Theory Course Objectives

Engineering Chemistry

Course Objectives:

- To attain awareness about the calculation of required Lime and soda for softening of hard water for industrial uses, desalination of brackish water and treatment of municipal water.
- To find out application of green chemistry and awareness of green synthesis, super critical solvent and the battery technology.
- To understand method of corrosion and its prevention.
- To understand concept of construction material as cement, its types, composition, manufacturing process and properties.

Course Outcomes:

After studying this course, students will be able to

1. Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. Design economically and new methods of green synthesis and batteries.
3. Apply their knowledge for protection of different metals from corrosion .
4. Have the knowledge of cementing materials for sound construction like dam, bridge, buildings etc.

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Applied Physics

Course Objectives:

To make the students deal with the basic knowledge of :

Quantum mechanics, Wave-packet & wave equation, Crystal Structure, Semiconductor Physics, Laser & wave optics, Electron Ballistics, Electron Optics, Optical Fibres & Nanoscience..

Course Outcomes:

After studying this course, students will be able to:

1. Demonstrate the quantitative Understanding of the quantum mechanical phenomena and processes and also apply the concepts of quantum mechanics to quantitatively predict behavior of physical systems.
2. Calculate the wavelength of a particle as a function of its momentum and Describe the Davisson-Germer experiment, and explain how it provides evidence for the wave nature of electrons.
3. Describe the behavior of wave packets when they encounter potential energy steps, barriers and wells
4. Demonstrate an understanding of how quantum states are described by wave functions and Solve the Schrodinger equation and describe the properties of a particle in simple potential wells.
5. Demonstrate an understanding of the significance of operators and Eigen value problems in quantum mechanics and also solve one- dimensional problems involving transmission, reflection and tunneling of quantum probability amplitudes.
6. Apply the knowledge of the structures of inorganic and organic solids and understanding of structural principles also differentiate between the characteristics of various unit cell.
7. Apply principles of diffraction of X-rays on single crystals.
8. Explain the basics of band theory of solids also difference between conductors, semiconductors and insulators also demonstrate a clear understanding of theory and function of basic circuit the components such diodes, transistors and semiconductor devices.
9. Describe quantitatively the characteristics of light from pulsed and c.w lasers also explain quantitatively how such characteristics are produced, measured and controlled by laser engineering.
10. Demonstrate an appreciation of the current state of the art in laser physics and applications.
11. Understand the concept of interference also demonstrating thin film interference and determining how the wavelength of incident monochromatic light.

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12. Recognize the basic concept of electric and magnetic field, describe the motion of free electron & other charged particle in electric & magnetic field also describe the straight path of electron with mono-velocity in cross field configuration.
13. Differentiate between the refraction between the light rays and electron beam also identify the various parts of CRO and CRT, to learn how to measure time-varying electronic signals with a CRO, determine the time & voltage values of a signal, measure the frequency of an oscillating signal.
14. Discuss light propagation in an optical fibers,Identify the various types of optical fibers and also determine the dispersion characteristics for the various types of optical fibers.
15. Describe the basic structure of materials down to the nanometer (atomic) level with emphasis on crystal structure and their synthesis.

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Engineering Mechanics

Course Objectives:

- To determine the components of a force & resultant of a concurrent forces system and non concurrent forces system.
- To understand the vectorial and scalar representation of forces and moments.
- To describe static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions forces system.
- To draw complete and correct free-body diagrams and write the appropriate equilibrium equations from the free-body diagram for a concurrent forces system and non concurrent forces system.
- To determine the support reactions on a structure.
- To determine the connection forces in trusses and in general frame structures.
- To determine the internal reactions in a beam by virtual work method.
- To determine the coordinate of centroid of an area, calculate the second moment of an area (moment of inertia), calculate moment of inertia about centroidal and reference axis & also calculate the product of inertia.

Course Outcomes:

Students who successfully complete the course will demonstrate the following outcomes:

- An ability to components of a force & find resultant of a concurrent forces system and non concurrent forces system.
- An ability to construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium.
- An understanding of the analysis of distributed loads.
- A knowledge of internal forces and moments in members.
- An ability to calculate centroids and moments of inertia, Product of inertia.

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Applied Mathematics

Course Outcomes:

1. Use derivative and Successive Differentiation to solve engineering problems.
2. Solve engineering problems using Partial differentiation.
3. Apply concepts of matrices and its application for solving engineering problems and
4. Develop mathematical model for various engineering problems and their solutions
5. Explain data accumulation Ex. Downloading a movie(Data Accumulating)
6. Interpret and draw inferences from mathematical models such as formulas, graphs, tables and schematics;
7. Use arithmetical, algebraic, geometric and statistical methods to solve problems.
8. Represent mathematical information symbolically, visually, numerically and verbally.
9. Estimate and check mathematical results for reasonableness.
10. Recognize the limits of mathematical and statistical methods.
11. Know the risk that extrapolation plays when applying a linear regression equation to data outside the range of the observed x-values.
12. When making statistical decisions regarding correlation students should be able to explain that the results do not imply causation.
13. Determine the direction of the slope of a regression equation from a given correlation, and vice-versa. That is, understand that the slope and correlation are directly related.
14. Understand that change in units does not affect the correlation value between two quantitative variables.
15. When presented with a study of the linear relationship between two quantitative variables students can identify which variable is the response and which is the predictor.
16. Know the risk that extrapolation plays when applying a linear regression equation to data outside the range of the observed x-values.
17. 2When making statistical decisions regarding correlation students should be able to explain that the results do not imply causation.

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18. Determine the direction of the slope of a regression equation from a given correlation, and vice-versa. That is, understand that the slope and correlation are directly related.

19. Understand that change in units does not affect the correlation value between two quantitative variables.

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Advanced Electrical Engineering

Course Objectives:

This course mainly focuses on the fundamental ideas of the **Advanced Electrical Engineering** by providing wide exposure to the basic concepts of Electrical Engineering along with the dynamic implementations of these concepts into everyday life.

1) To Develop basic knowledge in the field of Electrical Engineering in areas like Power Generation, transmission and Distribution and the understanding about conventional/renewable energy sources. Course also provides knowledge of basic protection method and related equipments, etc.
2) Students should be able to calculate the electrical charges of connected load at residential, commercial, industrial premises and understanding of energy tariff by calculating the energy bill. Course also develop the understanding of electrical energy utilization, illumination sources and their selection.
3) The topics also covers description of the construction, principle, applications and performance characteristics of DC machines as well as induction motor.

Course Outcomes :

Upon completion of this course, the students shall be able to

1) To gain the concepts of conventional/renewable energy sources with the knowledge of Generation, transmission and Distribution system.
2) Demonstrate the understanding about necessity of electrical earthing, safety & protecting devices.
3) To calculate the electrical charges and calculating the energy bill by using energy tariff.
4) Demonstrate the understanding about electrical energy utilization, illumination sources and their selection.
5) Describe the construction, principle, applications and performance characteristics of DC machines and Induction motors.

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ENGINEERIN GRAPHICS-I

Course Outcome

Students will be able to:

1. learn how form conical section like ellipse, parabola, hyperbola and special curve cycloid, involute, spiral. Also we learn how a line or point seen from different positions. We learn about projection and how to draw an object in different quadrants.
2. learn types of plane and solid and how a plane or solid seen from different positions.
3. learn conversion of 3D objects into 2D ,different machine parts from different positions, use of quadrant for drawing.we can learn conversion of isometric projection of orthographic.
4. learn conversion of 2D objects into 3D ,different machine parts can combine in a single view called isometric. we can learn conversion of orthographic projection of isometric.

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Laboratory Course Objectives

Engineering Chemistry Laboratory (CHM-103L/203L)

Course Outcome

Students will be able to:

1) Carry out different types of titrations for estimation and analyze the titration results.
2) Apply fundamentals of acid/base reactions, redox reactions and precipitation reactions for quantification.
3) Standardize the solutions using conductivity meter and pH-meter

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Engineering Physics Laboratory (PHY-103L /203L)

Course Outcome

Students will be able to:

1) Distinguish different phenomenon of light like interference, reflection, refraction etc.
2) Construct the various devices based on optical phenomenon.
3) Design the frame work of various electronic circuitries based on semiconducting materials.

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Communication Skills Laboratory (HS 102L/HS202L)

Course Outcomes:

Students will be able to:

1) Develop the inner confidence of the students.
2) Build-up the confident attributes to inculcate the interview techniques.
3) Ascend the pupil's vocabulary.

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Engineering Graphics Laboratory (ME104L/204L)

Course Outcomes:

Students will be able to:

1) Understand and proficient in using language of engineering drawing.
2) Understand the theory of projection.
3) Create and modify two-dimensional orthographic drawings & three-dimensional isometric drawing using AutoCAD software

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Basic Electrical Engineering Laboratory (EE104L/204L)

Course Outcomes:

Students will be able to:

1. Connect the electric circuits based on the syllabus of theory subject and test the performance by way of observation, calculations and conclusion.
2. Demonstrate the concept and significance R, L & C circuits and power and phase relation and measurements of 3 phase system.
3. Determine the power losses/efficiency and voltage drop/voltage regulation of a 1-phase transformer at full load condition.

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Basic Civil Engineering Laboratory (CV105L/205L)

Course Outcomes:

Students will be able to:

1. Comprise knowledge of Building materials, Members and Drawings.
2. Determine linear and angular measurements and perform simple leveling using various surveying instruments.
3. Understand traffic survey, water purification process and compressive strength test on concrete.

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Engineering Mechanics Laboratory (ME202L/102L)

Course Outcomes:

Students will be able to:

1. Visualize various types of forces and their effects
2. Determine experimentally centroid and moment of inertia
3. Verify law of machine using various simple lifting machines

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Basic Electronics Engineering Laboratory (EXE105L/205L)

Course Outcomes:

Students will be able to:

1. Understand the classification of materials and particularly the semiconductors in detail.
2. Understand the behavior and applications of passive components (R, L, and C) and solid state devices such as diodes and Transistors.
3. Will be able to select and use the appropriate instrument for the measurement of electrical parameters professionally.
4. Use the basic logic gates and various reduction techniques of digital logic circuit in detail and design combinational and sequential circuits.

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Basic Computer Programming Laboratory (ICT 106L/206L)

Course Outcomes:

1. After completion of the lab course student should able to:
   Know concepts in problem solving

   To do programming in C language

   To write diversified solutions using C language.

2. Develops basic understanding of computers, the concept of algorithm and algorithmic thinking.
3. Develops the ability to analyze a problem, develop an algorithm to solve it.

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J. D. College of Engineering and Management

Department of Mechanical Engineering

Vision

To be a center of excellence for learning and research in Mechanical Engineering

Mission

- To provide high quality, innovative and research environment in Mechanical Engineering
- To impart soft skill and hard skill to achieve institutional vision

Graduate Attributes

The Graduate Attributes are the knowledge skills and attitudes which the students have at the time of graduation. These Graduate Attributes identified by National Board of Accreditation are as follows:

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

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

3. Design/development of solutions: 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.

4. Conduct investigations of complex problems: 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.

5. Modern tool usage: 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.

6. The engineer and society: 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.

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

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

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

10. Communication: 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.

11. Project management and finance: 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.

12. Life-long learning: 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.

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Program Educational Objectives

PEO 1	Graduates should excel in engineering positions in industry and other organizations that emphasize design and implementation of engineering systems and devices.
PEO 2	Graduates should excel in best post-graduate engineering institutes, acquiring advanced degrees in engineering and related disciplines.
PEO 3	Alumni should establish a successful career in an engineering-related field and adapt to changing technologies.
PEO 4	Graduates are expected to continue personal development through professional study and self-learning.
PEO 5	Graduates should be good citizens and cultured human beings, with full appreciation of the importance of professional, ethical and societal responsibilities.

Program Outcomes

At the end of the program the student will be able to:

PO 1	Apply the knowledge of mathematics, basic sciences, and mechanical engineering to the solution of complex engineering problems.
PO 2	Identify, formulate, research literature, and analyze complex mechanical engineering problems reaching substantiated conclusions.
PO 3	Design solutions for complex engineering problems and design mechanical system components that meet the specified needs.
PO 4	Use mechanical engineering research-based knowledge related to interpretation of data and provide valid conclusions.
PO 5	Create, select, and apply modern mechanical engineering and IT tools to complex engineering activities with an understanding of the limitations.
PO 6	Apply reasoning acquired by the mechanical engineering knowledge to assess societal and safety issues.
PO 7	Understand the impact of engineering solutions on the environment, and demonstrate the knowledge for sustainable development.
PO 8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communicate effectively on complex engineering activities with the engineering community and with society at large.
PO 11	Understand the engineering and management principles and apply these to the multidisciplinary environments.
PO 12	Recognize the need for life-long learning in the broadest context of technological change.

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Program-Specific Outcomes (PSOs)

PSO 1	Make the students employable in engineering industries.
PSO 2	Motivate the students for higher studies and research.

