of combustion in Compression ignition engine, Pressure Vs crank angle diagrams, Knocking, Detonation
5. Gain the knowledge about performance calculations in I.C.Engine
6. Gain the knowledge about engine pollution and working of catalytic converter
7. Gain the knowledge about working principle of reciprocating compressors and its efficiencies
8. Gain the knowledge about Mechanical details of axial flow compressors and its efficiencies

Course Title: HYDRAULIC MACHINARY   Course Code: ME 2411
1. Knowledge is useful for the selection of type of turbine required with reference to available head of water and also used for Identification of type of turbine with estimated specific speed.
2. This study is also used for the estimation of efficiency and performance of the turbine with the study of characteristics curves.
3. This study is also used for the estimation of efficiency of different pumps and performance of the pumps with the study of characteristics curves.
4. Study is used for the design and planning of Hydroelectric Power plant with the available water resources and requirement of power.

Course Title: DC MACHINES AND TRANSFORMERS Subject code: EEE 2410

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Upon completion of this course the students are able to:
1. Understand the principle of operation, constructional details of DC machines.
3. Analyze armature reaction which helps in investigating the performance of DC machines.
4. Identify the DC Machine to meet various load requirements by analyzing Load characteristics of shunt, series and Compound machines.
5. Analyze the speed control of D.C. motors by understanding the concepts of back e.m.f, torque developed.
6. Understand the necessity of starters for safe starting of dc motors.
7. Evaluate the performance of DC machine by calculating Losses and Efficiency.
8. Design experimental procedure for testing of DC machines.
9. Apply the three phase transformer in the industrial needs like electrical drives and agricultural pumps etc..
10. Understand parallel operation of transformer, three phase transformer, auto transformer and their practical applications.
11. Analyze equivalent circuits of three phase transformers.
12. Understand the different testing methods for evaluating the various losses of the transformers

Course Title: CONTROL SYSTEMS
Upon completion of this course the students are able to:
1. Apply transfer function and state space model in continuous time control systems.
2. Evaluate the overall transfer function of systems using block diagram and signal flow graph techniques.
3. Analyze the transient and steady state performance of control systems.
4. Investigate the stability of a system using time domain and frequency domain techniques.
5. Design different compensators and controllers in time/frequency domain to improve the performance of systems.
6. Investigate the controllability and observability of control systems for pole placement at desired locations.

Course Title: ELECTRICAL MEASUREMENTS & INSTRUMENTATION   Subject code: EEE 3417
Upon completion of this course the students are able to:
1. Judge a suitable instrument to obtain accurate readings.
2. Measure high voltage and current in the power system using CT and PT.
3. Measure power, power factor and energy in the power system using watt meter, pf meter and energy meter respectively.
4. Demonstrate the design considerations in basic instruments.
5. Evaluate different methods of measuring R, L and C parameters in an electric network.

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6.   Apply different methods to measure non electrical quantities (Temperature, Pressure etc) in industries.

Course Title: FLUID MECHANICS & HYDRAULIC MACHINARY LAB   Course Code: CE 2213

1. Students can able to explain about units, dimensions and fluid statics and its applications.
2. They can able to explain the fluid flow phenomena, types of fluid and its flow types.
3. They can able to derive the continuity equation, momentum balance equation and also solve problems.
4. They can able to derive the mechanical energy balance equation with friction and without friction.
5. They can able to explain and derive compressible fluid flow and flow processes.
6. Students can capable to design turbines with the available heads.
7. Student can able to identify the type of turbine with known specific speed.
8. Student can able identify and design the pumps with known specific speed and manometric head.

Course Title: DC MACHINES AND TRANSFORMERS LAB   Course Code: EEE 2214

After the completion of the course, students are able to

1. Apply the practical methods to find the performance of various types of DC machines.
2. Identify a suitable method to find out performance characteristics of a DC machine.
3. Investigate a suitable DC machine based on its performance characteristics.
4. Design the circuits for safe operation of DC Machines.
5. Apply the speed control techniques of DC motors.
6. Evaluate the performance of transformer by conducting OC and SC tests.
7. Design the practical circuits for safe operation transformers

B.Tech-5th Semester

Course Title : Steam and Gas Turbines Course Code : ME 3421
At the end of the course students are able to:

1. Understand the concept of Rankine cycle.
2. Understand working of boilers including water tube, fire tube and high pressure boilers and determine efficiencies.
3. Analyze the flow of steam through nozzles
4. Evaluate the performance of condensers and steam & gas turbines