Semester III

Material Science and Metallurgy

CO1	Study various crystal structures of materials
CO2	Understand mechanical properties of materials and calculations of same using appropriate equations
CO3	Evaluate phase diagrams of various materials
CO4	Suggest appropriate heat treatment process for a given application
CO5	Prepare samples of different materials for metallography
CO6	Recommend appropriate NDT technique for a given application

Fluid Mechanics

CO1	Define fluid, define and calculate various properties of fluid
CO2	Calculate hydrostatic forces on the plane and curved surfaces and explain stability of floating bodies
CO3	Explain various types of flow. Calculate acceleration of fluid particles
CO4	Apply Bernoulli's equation and Navier-Stokes equation to simple problems in fluid mechanics
CO5	Explain laminar and turbulent flows on flat plates and through pipes
CO6	Explain and use dimensional analysis to simple problems in fluid mechanics
CO7	Understand boundary layer, drag and lift

Machine Drawing and Computer Aided Drafting

CO1	Interpret the object with the help of given sectional and orthographic views.
CO2	Construct the curve of intersection of two solids
CO3	Draw machine element using keys, cotter, knuckle, bolted and welded joint
CO4	Assemble details of any given part. i. e. valve, pump , machine tool part etc.
CO5	Represent tolerances and level of surface finish on production drawings
CO6	Understand various creating and editing commands in Auto Cad

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Thermodynamics

CO1	Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics.
CO2	Study different laws of thermodynamics and apply these to simple thermal systems like balloon, piston-cylinder arrangement, compressor, pump, refrigerator, heat exchanger, etc. to study energy balance.
CO3	Study various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes.
CO4	Apply availability concept to non-flow and steady flow type systems.
CO5	Represent phase diagram of pure substance (steam) on different thermodynamic planes like p-v, T-s, h-s, etc. Show various constant property lines on them.

Basic Human Rights

CO1	Understand the history of human rights.
CO2	Learn to respect others caste, religion, region and culture.
CO3	Be aware of their rights as Indian citizen.
CO4	Understand the importance of groups and communities in the society.
CO5	Realize the philosophical and cultural basis and historical perspectives of human rights.
CO6	Make them aware of their responsibilities towards the nation.

Semester IV
Manufacturing Processes-I

CO1	Identify castings processes, working principles and applications and list various defects in metal casting
CO2	Understand the various metal forming processes, working principles and applications
CO3	Classify the basic joining processes and demonstrate principles of welding, brazing and soldering.
CO4	Study center lathe and its operations including plain, taper turning, work holding devices and cutting tool.
CO5	Understand milling machines and operations, cutters and indexing for gear cutting.
CO6	Study shaping, planing and drilling, their types and related tooling's

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Theory of Machines- I

CO1	Define basic terminology of kinematics of mechanisms
CO2	Classify planar mechanisms and calculate its degree of freedom
CO3	Perform kinematic analysis of a given mechanism using ICR and RV methods
CO4	Perform kinematic analysis of a given mechanism analytically using vector or complex algebra method
CO5	Perform kinematic analysis of slider crank mechanism using Klein's construction and analytical approach

Strength of Materials

CO1	State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E, μ, etc.
CO2	Recognize the stress state (tension, compression, bending, shear, etc.) and calculate the value of stress developed in the component in axial/eccentric static and impact load cases.
CO3	Distinguish between uniaxial and multiaxial stress situation and calculate principal stresses, max. shear stress, their planes and max. normal and shear stresses on a given plane.
CO4	Analyze given beam for calculations of SF and BM
CO5	Calculate slope and deflection at a point on cantilever /simply supported beam using double integration, Macaulay's , Area-moment and superposition methods
CO6	Differentiate between beam and column and calculate critical load for a column using Euler's and Rankine's formulae

Numerical Methods in Mechanical Engineering

CO1	Describe the concept of error
CO2	Illustrate the concept of various Numerical Techniques
CO3	Evaluate the given Engineering problem using the suitable Numerical Technique
CO4	Develop the computer programming based on the Numerical Techniques

Physics of Engineering Materials

CO1	Understand the different types of structures of solid, defects in solids and analysis of crystal structure by X-ray diffraction technique.
CO2	Understand the origin and types of magnetism, significance of hysteresis loo in different magnetic materials and their uses in modern technology
CO3	Understand the band structure of solids and conductivity, categorization of solids on the basis of band structure, significance of Fermi-Dirac probability functions
CO4	Understand the principles of superconductivity, their uses in modern technology
CO5	Understand the position of Fermi level in intrinsic and extrinsic semiconductors, Semiconductor conductivity
CO6	Understand the electric field in dielectric
CO7	Understand basics of Nano materials, synthesis methods and characterization techniques

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Advanced Engineering Chemistry

CO1	Classify and explain various types of Corrosion and should apply methods to minimize the rate of corrosion.
CO2	Understand and apply the concepts of Photochemical and Thermal reactions.
CO3	Understand the basic concepts of Polymers, Polymerization and Moulding techniques; Determine molecular weight of High-Polymers.
CO4	Understand and apply the basic techniques in Chemistry and capable to explain the concepts of Solvent Extraction.
CO5	Understand and apply various types of Spectroscopic, Chromatographic techniques and also able to explain the concepts of Thermo-Gravimetric Analysis (TGA).

Interpersonal Communication Skill & Self Development

CO1	Acquire interpersonal communication skills
CO2	Develop the ability to work independently.
CO3	Develop the qualities like self-discipline, self-criticism and self-management.
CO4	Have the qualities of time management and discipline.
CO5	Present themselves as an inspiration for others
CO6	Develop themselves as good team leaders

Semester - V
Heat Transfer

CO1	Explain the laws of heat transfer and deduce the general heat conduction equation and to explain it for 1-D steady state heat transfer in regular shape bodies
CO2	Describe the critical radius of insulation, overall heat transfer coefficient, thermal conductivity and lumped heat transfer
CO3	Interpret the extended surfaces
CO4	Illustrate the boundary layer concept, dimensional analysis, forced and free convection under different conditions
CO5	Describe the Boiling heat transfer, mass transfer and Evaluate the heat exchanger and examine the LMTD and NTU methods applied to engineering problems
CO6	Explain the thermal radiation black body, emissivity and reflectivity and evaluation of view factor and radiation shields

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Applied Thermodynamics – I

CO1	Define the terms like calorific value of fuel, stoichiometric air-fuel ratio, excess air, equivalent evaporation, boiler efficiency, etc. Calculate minimum air required for combustion of fuel.
CO2	Study and Analyze gas power cycles and vapour power cycles like Otto, Diesel, dual, Joule and Rankine cycles and derive expressions for the performance parameters like thermal efficiency, Pm
CO3	Classify various types of boiler, nozzle, steam turbine and condenser used in steam power plant.
CO4	Classify various types of IC engines. Sketch the cut section of typical diesel engine and label its components. Define the terms like TDC, BDC, rc, etc.
CO5	Draw P-v diagram for single-stage reciprocating air compressor, with and without clearance volume, and evaluate its performance. Differentiate between reciprocating and rotary air compressors.

Machine Design – I

CO1	Formulate the problem by identifying customer need and convert into design specification
CO2	Understand component behavior subjected to loads and identify failure criteria
CO3	Analyze the stresses and strain induced in the component
CO4	Design of machine component using theories of failures
CO5	Design of component for finite life and infinite life when subjected to fluctuating load
CO6	Design of components like shaft, key, coupling, screw and spring

Theory of Machines – II

CO1	Identify and select type of belt and rope drive for a particular application
CO2	Evaluate gear tooth geometry and select appropriate gears, gear trains
CO3	Define governor and select/suggest an appropriate governor
CO4	Characterize flywheels as per engine requirement
CO5	Understand gyroscopic effects in ships, aeroplanes, and road vehicles.
CO6	Understand free and forced vibrations of single degree freedom systems

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Metrology and Quality Control

CO1	Identify techniques to minimize the errors in measurement
CO2	Identify methods and devices for measurement of length, angle, and gear and thread parameters, surface roughness and geometric features of parts.
CO3	Choose limits for plug and ring gauges.
CO4	Explain methods of measurement in modern machineries
CO5	Select quality control techniques and its applications
CO6	Plot quality control charts and suggest measures to improve the quality of product and reduce cost using Statistical tools.

Product Design Engineering – II

CO1	Create prototypes
CO2	Test the prototypes
CO3	Understand the product life cycle management

Automobile Engineering

CO1	Identify the different parts of the automobile.
CO2	Explain the working of various parts like engine, transmission, clutch, brakes etc.,
CO3	Demonstrate various types of drive systems.
CO4	Apply vehicle troubleshooting and maintenance procedures.
CO5	Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications.
CO6	Evaluate future developments in the automobile technology.

Nanotechnology

CO1	Demonstrate the understanding of length scales concepts, nanostructures and nanotechnology.
CO2	To impart basic knowledge on various synthesis and characterization techniques involved in Nanotechnology
CO3	To educate students about the interactions at molecular scale
CO4	Evaluate and analyze the mechanical properties of bulk nanostructured metals and alloys, Nano-composites and carbon nanotubes.
CO5	To make the students understand about the effects of using nanoparticles over conventional methods

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Energy Conservation and Management

CO1	Understand energy problem and need of energy management
CO2	Carry out energy audit of simple units
CO3	Study various financial appraisal methods
CO4	Analyse cogeneration and waste heat recovery systems
CO5	Do simple

Semester - VI
Manufacturing Processes – II

CO1	Understand the process of powder metallurgy and its applications
CO2	Calculate the cutting forces in orthogonal and oblique cutting
CO3	Evaluate the machinability of materials
CO4	Understand the abrasive processes
CO5	Explain the different precision machining processes
CO6	Design jigs and fixtures for given application

Machine Design – II

CO1	Define function of bearing and classify bearings.
CO2	Understanding failure of bearing and their influence on its selection.
CO3	Classify the friction clutches and brakes and decide the torque capacity and friction disk parameter.
CO4	Select materials and configuration for machine element like gears, belts and chain
CO5	Design of elements like gears, belts and chain for given power rating
CO6	Design thickness of pressure vessel using thick and thin criteria

Engineering Tribology

CO1	Understand the basic concepts and importance of tribology.
CO2	Evaluatethenatureofengineeringsurfaces,theirtopographyandsurface characterization techniques
CO3	Analyze the basic theories of friction and frictional behavior of various materials
CO4	Select a suitable lubricant for a specific application
CO5	Compare different wear mechanisms
CO6	Suggest suitable material combination for tribological design.

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Additive Manufacturing

CO1	Understand the importance of Additive Manufacturing
CO2	Classify the different AM processes
CO3	Design for AM processes
CO4	Understand the applications of AM
CO5	Differentiate the post processing processes

Mechanical Measurements

CO1	Define measurement parameters, and Identify errors in measurement
CO2	Identify methods and devices for measurement of length, angle
CO3	Identify methods and devices for measurement of pressure, flow, force, torque, strain, velocity, displacement, acceleration, temperature

Quantitative Techniques in Project Management

CO1	Define and formulate research models to solve real life problems for allocating limited resources by linear programming.
CO2	Apply transportation and assignment models to real life situations.
CO3	Apply queuing theory for performance evaluation of engineering and management systems.
CO4	Apply the mathematical tool for decision making regarding replacement of items in real life.
CO5	Determine the EOQ, ROP and safety stock for different inventory models.
CO6	Construct a project network and apply CPM and PERT method.

Sustainable Development

CO1	Explain the difference between development and sustainable development
CO2	Explain challenges of sustainable development and climate change
CO3	Explain sustainable development indicators
CO4	Analyze sustainable energy options
CO5	Understand social and economic aspects of sustainable development

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Renewable Energy Sources

CO1	Explain the difference between renewable and non-renewable energy
CO2	Describe working of solar collectors
CO3	Explain various applications of solar energy
CO4	Describe working of other renewable energies such as wind, biomass

Biology for Engineers

CO1	Explain origin of life and Evolution, Cells, Biomolecules-Lipids
CO2	Understand Biomolecules
CO3	Understand Cell structure and function and cell cycle
CO4	Explain Mendelian genetics
CO5	Understand and Explain DNA structure, DNA replication, Transcription, Translation

Solar Energy

CO1	Describe measurement of direct, diffuse and global solar radiations falling on horizontal and inclined surfaces.
CO2	Analyze the performance of flat plate collector, air heater and concentrating type collector.
CO3	Understand test procedures and apply these while testing different types of collectors.
CO4	Study and compare various types of thermal energy storage systems.
CO5	Analyze payback period and annual solar savings due to replacement of conventional systems.
CO6	Design solar water heating system for a few domestic and commercial applications.

Human Resource Management

CO1	Describe trends in the labor force composition and how they impact human resource management practice.
CO2	Discuss how to strategically plan for the human resources needed to meet organizational goals and objectives.
CO3	Define the process of job analysis and discuss its importance as a foundation for human resource management practice
CO4	Explain how legislation impacts human resource management practice.
CO5	Compare and contrast methods used for selection and placement of human resources.
CO6	Describe the steps required to develop and evaluate an employee training program
CO7	Summarize the activities involved in evaluating and managing employee performance.
CO8	Identify and explain the issues involved in establishing compensation systems.

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Programme Educational Objectives :

PEO1 Training:
Students will have to trained in depth of current technical knowledge of Computer Science ,Wireless Computing for effective communication skills, desire for lifelong learning with leader qualities to work in any multidisciplinary areas in a team.

PEO2 Analyze:
To develop an ability to analyze on the requirements of the software design and development in the construction of software systems and computer system to provide efficient engineering solutions with novel product designs.

PEO3 Competence:
Students will provide solutions to challenging problems by implementing the concepts of computer science and wireless computing methodology with competence in the area of humanities and social sciences so as to develop their awareness of community issues and protect environment

PEO4 Learning Attitude:
Students will engage in life long continuous learning and professional development to get used to rapidly changing work experience.

Programme Outcomes:

PO 01: Engineering Knowledge:
The ability to identify ,formulate and solve composite engineering problems with the understanding of mathematics ,science ,algorithm ,computing and wireless principles.

PO 02: Ethics
Ability to develop confidence for self education an ability for ever lasting learning process professionally with ethical principles and environment considerations.

PO 03: Individual Team Work.
The ability to perform the complex task effectively as an individual ,member or group in homogeneous and heterogeneous teams to provide valid conclusion.

PO 04:Modern Tools Usage
The ability to demonstrate on modern technologies tools or software's in implementing real time projects with professional considerations.

PO 05:Design/Development Solutions.
The ability to design system components or processes and implements IT solutions for complex engineering problems.

PO 06:Communication & Research Development
Ability to practice professional and communicate effectively with the interest of graduate students to participate in research and development.

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Learning Outcomes

A Graduate in Computer Science & Engineering will have the ability to

1) An Ability to Communicate computer science concepts , designs to produce effective solutions to the problems.
2) An Ability to understand for collecting the valid inputs for the requirements, design, analysis, implement and testing on the computer system to generate the effective solutions for a specific problems.
3) An ability to use and implements the current technology with a appropriate tools for modern computing practice to meet the desired results .
4) An ability to undertake in continuing professional development with the understanding of local and global change of computing techniques to accomplish a common goal of a client.
5) An Ability to demonstrate effective independent learning strategies.

Graduate Attributes:

GA 1: Priorities

Graduates should identify and establish priorities and goals with the risk of the system(social, business, cultural, environmental, legislative, etc)

GA 2:Problem Solving Attitude

Graduates should be able to identify and implement on relevant problem solving methodology with the proper decision making solutions for effectiveness and reliable designs products and always ready for change.

GA 3: Learning Supports.

Graduates should have the ability to solve their problems independently from the feedback and learning supports from the individual or multi-level, multi-disciplinary and multi-culture settings.

GA 4: Innovation and Creativity through research Skills

Graduates should have the attitude towards personal initiatives through research skills or with the supports of other graduates to process on entrepreneurial activity, innovation and commercialization.

GA 5 : Social Responsibility

Graduates should learn how their actions and efforts can inculcate the well being to the society.

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Course Outcomes

S No	Subject Title	Outcomes
1	Object Oriented Programming	• Understand the difference between object oriented programming and procedural oriented language and data types in C++. • Be able to program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc. • Students will able to simulate the problem in the subjects like Operating system, Computer networks and real world problems.
2	Algorithm & Data Structures	• To access how the choices of data structure & algorithm methods impact the performance of program. • Solved problems based upon different data structure & also write programs. • Choose an appropriate data structure for a particular problem.
3	Internet Programming	• Learn the basic concepts & techniques of java. • Learn the advanced concepts of java. • Generate an application based upon the concepts of java & advance java.
4	Operating System	• To make students able to learn different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system. • To provide students knowledge of memory management and deadlock handling algorithms. • At the end of the course, students will be able to implement various algorithms required for management, scheduling, allocation and communication used in operating system.
5	Computer Graphics	• To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations. • To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations. • The computer graphics course prepares students for activities involving in design, development and testing of modeling, rendering, shading and animation.
6	Computer Architecture & Organization	• Study basic computer organization, design and micro-operations. • Understanding of CPU functioning and computer arithmetic. • Learning various methods and techniques of memory organization.
7	Relational Database Management	• Gain a good understanding of the architecture and functioning of database management systems as well as

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	System	associated tools and techniques, principles of data modeling using entity relationship and develop a good database design and normalization techniques to normalize a database. • Understand the use of structured query language and its syntax, transactions, database recovery and techniques for query optimization. • Acquire a good understanding of database systems concepts and to be in a position to use and design databases for different applications.
8	Computer Networks	• To explain how communication works in computer networks and to understand the basic terminology of computer networks • To explain the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack. • To understand design issues in Network Security and to understand security threats, security services and mechanisms to counter them.
9	Multimedia Technology	• To understand about various latest interactive multimedia devices, the basic concepts about images and image formats. • To understand about data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts about animation. • To develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications surrounding the emergence of multimedia technology.
10	Software Project Management	• Carry out an evaluation and selection of projects against strategic, technical and economic criteria and use a variety of cost benefit evaluation techniques for choosing among competing project proposals. Approach project planning in an organized step by step manner and select an appropriate process model produce an activity plan for a project. • Identify project risks, monitor and track project deadlines and produce a work plan and resource schedule. • Plan the evaluation of a proposal or a product and manage people in software environments. Understand the importance of teamwork and quality management in software project management. Apply these project management tools and techniques in a diversity of fields such as new product and process development, construction, information technology, health care, and applied research.
11	Enterprise Resource Planning	• To make students able to learn fundamental concepts of ERP system and ERP related technologies. • To provide students knowledge of different ERP modules and manufacturing perspectives of ERP. • At the end of the course, students will be able to use ERP

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		system in different business organizations by having knowledge of latest scenario of ERP market in e-business.
12	Internet Security System	• This course builds on the overview about information security, which includes an overview of public and secret key cryptosystems. • Comprehend and apply authentication services and mechanisms. • On completion of this course students will be able to apply the knowledge and skills obtained to study further concepts in information security
13	Object Oriented Modeling and Design	• To understand the concept of object-oriented development, and create a static object model and a dynamic behavioral model and a functional model of the system. • To understand the approaches to system design and object design, and the techniques of translating design to implementation. • To implement the object-oriented modeling and design patterns to provide solutions to the real-world software design problems.
14	Embedded Systems	• To introduce the embedded Hardware and Interfacing. • To make the students familiar with software development & tools for embedded systems. • The objective of the course is to cover the Hardware Design, Software Development & RTOS for the Embedded Systems.
15	Natural Language Processing	• Upon the successful completion of this course, the students will be able to: • To understand the approaches to syntax and semantics in Natural Language Processing, the various types of language processors, the elements of formal language theory, the types of grammar, and the computational morphology. • To understand the basic parsing strategies for context-free grammars, the data structures and algorithms for parsing, and the approaches to ambiguity resolution, generation and dialogue. • explain and apply the fundamental algorithms and techniques in the area of Natural Language Processing.
16	Distributed Computing	• Study software components of distributed computing systems. Know about the communication and interconnection architecture of multiple computer systems. • Recognize the inherent difficulties that arise due to distributed-ness of computing resources. Understanding of networks & protocols, mobile & wireless computing and their applications to real world problems. • At the end students will be familiar with the design, implementation and security issues of distributed system.
17	Real Time Systems	• understand the basic concepts and characteristics of real-time systems, assess the difference between hard and soft

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		real-time systems, task models, and common approaches to real-time scheduling. • understand the practical considerations, implementation, pros and cons of clock-driven scheduling, priority scheduling and multiprocessor scheduling, resource access control and synchronization, and models of real-time communication. • understand the principles behind the implementation of real-time systems and the importance of time to computing systems.
18	Digital Image Processing	• understand the mathematical foundations for digital image representation, image acquisition, image transformation, and image enhancement. • understand the mathematical principles of image restoration, image compression, and image segmentation. • develop a theoretical foundation of fundamental concepts of digital image processing.
19	Data Mining & Warehousing	• To understand the basic principles, concepts and applications of data warehousing and data mining, • Ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment • Have a good knowledge of the fundamental concepts that provide the foundation of data mining.
20	Mobile Computing	• To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies. • To provide the student with an understanding of Equalization and diversity reception techniques • To give the student an understanding of digital cellular systems (GSM, GPRS, WAP, cdma2000, and W-CDMA)
21	Distributed Operating Systems	• understand the hardware and software concepts of distributed operating systems, various design issues like transparency, flexilibity etc., and communication and synchronization in distributed operating systems. • understand scheduling in distributed operating systems, fault tolerance, real-time distributed systems, and designing of distributed file systems. • understand the concept of design and implementation in the context of distributed operating systems.
22	Soft Computing	• Understand basics of fuzzy system, genetic algorithms & their relations. • Learn artificial neural n/ws, models 7 their functions. • Apply genetic algorithms & artificial neural N/ws as computation tools to solve a variety of problems in various areas of interest ranging from optimization problems to text analytics.
23	Discrete Mathematics and	• Formulate problems precisely and solve the problems • Illustrate by example, basic terminology and model

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	Graph Theory	problems in computer engineering using graphs and trees • Use graph algorithms for suitable applications
24	System Programming	• Student will understand the role played by system softwares such as assembler,interpreter, linker, loader and compilers in the development of IT solutions. • Students will use regular expressions, deterministic finite automata for solving problems involving pattern matching. • Students can use tools such as lex and yacc to design a compiler for a elementary language grammar. • Student will be able to develop elementary assembler and interpreter
25	Design Patterns	• Understands the concept of pattern based analysis and design. • Understands the pattern based design principle. • Learns that design patterns are solutions, and they can solve many problems that can be encountered in the future. • Understands how to apply the pattern based analysis and design to the software to be developed. • Understands the structure of design patterns. • Understands the logic of design patterns. • Understands the importance of design patterns in software development. • Understands the details of object oriented programming by comparing the object-oriented programming model with the standard structured programming.
27	Theory of Computation	• Acquire a full understanding and mentality of Automata Theory as the basis of all computer science languages design • Be able to design FAs, NFAs, RE, Grammars, languages modeling, small compilers basics • Describe the formal relationships among machines, languages and grammars • Be able to classify languages into their types • Have a clear understanding of the Automata theory concepts such as REs, DFAs, NFAs, Stacks, Turing machines, and Grammars • Have a good knowledge of formal computation and its relationship to languages
28	Theoretical Foundation of Computer Science	• Describe the formal relationships among machines, languages and grammars • Be able to classify languages into their types Have a clear understanding of the Automata theory concepts such as REs, DFAs, NFAs, Stacks, Turing machines, and Grammars • Have a good knowledge of formal computation and its relationship to languages
29	Game Architecture and Programming	• Adapt approaches including some at the forefront of the discipline and identify possibilities for originality or

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		creativity. • Demonstrate understanding of technical components in realizing a 2D game
30	Artificial Intelligence	• Familiar with several powerful search techniques for automatically solving complex problems. • Student will also have sufficient expertise in both the theory of machine learning and its application to data mining, so as to use these powerful techniques in a wide range of • industrial contexts, for example, bioinformatics, electronic commerce, finance. • Techniques and application of machine learning techniques • to data mining. • Implement and execute by hand alpha-beta search. Design good evaluation functions and strategies for game playing
31	Ethics In IT	• Describe and explain historical, legal, professional, and personal reasons why legal and professional definitions of ethics exist. • Describe the benefits that are expected to arise from acting ethically. • Describe the specific consequences of acting unethically. • Familiar with the social impact of decisions and actions of Participants in the computing profession
32	Digital Electronics & Fundamental of Microprocessors	• Students should be able to program using the capabilities of the stack, the program counter, and the status register and show how these are used to execute a machine code program • Students should be able to apply knowledge of the microprocessor's internal registers and operations by PC
33	Design and Analysis of Algorithm	• Basic ability to analyze algorithms and to determine algorithm correctness And time efficiency class. • Master a variety of advanced abstract data type (ADT) and Data structures and their implementations. • Master different algorithm design techniques (brute - force,Divide and conquer, greedy, etc.) • Ability to apply and implement learned algorithm design Techniques and data structures to solve problems.
34	Computer Graphics	• Understand the foundations of computer graphics. • Understand concept of geometric, mathematical and algorithmic concepts necessary for programming computer graphics • Understand the comprehension of windows,clipping and view-ports object representation in relation to images displayed on screen.
35	Data Communications	• Understand the basic concepts of data communication • Describe emerging network technologies

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		• Understand the terminology and concepts of the OSI reference model and the TCP-IP reference model
36	Applied Mathematics	• Solve mathematical problems using analytical methods • Students understand the Breadth and perspective in understanding the relationships of applied mathematical concepts and problems in science and engineering • Skill in mathematical modeling and analysis, as well as skill in communicating their modeling and analysis • Proficiency in scientific computation and the ability to combine analysis and computation • Understand Taylor series to approximate functions and estimate the error of approximation.
37	Java	• Understand the Java programming language: its syntax, idioms, patterns, and styles. • Become comfortable with object oriented programming: Learn to think in objects • Understand the essentials of the Java class library, and learn how to learn about other parts of the library when you need them. • Familiar with event driven Graphical User Interface (GUI) programming
38	Language Processors	• We covered Major concept areas of language translation and compiler design • Develop an awareness of the function and complexity of compilers. • Provide practical, hands on experience in compiler design • Identify the similarities and differences among various parsing techniques and grammar transformation techniques • Ability to use Flex or similar tools to create a lexical analyzer and Yacc/Bison tools to create a parser. • Abilty to design a compiler for a concise programming language.
39	Software Testing & Quality Assurance	• Students can create test procedures. • Students can evaluate the results of tests. • Students can design comprehensive test plan • Students can use test tools to effectively test software. • Students can describe the use of formal verification techniques, including strengths and issues in their use. • Students can assess a software process to evaluate how effective it is at promoting quality. • Students can conduct effective and efficient inspections. • Understand the issues with testing of object-oriented software. • Students can use statistical techniques to evaluate the defect density and the likelihood of faults
40	TCP-IP	• Identify the OSI and TCP/IP layers and their tasks. Distinguish between the OSI reference and the TCP/IP

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		suite of protocols. Interpret and explain physical, logical and port addresses • Understand the importance of DNS within the Internet; • Discuss the data link layer of internet model and classify the various protocols in data link layer Inquire about issues related to framing, flow and error control Differentiate between noisy and noiseless protocols Design the protocols in pseudo code and analyze the same. • Define the Network Layer and describe its functions. Interpret Logical addressing Discuss the format of Ipv4 addresses. • Deploy appropriate addressing for networks and design networks with specified nodes and addresses. • Discuss Ipv6 addresses. Compare Ipv4 and Ipv6 addresses and look into the transition fromIpv4 to Ipv6
41	System Programming	• Understand the importance of systems software's and be able to apply appropriate knowledge of computing and mathematics to solve systems programming problems • Design system-level computing problem, identify ,define and describe the computing requirements appropriate to its result. • Implement and Analyze an integrated core hardware and software system that meets a understandable set of conditions in the system. • Apply design and development principles of system programming to construct complex software systems of integrating Android and Linux devices using current techniques, skills, and tools.
42	Cluster & Cloud Computing	• Understand the broad perspective of different computing model with respect to Grid,Cluster and Cloud • Become comfortable with the cloud Computing Architecture and Service models • Understand the Hypervisor in cloud computing and their types of Virtualization • Understand the Clustering Big Data and Hadoop MapReduce Functions • Hadoop MapReduce Job Execution, Schedulers and Cluster Setup • Understand Cloud Security Challenges • Understand Azure life cycle • Students can create a Virtual Machine

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Civil Engineering Department

Program Outcomes (PO) and their mapping with identified PEOs

The program educational objectives (PEO) of the civil engineering program are that its graduates could demonstrate the following necessary components of a successful engineer and/or consultant within two to four years after the graduation.