Course Title : Design of Heat Transfer Equipment Course Code : PE 3401
At the end of the course students are able to:

1. Understand basic modes of heat transfer and compute temperature distribution in steady state and unsteady state heat conduction

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2.   Analyze heat transfer through extended surfaces
3.   Interpret and analyze free & forced convection heat transfer
4.   Comprehend the phenomena and flow regimes of boiling and condensation
5.   Understand the principles of radiation heat transfer and apply LMTD and NTU methods to design heat exchangers

Course Title : Induction and Synchronous Machines Course Code : PE 3402

   At the end of the course students are able to:
1.   Understand the principles of operation, construction details of three phase induction motor
2.   Understand methods of speed control and methods of calculating performance characteristics of 3-phase induction motor
3.   Evaluate the performance characteristics of 3-phase incaution motor using equivalent circuit and voltage regulation of synchronous generator
4.   Analyze the performance characteristics of synchronous machine using excitation and power circles.

Course Title : Power Transmission and Distribution Subject Code : PE 3403

Upon completion of this course the students are able to:
1.   Under stand representation of transmissions lines and analyze the circuits as standard two port networks
2.   Evaluate the performance of transmission lines with and without loading conditions and voltage at different distribution points in network
3.   Evaluate the mechanical integrity of a transmission system in terms of sag of a long stretched lines and fixed costs and tariffs of generation
4.   Analyze the effect of proximity, corona, and shunt compensation on the performance of transmission line.

Course Title : Power Plant Pollution and Control Subject code : CHEM 4445

After completion of this course the student is able to:
   At the end of the course, the student will be able to:
1.   Understanding of different types of pollution and apply knowledge for the protection and improvement of the environment
2.   Select and use suitable wastewater treatment technique
3.   Identify suitable sampling, analysis and equipment for air pollutants.
4.   Control the pollution in thermal power plants

Course Title : Power Generation Engineering Course Code : PE 3404

At the end of the course students are able to :
1.   Understand the various sources of energy.
2.   Gain the knowledge regarding Equipment, Plant layout, principle of working of various diesel and gas turbine plants.
3.   Understand the various combustion systems.
4.   Familiarize the working principles of various nuclear reactors

Course Title : Power Plant Operation and Maintenance Subject code : PE 3405

At the end of the course students are able to:

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1. Identify pre-requisites for power plant operation and maintenance professional
2. Understand the basic concepts of power plant operation and maintenance systems
3. Understand applicable operation and maintenance method and planning related to specific equipment
4. Understand the importance and application of NDT methods applied to power plant

Course Title : Thermal Engineering Lab Course Code : ME 3226
At the end of the course students are able to:
1. Evaluate the performance of IC engines, reciprocating air compressor
2. Perform heat balance analysis of IC engines.
3. Evaluate the performance of refrigeration and air conditioning systems.
4. Plot Valve and Port timing diagrams of 4-stroke and 2-stroke engines
5. Compile and present specifications of two and four wheelers.

Course Title : Electrical Measurements and Control Lab Subject code : EEE 4236
At the end of the course students are able to:
1. Analyze the quality of the metering instruments and find the reasons behind erroneous operation.
2. Evaluate the functioning of insulators as the voltages levels are varied and justify its installation at any given location.
3. Check the performance of different electric machines by doing qualitative analysis on the parameters of that machine.
4. Design the models of dynamic systems and obtain transfer functions used in real time control applications.
5. Analyze stability of linear time-invariant systems along with their properties and characteristics

B.Tech-6th Semester

Course Title : Engineering Economics and Project Management Course Code: HS 3405
At the end of the course students are able to:
1. Understandbasic principles of engineering economics.
2. Evaluate investment proposals through various capital budgeting methods.
3. Analyze key issues of organization, management and administration.
4. Evaluate project for accurate cost estimates and plan future activities.

Course Title : Switchgear and Protective Devices Course Code : EEE 3423

After completion of this course the students are able to:
1. Apply the electromechanical energy conversion principles for the protection of power system equipment through relays and breakers.
2. Propose suitable protection schemes for different electrical equipment.

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3. Analyze neutral grounding techniques at all locations in a power system.
4. Evaluate the influence of over voltages and over currents in a power system and volt-time characteristics for the insulation coordination to design the proper insulation

Course Title : Power Electronics and Drives Subject Code : PE 3406
After completion of this course student is able to:
1. Calculate the parameters of a circuit with semiconductor power devices, given a specification in terms of power, current , voltage and quality. Understand design and control concepts of Power Electronic devices.
2. Identify suitable converter based on source and load requirements.
3. Understand the speed control and braking methods of electrical drives
4. Design drives for motion control of ac and dc machines.
5. Analyze the performance of a converter control techniques fed drive.