1. To train graduate so that they can work and contribute to the infrastructure development projects being undertaken by Govt. and private or any sector.

2. To train graduate in such as a way that they can pursue higher studies so that they can contribute to the teaching profession/ research and development of civil engineering and other allied fields.

3. To train graduate in a manner that they should function effectively in the multicultural and multidisciplinary groups for the sustainable development and growth of civil engineering projects and profession.

Program outcome (PO)		**PEOs that are attained through concerned PO**	**Remark**
a)	An ability to apply knowledge of mathematics, science, and engineering to problem solving.	**1**	
b)	An ability to design and conduct experiments, as well as to analyze and interpret data.	**1,2**	
c)	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacture ability and sustainability.	**1,2,3**	
d)	An ability to function on multidisciplinary teams.	**3**	
e)	An ability to identify, formulates, and solves engineering problems.	**2**	
f)	An understanding of professional and ethical responsibility.	**3**	

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g)	An ability to communicate effectively.	**3**	
h)	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	**1,3**	
i)	Recognition of the need for, and an ability to engage in life-long learning.	**2,3**	
j)	Knowledge of contemporary issues.	**1,3**	
K)	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.	**2,3**	
l)	An ability to work for the infrastructural development, to pursue teaching, research & development activities and to work effectively in a group.	**1,3**	

Course Outcomes (CO)

Course	**CO**
SURVEYING – I (BECVE 404 T)	1. Conceptual clarity of various surveying instruments, operating principles and their suitability with temporary and permanent adjustment. 2. Measurements of distances and angles orientation of various maps. 3. Calculation of areas and volumes for various Civil Engineering survey works.
SURVEYING – I (BECVE 404 P)	1. Survey the area using different methods of plane tabling and compass survey and to adjust the compass traverse graphically. 2. Record the reduced levels using various methods of levelling and measurement of horizontal and vertical angles by Theodolite and setting out curves in the field. 3. Determine the location of any point horizontally and vertically using Tachometry.
CONSTRUCTION ECONOMICS AND FINANCE (BECVE804T)	1. Orientation of various economic concepts related to construction sector and estimation of financial requirements of turnkey construction projects. 2. Develop tools and techniques of economic analysis for improving their decision making skills the knowledge of economics and finance to analyze inflation, recession, financial ratios.

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	3. Develop balance sheet and various financial ratios, measure cost of capital, and working capital management in construction projects and the concept and practice of CIBIL in finance.
CONSTRUCTION MANAGEMENT & LAW (BECVE704T)	1. Demonstrate modern construction techniques planning, scheduling, various controls and various types of equipments, and calculate manpower requirement, planning, resources utilization and management. 2. Implementation of quality control aspects in planning & management, modern trends project management, application of information system in management of construction projects, safety provisions and equipments. 3. Analyze the legal aspects in construction projects through the understanding of various laws pertaining to civil engineering and architectural planning & sanctioning, labor & organizational welfare measure, provisions of arbitration and litigations.
BECVE 302 T STRENGTH OF MATERIALS	1: Perform the stress-strain analysis. 2: Draw force distribution diagrams for beams under different conditions of Loading. 3: Investigate different methods to analyze the deflection of beams under different loading conditions. 4: Visualize force deformation behavior of bodies.
BECVE 302 P : STRENGTH OF MATERIALS	1: Examine various elastic properties of different Metals. 2: Evaluate Young's Modulus, torsional strength, hardness and tensile strength of given specimens. 3: Determine the compressive strength of concrete cubes and bricks.
BECVE 405 T BUILDING CONSTRUCTION & MATERIAL	1: have the exposure to different types of masonry structures. 2: Determine the composition of concrete and effect of various parameters affecting strength. 3: Comprehend components of building and there purposes. 4: Investigate the precast and pre-engineered building construction techniques.
BECVE501T STRUCTURAL ANALYSIS –II	1: Analyze the Structure using matrix method. 2: Calculate the forces in members of Truss, Beams and Frames by Stiffness Method 3: Draw the SFD and BMD for Non Prismatic beams for understanding its behavior 4: Comprehend the principles and concepts related to finite element

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	methods.
BECVE501P STRUCTURAL ANALYSIS –II	1: Analyze and compare the results obtained from the software with the analytical solutions. 2: Design the various Structural elements such as beams frames and truss etc with the help of available commercial software packages.
BECVE602T SURVEYING-II	1: Measure distances and Angles. 2: Identify different types of curves on roads and their preliminary survey. 3: Calculate areas and volumes of earthwork. 4: Comprehend different geodetic methods of survey such as triangulation, trigonometric leveling. 5: Investigate modern advanced surveying techniques.
BECVE602P SURVEYING-II	1: Determine contour level of field. 2: Calculate the tachometric constants and grade of a line. 3: Set the Horizontal and Vertical Curves. 4: Work on detailed Survey Project and prepare maps,cross sections,L-sections Contour map
BECVE 403 T TRANSPORTATION ENGINEERING – I	1. Application of knowledge of design and construction practices in highway engineering and pavement. 2. Develop the basic understanding to maintain and propose measurement. 3. Analyzing and stating main ideas for undertaking Traffic studies. Applying abstractions for various terminologies of Traffic Engineering.
BECVE 403 P TRANSPORTATION ENGINEERING - I	1. Demonstrate various tests on highway materials and draw appropriate conclusion. 2. Recognition of Engineering Surveys and Plannings so that he should be able to plan a new Highway. 3. To design various geometric features of highways. 4. Examinig techniques and rules about various design and construction practices in Highway.

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BECVE802T PAVEMENT ANALYSIS AND DESIGN (ELECTIVE-II)	1. Analyze and Design pavement and under different loading conditions for highways and airfields taking into consideration different characteristics. 2. Propose a pavement management system framework. 3. Design highway appurtenance and highway drainage. 4. Perform different tests considering field conditions to make a judgment, using the knowledge to increase the strength of pavements along with its economy point of view. 5. Applying abstractions for rigid and flexible pavements.
(BECVE702T) ESTIMATING AND COSTING	1. Develop the preliminary estimate for administrative approval & technical sanction for a Civil Engineering project. 2. Schedule the project for its timely completion. 3. Application of technique of Rate analysis in estimating the exact cost of material & manpower and hence the entire project.
BECVE702P ESTIMATING AND COSTING	1. Draft the specification of items on basis of expected quality of material and workmanship. 2. Estimate the bill of quantities using different techniques of preliminary & detailed estimation of buildings & roads. 3. Valuation of the asset using different Valuation techniques.
REINFORCED CEMENT CONCRETE (RCC) STRUCTURES BECVE502T	1. Restate conceptually the difference between Working stress method & Limit state Design method. 2. Design the structural elements like RCC beam, slab, column, and footings by limit state Design method as per I.S.456-2000. 3. Apply the concepts and applications of prestressed concrete in real problems

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STEEL STRUCTURES BECVE601T	1. Use the knowledge of structural properties in assessing its strength for the construction purpose. 2. Apply the knowledge of various techniques in analyzing the steel structural components. 3. Analyze and design tension members, bolted connections, welded connections, compression members and beams.
ADVANCED CONCRETE STRUCTURES BECVE701T	1. Analyze and apply the results in designing various concrete member of structure. 2. Apply the knowledge & skills in practical problems like various water tanks, retaining wall, and portal frame.
ADVANCED REINFORCED CEMENT CONCRETE DESIGN (ELECTIVE-III) BECVE803T	1. Apply the concept of multistoried frame structure incorporating seismic forces. 2. Analysis and design of cylindrical shells, various water tanks. 3. Design a building from foundation to roof level.
STRUCTURAL ANALYSIS – I (BECVE 401 T)	1. Visualize and analyze concept of deflection, bending moment and shear force diagram in beams, frames, trusses and columns under various loading conditions using different analysis methods. 2. To determine forces and moments in determinate and indeterminate structures by the force and displacement method. 3. To perform ILD analysis of determinate beams and trusses.
STRUCTURAL ANALYSIS – I (BECVE 401 P)	1. Verify theoretical formulas by conducting experiments. 2. To determine the deflection of continuous beams, portal frames, and 2-hinged arch. 3. To analyze and construct the influence lines of various statically determinate and indeterminate structures.

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3rd Semester Information Technology

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT301	Data structure using OOPs

Course Outcomes:
After learning the course, the students should be able:
1. To draw the control flow of a program.
2. To understand the storage concepts in a simple program.
3. To program using basic concepts of OO languages i.e. objects, encapsulation, data hiding etc.
4. Design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees..
5. .Analyze and implement various kinds of searching and sorting techniques..

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT302	Discrete Mathematics & Graph Theory

Course Objectives:
1. To provide in depth knowledge of complex numbers
2. To find the solution of differential equations
3. To find an in-depth knowledge of Fourier series analysis of periodic function

Course Outcomes:
After learning the course the students should be able:
1. To develop an ability to use characteristics of complex numbers in problem pertaining to electric circuits
2. To develop an acquaintance with the method of finding solution of differential equations
3. To develop an in depth knowledge of vector differentiation and vector integration
4. To develop Fourier series expansion of different periodic functions

Sr. No.	Category of Subject	Course Code	Course Name

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1	HSMC	ITT303	Organization Behavior

Course Objectives:

1. To help the students to develop cognizance of the importance of human behaviour.

2. To enable students to describe how people behave under different conditions and understand why people behave as they do.

3. To provide the students to analyse specific strategic human resources demands for future action. 4. To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.

Course Outcomes

CO1: Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.

CO2: Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.

CO3: Analyze the complexities associated with management of the group behavior in the organization.

CO4: Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT304	CAO

Course Objectives:

1. To understand the structure, functions and characteristics of computer systems.
2. To learn basics of Parallel Computer Architecture.
3. To study hierarchical memory system including cache memories and virtual memory.
4. To identify input / output devices and their data transfer mechanism.

Course Outcomes:

After learning the course, the students should be able:

1. To identify components of a computer system, including CPU, memory, and input/output units.
2. To explain instruction types, its execution and interrupt mechanism.
3. To illustrate numerical and character representations in digital logic and floating point arithmetic.

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Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT305	Computer Networks

Objective:

1. Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.

2. Acquire knowledge of Application layer and Presentation layer paradigms and protocols.

3. Study Session layer design issues, Transport layer services, and protocols.

4. Gain core knowledge of Network layer routing protocols and IP addressing.

5. Study data link layer concepts, design issues, and protocols.

Course Outcomes:

a) Understand computer network basics, network architecture, TCP/IP and OSI reference models.

b) Identify and understand various techniques and modes of transmission

c) Describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN

d) Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme

e) Understand network security and define various protocols such as FTP, HTTP, Telnet, DNS

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITL305	Computer Networks(Lab)

Course Outcomes

a) Identify and use various networking components Understand different transmission media and design cables for establishing a network

b) Implement any topology using network devices

c) Understand the TCP/IP configuration for Windows and Linux

d) Implement device sharing on network e) Learn the major software and hardware technologies used on computer networks.

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITL301	Data structure using OOPs(Lab)

Course Outcomes

1. Know about the basic concepts of Function, Array and Link-list.

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2. Understand how several fundamental algorithms work particularly those concerned with Stack, Queues, Trees and various Sorting algorithms.
3. Design new algorithms or modify existing ones for new applications and able to analyze the space & time efficiency of most algorithms.