Course Title : Utilization of Electrical Energy Subject code : EEE 3426
After completion of this course the student enables to:
1. Design Electric Drive and elevator used in industries.
2. Maintain various electric heating and welding equipments used in industries.
3. Analyze different schemes of speed control for the traction system.
4. Evaluate Electric Traction system.
5. Identify various domestic electrical appliances

Course Title : Power Plant Safety Systems Subject code : PE 3407
At the end of the course students are able to:
1. Identify hazard and potential hazard areas
2. Develop safety programs to prevent or mitigate damage or losses
3. Assess safety practices and programs
4. Conduct safety audits
5. Improve safety practices

Course Title : Thermal Power Plant Auxiliaries Course Code : PE 3408
At the end of the course students are able to:
1. Acquire the knowledge on the overall process flow in thermal power plant.
2. Understand various parameters taken for site selection and layout considerations.
3. Familiarize with coal handling and ash handling units.
4. Interpret the components of water treatment process.

Course Title : Smart Grid Technology Subject code : PE 3409
Upon completion of this course the students are able to:
1. Understand the smart grid technologies and it's components
2. Design smart Grid to meet the needs of Power utility
3. Adopt new technologies into the Power grid

Course Title : Heat Transfer Lab Subject code : ME 3233
At the end of the course students are able to:

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1. Apply the knowledge of heat transfer to perform experiments related to conduction heat transfer
2. Evaluate heat transfer coefficient in free and forced convection heat transfer situation and the performance of heat exchangers in parallel & counter flow types
3. Determine fin efficiency and emissivity in respective experiments
4. Observe the phenomena of drop and film wise condensation

Course Title : AC Machines Lab   Course Code : PE 3210

After completion of this course student is able to

1. Evaluate various methods of finding voltage regulation in alternators at different load power factors for finding their performance.
2. Investigate the efficiencies of single phase transformer and induction motors through various tests.
3. Analyze the performance of synchronous motors through V and inverted V curves.
4. Synthesize three phase system from two phase system and vice versa using Scott connection of transformers

B.Tech-7th Semester

Course Title : Power Plant Metallurgy and Material Science Subject Code: PE 4411

1. Understand the structure of metals, transformations in solid state, heat treatment of alloys, ceramic and composite materials
2. Understand the constitution of alloys and fundamental concepts of iron-iron carbide equilibrium diagrams and its application in metallurgy
3. Apply the fundamental concepts of equilibrium diagrams
4. Understand the Apply the concepts of non-ferrous metals and alloys in metallurgical areas

Course Title: Flexible AC Transmission Systems Subject Code: EEE 3425

Upon completion of this course the students are able to:

1. Apply knowledge of FACTS Controllers.
2. Design of different compensators in power system network with constraints.
3. Identify, formulate and solve real network problems with FACTS controllers
4. Evaluate various controllers for the given power system network.

Course Title : Microprocessor and Micro Controllers Course Code : ECE 3421

At the end of the course students are able to :

5. Understand the internal working of a CPU including the utilization of the hardware resources.
6. Introduce the design of basic I/O hardware and microprocessor interfacing: memory chip selection, memory expansion, I/O interfacing.
7. Interface input and output devices like LCD, LED, Keyboards ADC, DAC and stepper motor to microprocessors and microcontrollers.
8. Design the home appliances and toys using Microcontroller chips

Course Title : Refrigeration and Air Conditioning Course Code : ME 3431

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At the end of the course students are able to:

9. Understand the principles and applications of refrigeration systems
10. Understand vapor compression refrigeration system and identify methods for performance improvement
11. Analyze air conditioning processes using principles of psychrometry.
12. Evaluate cooling and heating load in an air conditioning system
13. Identify eco-friendly refrigerants and use P-H charts to evaluate the performance of refrigeration systems

Course Title : Power plant Instrumentation and Control Course Code : PE 4412

After completion of this course the student enables to:

1. Understand the instruments and controlling used in power plant
2. Demonstrate instruments used in power plant
3. Analyze the quality of the metering instruments and find the reasons behind erroneous peration.

Course Title : High Voltage Engineering Subject code : EEE 3430

At the end of the course students are able to:Students are able to understand the break down voltage and its importance of various kinds of insulating materials such as solids, liquids, vacuum and gases.