Sr. No.	Category of Subject	Course Code	Course Name
1	ESC	ITL306	IT Workshop

Course Outcomes

1. Learn the basic concepts& techniques of java.
2. Learn the advanced concepts of java.
3. Generate an application based upon the concepts of java & advance java.

4th Semester Information Technology

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT401	Operating System

Course Objective:

1. To understand the main components of an OS & their functions.
2. To study the process management and scheduling.
3. To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.
4. To understand the concepts and implementation Memory management policies and virtual memory.
5. To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS

Course Outcomes

1. Describe the important computer system resources and the role of operating system in their management policies and algorithms.
2. Understand the process management policies and scheduling of processes by CPU
3. Evaluate the requirement for process synchronization and coordination handled by operating system

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Sr. No.	Category of Subject	Course Code	Course Name

1	PCC	ITT402	Embedded Systems

4. Describe and analyze the memory management and its allocation policies.
5. Identify use and evaluate the storage management policies with respect to different storage management technologies.
6. Identify the need to create the special purpose operating system

Course Objective:

1. The concepts and architecture of embedded systems
2. Basic of microcontroller 8051.
3. The concepts of microcontroller interface.
4. The concepts of ARM architecture
5. The concepts of real- time operating system
6. Different design platforms used for an embedded systems application

Course Outcomes

1. Explain the embedded system concepts and architecture of embedded systems
2. Describe the architecture of 8051 microcontroller and write embedded program for 8051 microcontroller.
3. Design the interfacing for 8051 microcontroller.
4. Understand the concepts of ARM architecture.
5. Demonstrate the open source RTOS and solve the design issues for the same.
6. Select elements for an embedded systems tool.

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT403	TCP/IP

Course Objective:

1. The course is aimed at providing basic understanding of Computer networks starting with OSI Reference Model, Protocols at different layers with special emphasis on IP, TCP & UDP and Routing algorithms.
2. Some of the major topics which are included in this course are CSMA/CD, TCP/IP implementation, LANs/WANs, internetworking technologies,
3. Routing and Addressing. Provide the mathematical background of routing protocols.
4. Aim of this course is to develop some familiarity with current research problems and research methods in advance computer networks

Course Outcomes:

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Sr. No.	Category of Subject	Course Code	Course Name

1	HSMC	ITT404	Principles of Cyber Security

Course Outcomes:

- The importance of taking a multi-disciplinary approach to cyber security
- The cyber threat landscape, both in terms of recent emergent issues and those issues which recur over time
- The roles ad influences of governments, commercial and other organisations, citizens and criminals in cyber security affairs
- General principles and strategies that can be applied to systems to make them more robust to attack
- Issues surrounding privacy and anonymity
- The potentialities and challenges of emerging block chain technology to enhance inter-organisation trust and data/processing integrity

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT405	DBMS

Course Objective:

1. To describe a sound introduction to the discipline of database management systems
2. To give a good formal foundation on the relational model of data and usage of Relational Algebra.
3. To introduce the concepts of basic SQL as a universal Database language.
4. To enhance knowledge to advanced SQL topics like embedded SQL, procedures connectivity through JDBC
5. To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization
6. To provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques

Course Outcomes:

1. Explain the features of database management systems and Relational database.
2. Design conceptual models of a database using ER modelling for real life applications and also construct queries in Relational Algebra.
3. Create and populate a RDBMS for a real life application, with constraints and keys, using SQL
4. Retrieve any type of information from a data base by formulating complex queries in SQL.
5. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
6. Build indexing mechanisms for efficient retrieval of information from a database.

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Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITL403	TCP/IP (lab)

Course Objective:

1.To get familiar with the basic network administration commands.
2. To install and configure network simulator and learn basics of TCL scripting.
3. To understand the network simulator environment and visualize a network topology and observe its performance
4. To analyze the traffic flow and the contents of protocol frames.
5. To implement client-server socket programs.
6. To design and configure a network for an organization.

Course Outcomes:

1.Execute and evaluate network administration commands and demonstrate their use in different network scenarios
2. Demonstrate the installation and configuration of network simulator.
3. Demonstrate and measure different network scenarios and their performance behavior.
4. Analyze the contents the packet contents of different protocols.
5. Implement the socket programming for client server architecture.
6. Design and setup a organization network using packet tracer.

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITL405	DBMS(Lab)

Course Outcomes:

1. Infer database language commands to create simple database
2. Analyze the database using queries to retrieve records
3. Applying PL/SQL for processing database
4. Analyze front end tools to design forms, reports and menus
5. Develop solutions using database concepts for real time requirements.

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Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITL406	Python (Lab)

Course Objective:
1. Basics of Python programming
2. Decision Making and Functions in Python
3. Object Oriented Programming using Python
4. Files Handling in Python
5. GUI Programming and Databases operations in Python
6. Network Programming in Python

Course Outcomes

1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Express different Decision Making statements and Functions
3. Interpret Object oriented programming in Python
4. Understand and summarize different File handling operations
5. Explain how to design GUI Applications in Python and evaluate different database operations
6. Design and develop Client Server network applications using Python

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5th Semester Information Technology

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT501	DAA

Course Objectives:

1. To learn mathematical background for analysis of algorithm.
2. To learn various advanced data structures.
3. To understand the concept of designing an algorithm
4. To learn dynamic programming and greedy method

Course Outcome:

1. Apply Knowledge of Mathematics to perform asymptotic analysis of algorithms
2. Demonstrate a familiarity with major algorithms and data Structures
3. Students will be able to calculate complexity
4. Apply important algorithmic design paradigms and methods of analysis
5. Synthesize efficient algorithms in common engineering design situations

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT502	JAVA Programming

Course Objectives:

1. Programming in the Java programming language
2. knowledge of object-oriented paradigm in the Java programming language
3. The use of Java in a variety of technologies and on different platforms.

Course Outcome

- Learn the basic concepts& techniques of java.
- Learn the advanced concepts of java.
- Generate an application based upon the concepts of java & advance java
- Connect an application with database.
- Develop programs using java collection API as well as java Standard Library.
- Write, debug & document well structured java application

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Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT503	Adhoc Wireless Networks

Course Outcome

1.Explain the basic concepts of WIRELESS networks and challenges of adhoc and sensor
Course Outcome networks.
2. Classify the design issues and different categories of MAC protocols
3. Explain the various adhoc routing protocols and transport layer mechanisms
4. Discuss the sensor characteristics and wsn layer protocols
5. Illustrate the issues of routing in wsn and QoS related performance measurements

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT504	Artificial Intelligence

Course Objectives:

1. To create appreciation and understanding of both the achievements of AI and the theory underlying those achievements
2. To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
3. To review the different stages of development of the AI field from human like behavior to Rational Agents
4. To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
5. To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.

Course Outcome

1. Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
2. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
3. Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing.
4. Formulate and solve problems with uncertain information using Bayesian approaches.
5. Apply concept Natural Language processing to problems leading to understanding of cognitive computing.

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Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITL502	JAVA Programming (Lab)

Course Objectives:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand importance of Multi-threading & different exception handling mechanisms
3. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.

Course Outcome

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
3. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
4. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events

Sr. No.	Category of Subject	Course Code	Course Name
1	MC	ITT506	Constitution Of India

Course Objectives:

1. Understand the need for a Constitution
2. Explain the role of the Constitution in a democratic society.
3. List the key features of the Constitution
4. Appreciate the fundamental rights of the citizen of india.

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Course Outcome

1. Analysing what is Politics and explaining the approaches to the Study of Political Science – Normative, Behavioral, Post Behavioral, Feminist.
2. Assessing the theories of State (Origin, Nature, Functions): Contract, Idealist, Liberal and Neo-Liberal Theories.
3. xplaining the Concept of State Sovereignty: Monistic and Pluralistic Theories. Analysing the changing concept of Sovereignty in the context of Globalisation.
4. Understanding basic concepts of Liberty, Equality, Rights, Law and Justice
5. Classification of David Held's Democratic Theories.
6. Explaining Dialectical Materialism and Historical Materialism with special reference to relationship between base and superstructure

6th Semester Information Technology

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT601	DEEP Learning

Course Objectives:

Course Outcome

1. **Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.**
2. **Implement deep learning algorithms and solve real-world problems.**
3. **Students will be able to model the learning primitives.**
4. **Students will be able to build the learning model.**
5. **Student will be able to tackle real world problems in the domain of Data Mining, Information Retrieval, Computer vision, Linguistics and Bioinformatics.**

Sr. No.	Category of Subject	Course Code	Course Name
1	OEC	ITT605	Computer Graphics

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Course Objectives:

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them
2. To learn the basic principles of 3- dimensional computer graphics
3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition
4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Course Outcome

1. To list the basic concepts used in computer graphics
2. To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping
3. To describe the importance of viewing and projections.
4. To define the fundamentals of animation, virtual reality and its related technologies
5. Formulate and solve problems with uncertain information using Bayesian approaches.
6. Apply concept Natural Language processing to problems leading to understanding of cognitive computing

Sr. No.	Category of Subject	Course Code	Course Name
1	PROJECT	ITL601	DEEP Learning with MATLAB

Course Objectives:

1. Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problems.

Course Outcome

2. Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.
3. Implement deep learning algorithms and solve real-world problems.

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Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITP606	Mini Project

Course Objective:

1. To offer students a glimpse into real world problems and challenges that need IT based solutions
2. To enable students to create very precise specifications of the IT solution to be designed.
3. To introduce students to the vast array of literature available of the various research challenges in the field of IT
4. To enable students to use all concepts of IT in creating a solution for a problem
5. To improve the team building, communication and management skills of the students.

Course Outcome:

1. Discover potential research areas in the field of IT
2. Conduct a survey of several available literature in the preferred field of study
3. Compare and contrast the several existing solutions for research challenge
4. Demonstrate an ability to work in teams and manage the conduct of the research study
5. Formulate and propose a plan for creating a solution for the research plan identified
6. To report and present the findings of the study conducted in the preferred domain

Sr. No.	Category of Subject	Course Code	Course Name
1	PEC	ITL605	Computer Graphics (LAB)

Course Outcome:

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a) Understand the basic concepts of computer graphics.
b) Design scan conversion problems using C++ programming.
c) Apply clipping and filling techniques for modifying an object.
d) Understand the concepts of different type of geometric transformation of objects in 2D and 3D.
e) Understand the practical implementation of modeling, rendering, viewing of objects in 2D.

7th Semester Information Technology

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITT701	Research Methodology

Course Objectives

a) To familiarize participants with basic of research and the research process.
b) To enable the participants in conducting research work and formulating research synopsis and report.
c) To familiarize participants with Statistical packages such as SPSS/EXCEL.
d) To impart knowledge for enabling students to develop data analytics skills and meaningful interpretation to the data sets so as to solve the business/Research problem.

COURSE OUTCOMES

1.Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
2. Have basic knowledge on qualitative research techniques
3. Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
4. Have basic awareness of data analysis-and hypothesis testing procedures

Sr. No.	Category of Subject	Course Code	Course Name
1	PROJECT	ITP705	Project & Seminar

Course Objectives

1. To offer students a glimpse into real world problems and challenges that need IT based solutions
2. To enable students to create very precise specifications of the IT solution to be designed.
3. To introduce students to the vast array of literature available of the various research challenges in the field of IT
4. To create awareness among the students of the characteristics of several domain areas where IT can be effectively used.
5. To enable students to use all concepts of IT in creating a solution for a problem

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6. To improve the team building, communication and management skills of the students.

COURSE OUTCOMES

1. Discover potential research areas in the field of IT
2. Conduct a survey of several available literature in the preferred field of study
3. Compare and contrast the several existing solutions for research challenge
4. Demonstrate an ability to work in teams and manage the conduct of the research study.
5. Formulate and propose a plan for creating a solution for the research plan identified
6. To report and present the findings of the study conducted in the preferred domain

8th Semester Information Technology

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITTE801	Data Security

Course Objectives

1. To train students in the organizing and the technical realization and security of data and computers

COURSE OUTCOMES

1. define terms related to computer, data and network security
2. describe the ways in which the security of an information system can be endangered
3. demonstrate competence in detecting potential security vulnerabilities, and demonstrate ways of recovering from the effects of attacks
4. analyse the offered system, and point to the potential safety problems
5. suggest the optimal way to organize information system security
6. choose an appropriate engineering approach to problem solving

Sr. No.	Category of Subject	Course Code	Course Name
1	PROJECT	ITP805	Major Project

Course Objectives

1. To offer students a glimpse into real world problems and challenges that need IT based solutions
2. To enable students to create very precise specifications of the IT solution to be designed.
3. To introduce students to the vast array of literature available of the various research challenges in the field of IT
4. To create awareness among the students of the characteristics of several domain areas where IT can be effectively used.
5. To enable students to use all concepts of IT in creating a solution for a problem

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6. To improve the team building, communication and management skills of the students.

COURSE OUTCOMES

1. Discover potential research areas in the field of IT
2. Conduct a survey of several available literature in the preferred field of study
3. Compare and contrast the several existing solutions for research challenge
4. Demonstrate an ability to work in teams and manage the conduct of the research study.
5. Formulate and propose a plan for creating a solution for the research plan identified
6. To report and present the findings of the study conducted in the preferred domain

Sr. No.	Category of Subject	Course Code	Course Name
1	PCC	ITL801	DS- Lab

Course Objectives

1. To introduce the student to elementary number theory, as required for further study of important cryptographic protocols.
2. To introduce the student to the fundamentals of modern symmetric cryptography.•
3. To enable the student to appreciate the significance of cryptography as a means of securing information in the modern world

COURSE OUTCOMES

1. Understand the significance of cryptography to the modern world and the internet.
2. Understand the rationale behind block cipher design
3. Perform the cryptanalysis of a simple block cipher.
4. Integrate cryptographic algorithms into software projects.
5. Solve elementary problems in number theory relating to cryptography.
6. Build on number theoretic basics to further their knowledge of advanced methods of cryptography.

PROFESSIONAL ELECTIVE COURSES

Code	Subject	Sem
ITTE505	Software Engg. And Project Management	V

Course Objectives

COURSE OUTCOMES

1. Discuss software development techniques and methodologies
2. Apply various Computer Science methods and algorithms
3. Apply in group-based software development
4. Demonstrate appropriate professional conduct

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5. Discuss professional codes of conduct of Computer Scientists and Engineers
6. Demonstrate skills in investigating, analyzing, and using software tools

Code	Subject	Sem
ITTE505	DWM	V

COURSE OUTCOMES

- To understand the basic principles, concepts and applications of data warehousing and data mining,
- Ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
- Have a good knowledge of the fundamental concepts that provide the foundation of data mining.

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Department of Electrical Engineering

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POs	ATTRIBUTES
PO1	Ability to apply the **knowledge** of mathematics, science and engineering principles for modeling, analyzing and solving electrical engineering problems.
PO2	An ability to conduct experiments as well as **analyze** and interpret the data.
PO3	An ability **to design** a component, system or process to meet the desired requirements within realistic constraints such as social, political, safety, economy and sustainability**.**
PO4	Analyze and model the electrical systems to effectively contribute towards **solving complex problem.**
PO5	An ability to function on **multidisciplinary** teams.
PO6	An understanding of **professional responsibility**.
PO7	Ability to design and develop modern systems for the upkeep of pollution free **environment**.
PO8	Understand the significance of financial aspects in power system development with **ethical principles** and social responsibilities.
PO9	Ability to **think independently**, takes initiative and attitude to lead a team.
PO10	Ability to express ideas clearly and **communicate** effectively.
PO11	Ability to take up **administrative responsibilities** involving both project and financial management confidently.
PO12	Willingness and ability to maintain **lifelong learning** by way of participating in various professional activities.

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Name of Department: Department of Electrical Engineering

Class **:** BTECH (Second Year)

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Department of Electrical Engineering

"Igniting minds to illuminate the world"

Semester : Odd : Even : Y

Course Code : BTEEC403

Course Title : ELECTRICAL INSTALLATION AND ESTIMATION

Course Outcome No.	Course Outcome	Bloom's Taxonomy	Bloom's Level
CO310244.1	**To Understand the term Estimation and costing , conductor size calculation of internal wiring.**	**Understanding/ Analysis**	**L1, L2, L4**
CO310244.2	**Preparation of Estimate using typical plan and Electric layout.**	**Application**	**L3**
CO310244.3	**To understand the procedures of contracting and purchase.**	**understand**	**L2**
CO310244.4	**Study of different types of Cables, their types, reviews and different components of EDS.**	**Remember/ knowledge**	**L1**
CO310244.5	**Different tools used in the Installation.**	**Remember/Understanding**	**L1, L2**
CO310244.6	**Wiring System, Calculation and Estimation of AC DC Machines and Protection Circuit.**	**Identifying/ Analysis**	**L1, L4**

Course Code :BTHM3401

Course Title :BASIC HUMAN RIGHTS

Course Outcome No.	Course Outcome	Bloom's Taxonomy	Bloom's Level
CO1	**UNDERSTAND THE BASIC TERMS OF HUMAN RIGHTS**	**Retrieving**	**L1**
CO2	**LEARN TO RESPECT THE SOCIETY AND COMMUNITY**	**Understanding**	**L2**
CO3	**IMPACT OF MODERNISATIONON HUMAN RIGHTS**	**Analysis**	**L4**
CO4	**PEOPLES PARTICIPATION IN BRINGING ABOUT CHANGE**	**Understanding**	**L2**
CO5	**UNDERSTANDING THE IMPORTANCE OF RIGHTS /DUTIES IN INDIAN CONTEXT**	**Application**	**L3**
C06	**TO UNIFY ONESELF WITH GLOBAL SOCIETIES**	**Understanding**	**L2**

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Course Code :BTHM306

Course Title :ENGINEERING ECONOMICS

Course Outcome No.	Course Outcome	Bloom's Taxonomy	Bloom's Level
CO.BTHM306.1	**Basic understanding of economic terms**	**Retrieving**	**L1**
CO2BTHM306.2	**Time value of money**	**Understanding**	**L2**
COBTHM306.3	**What to produce**	**Analysis**	**L4**
COBTHMM306.4	**Factors of production**	**Understanding**	**L2**
COBTHM306.5	**How market operates**	**Application**	**L3**
COBTHM306.6	**Indian economy scenario**	**Understanding**	**L2**

Course Code :BTEEC 302

Course Title :Network Analysis and Synthesis

Course Outcome No.	Course Outcome	Bloom's Taxonomy	Bloom's Level
COBTEEC302.1	**To review basic components of electric network**	**Comprehension**	**L2**
COBTEEC302.2	**To design and develop network Equations**	**Synthesis**	**L5**
COBTEEC302.3	**To apply Laplace theorem for electric network**	**Application**	**L3**
COBTEEC302.4	**To analyze AC circuit**	**Analysis**	**L4**
COBTEEC302.5	**To study the transmission parameters in network**	**Knowledge**	**L1**
COBTEEC302.6	**To understand the filters circuit and resonance phenomena**	**understand**	**L2**

Course Title :Power Electronics

Course Outcome No.	Course Outcome	Bloom's Taxonomy	Bloom's Level
COBTEEC302.1	**To review basic components of electric network**	**Comprehension**	**L2**
COBTEEC302.2	**To design and develop network Equations**	**Synthesis**	**L5**
COBTEEC302.3	**To apply Laplace theorem for electric network**	**Application**	**L3**

COBTEEC302.4	**To analyze AC circuit**	**Analysis**	**L4**
COBTEEC302.5	**To study the transmission parameters in network**	**Knowledge**	**L1**
COBTEEC302.6	**To understand the filters circuit and resonance phenomena**	**understand**	**L2**

Course Code : BTEEOE40-B

Course Title : Introduction to Non Conventional Energy Resources

Course Outcome No.	Course Outcome	Bloom's Taxonomy	Bloom's Level
CO BTEEOE407-B.1	**Distinguish between Conventional and Non Conventional Energy Resources**	**Knowledge**	**L1**
CO BTEEOE407-B.2	**Discussion of solar energy collectors, Solar Radiation Geometry, Understand Construction of Solar Cell**	**Understanding**	**L1**
CO BTEEOE407-B.3	**Detailed Study of Wind Energy Plant , Site Selection and Application**	**Understanding**	**L1**
CO BTEEOE407-B.4	**To understand overview of Geo Thermal Energy and Working Principal of Tidal Power Plant**	**Knowledge Recalling**	**L2**
CO BTEEOE407-B.5	**To Study Different type of Nuclear Reactors**	**Understanding**	**L2**
CO BTEEOE407-B.6	**Will be able to Categories Bio Mass Energy, Study About Bio Gas Plant**	**Analysis**	**L1**

LAB COURSE OUTCOMES

1.	SUBJECT: **NETWORK ANALYSIS**	SEM: **III-EE**(ODD)
	Student will be able to:	
	Verify different types of network theorem for analysis and design of electric circuits.	
	Demonstrate phenomenon of resonance in series and parallel RLC circuit.	
	Calculate all parameter of two port networks.	

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2.	**ELECTRICAL MEASUREMENT &INSTRUMENTATION**	SEM: **III-EE**(ODD)
	Student will be able to:	
	Analyze different bridges to calculate Resistance, Inductance and Capacitance.	
	Demonstrate different types of measuring instruments like PMMC, moving iron and dynamometer type.	
	Measure and analyze active and reactive power requirements using Wattmeter.	

3.	SUBJECT: **ELECTRICAL MACHINE-II**	SEM:**V-EE**(ODD)
	Student will be able to:	
	Find Regulation & Efficiency of an alternator & sub transient synchronous reactance.	
	Draw different characteristics of an alternator and synchronous motor on different load conditions.	
	Start & control the speed of synchronous motor in forward and reverse direction.	

4.	SUBJECT: **ELECTRICAL WORKSHOP**	SEM:**V-EE**(ODD)
	Student will be able to:	
	Identify and interpret different electrical symbols and practice it.	
	Make different types of electrical wirings.	
	Design and construct transformer.	

5.	SUBJECT: **ELECTRICAL DESIGN & SIMULATION**	SEM:**V-EE**(ODD)
	Student will be able to:	
	Understand coding, simulation and modeling using electrical design software.	
	Analyze single line diagram of power system on software.	
	Improve wiring schemes using software.	

6.	SUBJECT: **HIGH VOLTAGE ENGINEERING LAB**	SEM:**VII-EE**(ODD)
	Student will be able to:	
	Recognize flash over voltage across pin type insulator and other	

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	insulator.
	Find break down voltage for different combination of electrodes.
	Learn about Ferranti effect and surge impedance loading in EHV line.

7.	SUBJECT: **ELECTRICAL INSTALLATION & DESIGN**	SEM:**VII-EE**(ODD)
	Student will be able to:	
	Utilize the proper equipment like power cable, MCB, MCCB, etc. as per the requirement.	
	Design and analyze the single line diagram.	
	Understand the tariff structure to determine the demand factor, load factor and power factor.	

8.	SUBJECT: **ELECTRICAL MACHINE-I**	SEM: **IV-EE**(EVEN)
	Student will be able to:	
	Find regulation and efficiency of transformer, Induction motor by Direct and Indirect loading method.	
	Perform speed control methods of DC Motor, three phase Induction Motor & draw its different characteristics.	
	Become familiar with different types of starter.	

9.	SUBJECT: **POWER ELECTRONICS**	SEM:**VI-EE**(EVEN)
	Student will be able to:	
	Identify power electronics switches & plot its different characteristics.	
	Analyze single and three phase power converter circuits.	
	Utilize the switch according to the output requirements.	

10.	SUBJECT: **CONTROL SYSTEM-I**	SEM:**VI-EE**(EVEN)
	Student will be able to:	
	Model linear systems and analyze control system components.	
	Understand and calculate time response and frequency response.	
	Check stability of the system.	

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PEOs	ATTRIBUTES
PEO 1	To prepare the graduates for professional careers with strong fundamental knowledge in Science, Mathematics, English and Engineering Sciences and capable to develop core competency in electrical engineering domain or enable to pursue higher education.

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PEO 2	The graduates can comprehend, analyze, design and create novel ideas and provide solutions to Electrical Engineering problems that are technically sound, economically feasible and socially acceptable.
PEO 3	The Graduates will be leaders with strong communication and interpersonal skills, capability to work efficiently in multidisciplinary teams, understanding of ethical and environmental constrains in engineering practices and deal with social and safety issues along with respect for intellectual property.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

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Program Outcomes (PO)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, as applicable to the field of Electronics & Telecommunication Engineering

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

3. Design/development of solutions: 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.

4. Conduct investigations of complex problems: 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.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to Electronics & Telecommunication Engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Electronics & Telecommunication Engineering practice.

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

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the Electronics & Telecommunication Engineering practice.

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

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

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effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: 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.

12. Life-long learning: 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.

Prof. V. P. Chaudhari
Academic Incharge

Prof. N. N.Gyanchandani
Head of Department

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Program Specific Outcomes (PSOs.)

Program Specific Outcomes (PSO)

The department of ECE Engineering has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

PSO1:	Apply the basic knowledge acquired in Electronic Devices and Circuits, Electromagnetic fields, signal processing, communication engineering, VLSI circuits and Embedded Systems to provide efficient solutions to engineering problems.
PSO2:	Should acquire the skills to communicate and document the ideas with necessary road maps and demonstrating the practices of professional ethics for societal and environmental wellbeing.

Prof. V. P. Chaudhari
Academic Incharge

Prof. N. N.Gyanchandani
Head of Department

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Session: 2019-2020

Subject: Electronics Devices & Circuit — Subject Code: BTEXC303

Year/ Sem: 3 rd sem — University: DBATU

Branch: ETC

Course Outcomes:

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

1. Analyze FET and MOSFET Circuits for small signal at low and high frequencies
2. Test the Performance of the circuit
3. Analyze the effect of feedback on terminal characteristics of amplifier
4. Design different oscillator circuits for various frequencies
5. Apply knowledge of FET and IC555 for Various applications
6. Design an adjustable Voltage regulator circuit

Prof. Gaytri Padole	Prof. V. P. Chaudhari	Prof. N.N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Computer Architecture and Organization — Subject Code: BTETC503

Year/ Sem: 5th sem — Section : A and B

University: DBATU — Branch: ETC

Course Outcomes:

CO1: Comprehensive understanding of scalable and parallel computer architectures for achieving a proportional increase in performance with increasing system resources.

CO2: Understanding of superscalar, vector processors and super pipelining technologies.

CO3: Broad understanding of the concept of Multiprocessor and multicomputer architectures.

CO4: Knowledge of advanced processor technology, memory hierarchy and design of pipelined processors.