1. Students are able to understand the importance of transients incase of power system elements.
2. Students are able to understand the procedure to measure the high voltages and high currents

Course Title : HV Transmission   Course Code : EEE4438

At the end of the course students are able to:

1. Understand the operational concepts of hv transmission
2. Understand the background and control of HVDV transmission and converters
3. Understands the principle of dc link control
4. Evaluate the fault and protection methods for HVDC transmission. Transmission.

Course Title : Power System Analysis Course Code : EEE 4431

Upon completion of this course thestudents are able to:

1. Model and represent system components (ex. Transformers, lines, generators etc.) for positive, negative and zero sequence networks.
2. Build nodal admittance and impedance matrices for the power system network.
3. Understand and modify existing system and design for future expansion of the system or subsystemsfor load flow study.
4. Learn about power system behavior under symmetrical and unsymmetrical faults, symmetrical component theory.
5. Understand the basic concepts of steady state and transient stabilities and their improvement methods

Course Title : Energy Management and Auditing Course Code : PE 4413

After completion of this course the student enables to:

1. Understand the energy demand and supply, energy crisis and future energy scenario
2. Apply Energy management techniques and perform energy audit
3. Develop and Analyze various energy economics, unit commitment table by

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evaluation optimal power flow
4. Find the requirement for the efficient use of energy resources

Course Title : Power Systems Lab   Subject code :EEE 4237
   After the completion of the course, students are able to
   1. Analyze various characteristics of under/over voltage & current induction relay.
   2. Analyze various characteristics of digital distance relay
   3. Evaluate breakdown strength of Oil.
   4. Analyze the characteristics of a Fuse.
   5. Can evaluate the parameters, performance of a long transmission line

Course Title : Power Systems & Power Plant Simulation Lab Subject code : PE4214
   Upon completion of this course the students are able to:
   1. Analyze various characteristics of Circuit Breaker and PV cell
   2. Analyze Various fault conditions in power systems
   3. Analyze load flows and economic load scheduling in power systems.
   4. Simulate and Analyze networks and power electronic circuits.
   5. Suggest the voltage control method in a power system

B.Tech- 8th Semester
Course Title : Power System Operation and Control Subject code : EEE 4439
   Upon completion of this course the students are able to:
   1. Operate a power system at low cost by allocation of load with equal incremental cost.
   2. Prevent voltage collapse condition from security assessment.
   3. Analyze the steady state and dynamic responses of control systems.
   4. Control the frequency of a single control area by free governor operation and governing system.
   5. Interconnect several areas(State Electricity Boards) to grid by tie-line bias control &make steady state error zero by including proportional and integral control.

Course Title : Advanced Power Generation Technology Course Code : PE 4415
   The course content enables students to:

   1. Understand the limitations of basic steam turbine and gas turbine power plants.
   2. Gain the knowledge on combine cycle power plants.
   3. Acquire knowledge in various direct energy conversion technologies.
   4. Understand the types and working principles of various fluidized bed technology.

Course Title : Computational Fluid Dynamics Course Code : ME 4450
   At the end of the course students are able to:
   1. Derive the basic governing equations applied for fluid flow problems.
   2. Apply the differential equations to fluid flow problems.
   3. Understand the concept of discretization.
   4. Solve simple algorithms for incompressible fluid flow.
   5. Apply the basics of CFD to heat transfer problems.

Course Title : Power Plant Economics and Tariff Regulations Course Code : PE 4416
   After the completion of the course, students are able to

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1. Students will have a basic understanding of conversion of coal, oil, gas, nuclear, hydro, solar, geothermal, etc. energy to electrical energy.
2. Analyze comparisons of capital cost allocation, operating cost, including fuel costs.
3. Know percentages and have understanding for magnitudes of energy and resources used.
4. Understand and analyze fixed and operating costs for various energy sources

Course Title : Power Plant Erection and Commissioning Subject code : PE 4417

At the end of the course students are able to:

1. Identify pre-requisites for erection and commission professional
2. Understand the basic elements of power plant mechanical, electrical and instrumentation and control systems
3. Develop activity sequence for effective implementation of erection and commissioning of a system
4. Assess technical problems during erection and commissioning

Course Title: Machine Design   Course Code: PE 4418

Upon completion of this course the students are able to:

1. Design a component subjected to static loads based on strength and stiffness criterion
2. Design bolted joints, shafts, keys and couplings
3. Design power screws and journal bearings, ball and roller bearings
4. Design power transmission systems including power screws, belts, pulleys, spur and helical gears
5. Provide alternate desing based on requirements

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