CO5:An ability to design a system, component, or process to meet desired needs within realistic constraints.

Prof.Shweta Sharma	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Advanced Digital System Design
Subject Code : BEECE704T Year/
Sem: 7th sem
University: RTMNU
Branch: ETC/EN

Course Outcomes:

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

1. Design of combinational & sequential circuit.
2. Develop as skilled VLSI front end designers
3. Implement digital system for practical world
4. Experiment on Hardware /Software co-design

Prof. N.A. Mohota	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Electro Magnetic Field — Subject Code: BTEXC501

Year/ Sem: 5th sem — Section : A and B

University: DBATU — Branch: EXTC/EN

Course Outcomes:

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

1. Understand characteristics and wave propagation on high frequency transmission lines
2. Carryout impedance transformation on Transmission Lines
3. Use sections of transmission line sections for realizing circuit elements
4. Characterize uniform plane wave
5. Calculate reflection and transmission of waves at media interface
6. Analyze wave propagation on metallic waveguides in modal form
7. Understand principle of radiation and radiation characteristics of an antenna

Prof.Shafaque Khan	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Embedded System — Subject Code: BEENE702P

Year/ Sem: 7th sem — University: RTMNU

Branch: EN

Course Outcomes:

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

1. Know what an embedded system basic understanding of General System Theory, how this applies to embedded system
2. Describe the differences between the general computing system and the embedded system, also recognize the classification of embedded systems.
3. Analyze floating point processor architecture and its architectural support for higher level language.
4. Study and use different protocols for embedded system.
5. Design real time embedded systems using the concepts of RTOS.
6. Implement the RTOS development tools in building real time embedded systems.

Prof. Mohammad Hassan	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Microelectronics — Subject Code: BTEXC503
Year/ Sem: 5th sem — University: DBATU
Branch: EN

Course Outcomes:

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

CO1: Analyze the frequency response of MOSFET and study the design parameters

CO2: Analyze the single stage IC amplifier using MOSFET and BJT

CO3: Study the different configurations of MOSFET and BJT

CO4: Study the multistage amplifier using MOS

CO5: Study the basic feedback topologies and its effect on amplifier poles

CO6: Study the design and performance of digital CMOS circuits

Prof. Nutan Suple	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Television Engineering
Year/ Sem: 7th sem
Branch: ETC

Subject Code: BEECE702T
University: RTMNU

Course Outcomes:

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

CO1:analyze and understand colour T.V.System

CO2:understand fundamental techniques of Different T.V. Standards.

CO3:understand Advanced T.V. Technology.

CO4:understand different video recording, display and its consumer application.

Prof. Firoz Khtar	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Maths-III
Year/ Sem: 3 rd sem
Branch: ETC

Subject Code : BTBSC301
University: DBATU

Course Outcomes:

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

1. Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
2. Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing.
3. Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.
4. Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields.
5. Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing

Prof. Sana Anjum	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Microcontroller — Subject Code: BTEXC505

Year/ Sem: 5th sem — Section : A and B

University:DBATU — Branch: ETC/EN

Course Outcomes:

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

CO1. Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications.

CO2.Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles.

CO3. Graduates will be able to design real time controllers using microcontroller based system.

CO4. Learners get acquainted with modern tools like Programmers, Debuggers, cross compilers and current IDE i.e. integrated development environment tools.

CO5.Learn use of hardware and software tools.

CO6.Develop interfacing to real world devices.

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Prof. Amit Fulsunge — Prof. V. P. Chaudhari — Prof. N. N. Gyanchandani

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Session: 2019-2020

Subject: DSP Processor and Architecture — Subject Code: BEECE701T
Year/ Sem: 7th sem — University: RTMNU
Branch: ETC/EN

Course Outcomes:

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

1. To describe fundamentals of Programmable DSPs.
2. To describe the detailed architecture, addressing mode, instruction sets of TMS320C5X.
3. To write program of DSP processor.
4. To design and implement DSP algorithm using code composer studio.
5. To design decimation filter and interpolation filter.

Prof.Divya Chandran — Subject Incharge
Prof. V. P. Chaudhari — Academic Incharge
Prof. N. N.Gyanchandani — Head of Department

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Session: 2019-2020

Subject: Basic Human Rights/BHR Subject Code: BTHM3401

Year/ Sem: 3 rd sem University: DBATU

Branch: ETC

Course Outcomes:

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

1. Describe human rights education which will develop the knowledge, skills and values of human rights.
2. Explain and strengthen the respect for human rights and fundamental freedom.
3. Enable all persons to participate effectively in a free society.
4. Illustrate human rights principles, such as the universality, indivisibility and interdependence of human rights.
5. Learn about regional, national, state and local law that reinforces international human rights law.
6. Learn and use human rights instruments and mechanisms for the protection of human rights.

Prof. Divya Chandran	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Digital Logic Design — Subject Code: BTEXC305
Year/ Sem: 3rd sem — University: DBATU
Branch: ETC

Course Outcomes:

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

1. To study the various Boolean minimization techniques applied to digital circuits.
2. To gain knowledge in the design of combinational circuits with performance parameters.
3. To gain knowledge in the design of sequential circuits with the fundamental study of flip-flops.
4. To understand the design of sequential circuits using finite state machine diagram.
5. To analyze and design Mealy and Moore machines.
6. Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.

Prof. Vaibhav Chaudhari	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Digital Signal Processing — Subject Code: BTEXC504

Year/ Sem: 5th sem — Section : A and B

University: DBATU — Branch: ETC/EN

Course Outcomes:

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

CO1: Understand use of different transforms and analyze the discrete time signals and systems.

CO2: Realize the use of LTI filters for filtering different real world signals.

CO3: Capable of calibrating and resolving different frequencies existing in any signal.

CO4: Design and implement multistage sampling rate converter.

Prof. Pranali Langde	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Control System Engineering — Subject Code: BTEXC502

Year/ Sem: 5th sem — Section : A and B

University: DBATU — Branch: ETC/EN

Course Outcomes:

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

1. Define the fundamentals of (feedback) control systems.
2. Classify various control systems and represent the mathematical model of a system.
3. Apply Root-Locus technique to analyze and design control systems.
4. Express and solve system equations in state-variable form (state variable models).
5. Differentiate between the time-domain and frequency-domain responses of control systems.
6. Design simple feedback controllers.

Prof. Shailesh M. Sakhare — Prof. V. P. Chaudhari — Prof. N. N.Gyanchandani

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Session: 2019-2020

Subject: Microelectromechanical Sysytem Subject Code: BTEEXPE506D

Year/ Sem : 5th sem Section : A and B

University: DBATU Branch: ETC/EN

Course Outcomes:

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

1) To make students familiar with MEMS principles, scaling properties, transducers, actuators, sensors and gyroscopes.

2) To develop good understanding of different materials used in MEMS technology and control of MEMS.

3) To make students familiar with recent developments and process technology used to MEMS devices.

4) To understand micromachining, etching process of MEMS.

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5) To make students familiar with various laws and effects used in MEMS.

6) To understand finite element method and modeling of electromechanical systems.

Prof. Amol Dhankar	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Network analysis Subject Code: EXC304

Year/ Sem: 3 rd sem University: DBATU

Branch: ETC

Course Outcomes:

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

1. Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same.
2. Apply Knowledge of resonance conditions in the circuit
3. Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters
4. Identify issues related to transmission of signals.
5. Analyze different RLC networks.
6. Analyze two port network and find parameters related to two port network.

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Prof.Sneha Jethani	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Optical Communication — Subject Code:BEECE703T

Year/ Sem: 7th sem — University: RTMNU

Branch: ETC/EN

Course Outcomes:

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

1. To understand optical fiber technology to sophisticated modern telecommunication systems.
2. To understand the fundamental behavior of the individual optical components, describes their interactions with other devices in an optical fiber.
3.To measure & analyze different measurements, parameters & properties of optical fiber.

Prof. Shyam bawankar	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Mobile Communication Subject Code: BEENE702P

Year/ Sem: 7th sem University: RTMNU

Branch: EN

Course Outcomes:

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

1. To impart the fundamental concept of mobile communication system.
2. To give the student the idea about cellular communication theory & technology
3. To introduce various technology and protocol involved in mobile communication
4. To provide the student with an understanding the cellular concept.

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Prof. Shyam bawankar Prof. V. P. Chaudhari Prof. N. N.Gyanchandani

Subject Incharge Academic Incharge Head of Department

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Session: 2019-2020

Subject: VLSI Signal Processing — Subject Code: BEECE704T

Year/ Sem: 7th sem — University: RTMNU

Branch: ETC

Course Outcomes:

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

1. Learn various methodologies to optimize power delay and area of VLSI design.
2. Build Real Time processing system.
3. Design of algorithm structure for DSP algorithms based on algorithm transformation.

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Prof. Avinash Ikhar	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Session: 2019-2020

Subject: Data Structure in Java Programming — Subject Code: BTEEXPE506D

Year/ Sem: 5th sem — Section: A

University: DBATU — Branch: ETC

Course Outcomes:

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

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques

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3. Describe how arrays, records, linked structures are represented in memory and use them in algorithms.

4. To understand basic concepts about stacks, queues, lists trees and graphs.

5. To enable them to write algorithms for solving problems with the help of fundamental data structures.

Prof. Umesh Samarth	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

Education to Eternity

JAIDEV EDUCATION SOCIETY'S

J D COLLEGE OF ENGINEERING& MANAGEMENT, NAGPUR

Department of Electronics Engineering / Electronics &Telecommunication Engineering

"Rectifying Ideas, Amplifying Knowledge"

Session: 2019-2020

Subject: Analog Circuits | Subject Code: BTEXC302

Year/ Sem: 3rd sem | University: DBATU

Branch: ETC

Course Outcomes:

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

1. Understand the characteristics of IC and Op-Amp and identify the internal structure, Understand and identify various manufacturing techniques.

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2. Derive and determine various performances based parameters and their significance for Op-Amp.
3. Comply and verify parameters after exciting IC by any stated method.
4. Analyze and identify the closed loop stability considerations and I/O limitations, Understand and apply the functionalities of PLL.
5. Analyze and identify linear and nonlinear applications of Op-Amp, understand and verify results (levels of V & I) with hardware implementation.
6. Implement hardwired circuit to test performance and application for what it is being designed

Prof. N. N.Gyanchandani	Prof. V. P. Chaudhari	Prof. N. N.Gyanchandani
Subject Incharge	Academic Incharge	Head of Department

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Department of Management Studies
2018-19

SEMESTER I

Course Objectives

MBCI - 1 – Principles of Management

Course Objectives

To develop intuition and insights in students about the principles and practice of management and the mechanics and roles of a management professional such as formulation of strategies, execute managerial functions

Course Outcomes

CO 1: Apply the basic concept of Managerial roles in the real life situations in different functional areas of management

CO 2:Formulate strategies and plans and perform control function to ensure quality

CO 3:Execute functions like organizing, staffing and directing

CO 4: Align the management practices with those of Japan, USA and China and adopting the global perspective of recent developments in the field of Management.

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MBCI 2-Managerial Economics

Course Objectives:

Enhance the ability of the students towards understanding of theoretical underpinnings of economic issues related to demand, supply, production, pricing, market forms, national income and their implications in policy framing at various levels in the organization.

Course Outcome:

- CO1: Develop the understanding towards economic concepts and their implications in economic decisions.
- CO2: Apply economic reasoning to the analysis of selected contemporary economic problems.
- CO3: Analyze how households (demand) and businesses (supply) interact in various market structures to determine price and quantity of goods and services produced and consumed and consumer behaviour.
- CO4: Determine production inputs and cost implications.
- CO5: Recognize the components of National Income and their role in economic health of the country.

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MBCI - 3 – Accounting for Managers

Course Objectives

To develop the ability of students to understand the foundation of accounting principles, processes, techniques and practical aspects and applications.

Course Outcomes

After completing the course, the student would be able to

CO1: Apply the understanding of Principles of Accounting, Concepts and conventions, and The Generally Accepted Accounting Principles (GAAP) in the Accounting Process of the organization.

CO 2: Carry out preparation of Journal and ledger, Trial Balance, Classification of capital and revenue expenses, preparation of subsidiary books and cash book. Reconciliation between bank pass book and cash book.

CO 3: Prepare Final Accounts of Joint Stock Companies as per Schedule III of the Companies Act, 2013, and comply with the Provisions for Statutory Audit.

CO 4: Carry out Interpretation of Financial Statements through Cash Flow Analysis, Ratio Analysis.

CO 5: Apply the principles of Budgeting and Budgetary Control in practice

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MBCI – 4 - Business Legislation

Course Objectives:

To develop and enhance the ability of the students towards understanding of theoretical underpinnings of legal aspects of business such as rights and responsibilities of citizens, various acts applicable to the business such as the Contract Act, company Act and Consumer Protection Act

Course Outcomes:

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

CO1: Apply the Understanding of legal aspects with respect to rights and responsibilities of citizens.

CO2: Analyze a contract for it to be valid and understand the essential elements of a valid contract.

CO3: Plan and organize the formation of a new company knowing it's all the legal requirements.

CO4: Develop the policies to protect the consumer rights and full knowledge of consumer complaint.

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MBCI - 5 – Business Communication & Information Systems

Course Objectives:

To develop and enhance the ability of the students to understand the theoretical basics of different types and modes of communication and the understand the underpinnings of information system and its role in efficient flow of information

Course Outcomes:

CO 1: To utilize different ways of communications and overcome various barriers of communication.

CO 2: To handle various business correspondences.

CO 3: To connect the Management with information system for efficient flow of information

CO 4: To adopt modern trends in Information system and business intelligence in practice.

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MBCI - 6 – Research Methodology & Quantitative Techniques

Course Objectives:

The course aims to develop the ability of the students to

1. Understand the techniques and role of descriptive and inferential statistics in managerial decision making
2. Study various statistical measures in comprehending business data understand the business research methods in business decision making in real situation
3. Understand the sampling concepts and data collection methods in collection of data for decision making.
4. understand data analysis methods and hypothesis testing in solving business problems

Course Outcomes:

After successfully completing this course, the student would be able to

CO 1: Apply descriptive and inferential statistics in managerial decision making

CO 2 : Utilize various statistical measures in comprehending business data

CO 3: Implement the business research methods in business decision making in real situations

CO 4: Incorporate the sampling concepts and data collection methods in collection of data for decision making.

CO 5: Apply data analysis methods and hypothesis testing in solving business problems

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SEMESTER II

MBCII - 1 – Human Resource Management & Organizational Behaviour

Course Objectives:

The course aims to develop the ability of the students to

- Understand the Conceptual base and evolution of Human Resource Management and Roles and Qualities of HR Manager
- Understand the Important Concepts in Managing Human Resource
- Understand the underlying Concepts of Organizational Behaviour –individual and group behaviour
- Understand the Important Concepts of Organizational Behaviour

Course Outcomes:

CO 1: Understand the Conceptual base and evolution of Human Resource Management and Roles and Qualities of HR Manager

CO 2: Understand the Important Concepts in Managing Human Resource

CO 3: Understand the underlying Concepts of Organizational Behaviour –individual and group behaviour

CO 4: Understand the Important Concepts of Organizational Behaviour

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MBCII – 2 - Financial Management

Course Objectives:

The course aims to develop the ability of the students to

1. Understand the basic theoretical concepts of finance in the context of real life
2. Understand techniques of short term and long term investment decision the for the organizations.
3. Understand cost of capital and capital structure decisions.
4. understand how to Develop and prepare budgetary policies for the organizations
5. Understand how to Design working capital requirements for the company.
6. Study the techniques and processes to Communicate and present effectively the decisions and policies in the given field.

Course Outcomes

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

CO1: Apply the basic theoretical concepts of finance in the context of real life.

CO2: Plan short term and long term investment decisions for the organizations.

CO3: Analyze cost of capital and capital structure decisions.

CO4: Develop and prepare budgetary policies for the organizations, through application of techniques like IRR, NPV, and PI.

CO5: Design working capital requirements for the company.

CO6: Communicate and present effectively the decisions and policies in the given field.

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MBCII – 3 Marketing Management

Course Objective:

On completion of Marketing Management Module the students shall be in position to understand the theoretical underpinnings of Marketing Management from the purview of product decisions, pricing, marketing research and distribution channels etc

Course Outcome

CO1: Apply the theoretical underpinnings of Marketing in the context of real life .

CO2: Identify and understand the dynamics of changing marketing environment.

CO3: Analyze the competitive scenario and strategize marketing move .

CO4: Synthesize idea into marketing plan.

CO5: Develop the appropriate pricing moves.

CO6: Communicate and present effectively the decisions and policies in the given field.

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MBCII - 4 Operations Management

Course Objectives: The course will equip the students with theoretical foundations of Operation Management concepts and develop their knowledge and skills in the area of planning production facilities, efficient materials management and management of product quality

Course Outcomes:

After successfully completing this course, the student would be able to

CO 1: Leverage the basic concepts of operation management to deftly handle the operation aspects of production.

CO 2: Effectively plan production facilities to achieve maximum efficiency

CO 3: Plan and Manage the materials to ensure smooth flow of production at optimum cost

CO 4: Ensure quality and efficiency of production and other functions through application of quality management techniques.

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MBCII - 5 – Cost Accounting

Course Objectives

The course would facilitate the students to learn the basic concepts of costs and cost accounting and their applicability in managerial decisions regarding selection of suitable product mix, desired level of profits, diversification of products, closing down or suspending activities, level of activity planning

Course Outcomes

CO 1: After completing the course, the student would be able to

CO 2: Use the cost accounting techniques for the analysis and Classification of Costs

CO 3: Prepare of Cost Sheet ,Quotations and tender

CO 4: Apply the concepts of Marginal Costing in Decision Making

CO 5: Take decisions such as selection of suitable product mix, desired level of profits, diversification of products, closing down or suspending activities, level of activity planning

CO 6: Apply the basics of BEP for various business problems.

CO 7: Apply Standard costing techniques

CO 8: Carry out Contract and Operating Costing

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MBCII – 6 Economic Environment of Business

Course Objectives:

The course aims to develop the ability of the students to understand the economic environment of the business in the Indian as well as global context, the reforms and policy decisions of the government, steps required to protect consumer rights

Course Outcomes:

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

CO1: Make decisions with respect to business environment and economic reforms.

CO2: Demonstrate leadership skills by making policies with respect to economic and industrial environment existing at the certain time.

CO3: Design policies and create awareness to protect consumer rights by having its understanding

CO4: Prepare future plans in respect to global environment and its impact on currency.

CO5: Develop and stay updates with recent technological developments.

CO6: Communicate and present effectively the decisions and policies in the given field.

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SEMESTER III

MBCIII - 1 – Strategic Management

Course Objectives:

1. To learn the concepts of Strategic decision making and practice Strategic management process and to explain the basics of SWOT analysis
2. To understand Resource analysis of the organization and Interpret the five forces model and carry out Competitors analysis
3. To understand External analysis, Portfolio analysis and industry analysis of the business
4. To understand the concepts Corporate level strategy, Business Level strategy & Functional level strategy -

Course Outcomes:

After completing the course, the student would be able to

CO 1: Adopt Strategic decision making and practice Strategic management process and carry out SWOT analysis

CO 2: Carry out Resource analysis of the organization and Interpret the five forces model and carry out Competitors analysis

CO 3: Conduct External analysis and industry analysis of the business and to conduct Portfolio analysis to maximize profit

CO 4: To formulate Corporate level strategy, Business Level strategy & Functional level strategy

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MBFIII - 1 Environment Management

Course Objectives:

1. To learn about the environment and the steps to be taken for the betterment of our environment by saving natural resources.
2. To understand the fundamentals and need of environment management.
3. To understand the need for saving or minimizing from different pollutions and minimize the climate change and the efforts needed in this direction
4. To study the methods of developing population and of handling various social issues in environment.

Course Outcomes:

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

CO 1: Identify and take precautions for the betterment of our environment by saving natural resources.

CO 2: Identify and understand the ecosystem, ecosystem degradation and fundamentals and need of environment management.

CO 3: Synthesize ideas for saving or minimizing from different pollutions and minimize the climate change.

CO 4: Identify and taking action on developing population and various social issues in environment.

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Elective: Marketing Management

Paper I

MBEIII - 11 – Sales and Distribution Management

Course Objectives: The student will

- CO 1: Understand the various theories and approaches to Sales Management and their applications
- CO 2: Understand the steps in setting up a sales organization and territory management.
- CO 3: Understand the physical distribution process, forms and functions of marketing channels.
- CO 4: Understand the concepts, tools and techniques of Supply Chain Management And Logistics.

Course Objectives: The student will be able to

CO 1: Apply the appropriate theories and approaches to Sales Management of any organisation.

CO 2: Set up a sales organization and handle territory management, Recruitment & Selection, Training, Motivation, Compensation and Evaluation.

CO 3: Implement and monitor of physical distribution process, applying the appropriate marketing channels suitable for given organization.

CO 4: Apply the concepts, tools and techniques of Supply Chain Management And Logistics

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Paper II

MM2 - MBEIII - 12 – Integrated Marketing Communication & Brand Management

Course Objectives:

1) To understand the basics of marketing communication in marketing of the company products.
2) To study various types of media and their characteristics.
3) To understand the basics,, techniques and methods of creating and nurturing brands and enhancing brand equity.
4) To understand the nuances of Brand management concepts and techniques.

Course Outcomes

CO 1: To apply the basics of marketing communication in marketing of the company products.

CO 2: To identify various types of media and their characteristics.

CO 3: To evaluate the basics, techniques and methods of creating and nurturing brands and enhancing brand equity.

CO 4: To apply the concepts and techniques of Brand management concepts

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Elective: Financial Management

Paper I

MBEIII - 11 – Corporate Financial Management

Course Objectives:

1. To understand the conceptual base and techniques of long term investment decisions with the help of capital budgeting tools
2. To study the merits and demerits of options for short term and long term finance requirements of the business
3. To understand the basic theories and concepts of valuation of business and make dividend decisions
4. To study the processes and rationale of mergers and acquisition decisions by considering valuation and taxation aspects and adapt to the contemporary trends in the field to real situations

Course Outcomes:

After successfully completing this course, the student would be able to

CO 1: Take long term investment decisions with the help of capital budgeting tools

CO 2: Choose the best options for short term and long term finance requirements of the business

CO 3: Undertake valuation of business and make dividend decisions.

CO 4: Effect mergers and acquisition decisions by considering valuation and taxation aspects incorporating contemporary trends in the field

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Paper II

MBEIII - 12 – Securities, Portfolio and Risk Management

Course Objectives:

1. To understand the techniques of Valuation of Securities such as equity, bonds and hybrid instruments
2. To gain insights about fundamental and technical analysis of equities
3. To study portfolio theory and portfolio management concepts in creating and managing investment portfolios.
4. To understand the basics of risk management tools such as futures and options and other derivative contracts

Course Outcomes:

After successfully completing this course, the student would be able to

CO 1: Undertake Valuation of Securities such as equity, bonds and hybrid instruments

CO 2: Conduct fundamental and technical analysis of equities

CO 3: Apply the portfolio theory and portfolio management concepts in creating and managing investment portfolios.

CO 4: Evaluate and Effectively employ risk management tools such as futures and options and other derivative contracts

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Elective Group C: Human Resource Management

Paper I

MBEIII - 11 – Training & Development Practices

Course Objectives:

To introduce the concepts of Training and Training need analysis

To understand the basics of Training Process and techniques

To understand the basics, methods and techniques of evaluating training

To understand the need and role of Management Development

Course Outcomes:

CO 1: To conduct Training and Training need analysis

CO 2: To design and conduct training activities suitable for various groups of employees

CO 3: To carry out Evaluation of Training and Follow Up of Training

CO 4: To design, initiate execute management development initiatives

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Paper II

MBEIII - 12 – Performance & Compensation Management

Course Objectives:

- To introduce the concepts of Performance Appraisal and Performance appraisal system
- To study and understand Traditional and Modern methods of performance appraisal
- To understand the basics, methods and techniques of Compensation Planning
- To understand the basics, methods and techniques of Career Management

Course Outcomes:

CO 1: To design Performance appraisal system on the basis of the concepts of Performance Appraisal

CO 2: To list and apply Traditional and Modern methods of performance appraisal

CO 3: To identify the basics, methods and techniques of Compensation Planning

CO 4: To practice the basics, methods and techniques of Career Management

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SEMESTER IV

MBCIV - 1 – Business Ethics & Corporate Governance

Course Objectives: The student will

- CO 1: Understand the various theories approaches to Business Ethicsand their applications
- CO 2: Identify Ethical Concerns & CSRin the Indian context and understand the basics of Business Ethics Ratings and Corporate Code of Ethics,
- CO 3: Understand the systems of Corporate Governance in the context of Globalisation , International codes of Business Conduct, Whistle blowing and its codes.
- CO 4: Understand Environment Ethics, Marketing Ethics & Ethics in HRM - India‟s Environment Policy and also Risk Management and audit in all these spheres.

Course Objectives: The student will be able to

CO 1: apply the various theories approaches to Business Ethicsand their applications

CO 2: Analyse Ethical Concerns & CSRin the Indian context and compute of Business Ethics Ratings and design Corporate Code of Ethics,

CO 3: Evaluate the systems of Corporate Governance in the context of Globalisation , International codes of Business Conduct, Whistle blowing and its codes.

CO 4: Implement and evaluate Environment Ethics, Marketing Ethics & Ethics in HRM – India’s Environment Policy and also Risk Management and audit in all these spheres.

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MBCIV - 2 – Entrepreneurship Development

Course Objectives: The student will

- CO I: Understand the characteristics o and role of Entrepreneurship in Economic Development
- CO 2: Understand the nuances of Starting the venture from generating business idea , steps in setting up a small business enterprise and basics of business plan
- CO 3: Understand business planand its elementsand the dos and donts.
- CO 4: Understand the various financial statements and identify the Entrepreneurial Support system consisting of MSME and other institutions and Social Responsibility of Entrepreneurs.

Course Outcomes: The student will be able to

CO 1: Identify the characteristics and role of Entrepreneurship in Economic Development

CO 2: Take steps for starting the venture from generating business idea, steps in setting up a small business enterprise and basics of business plan

CO 3: Prepare business plan with its essential elements

CO 4: Prepare the various financial statements and leverage the Entrepreneurial Support system consisting of MSME and other institutions and also have awareness about the Social Responsibility of Entrepreneurs.

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Foundation Course: MBFIV - 2 – International Business Management

Course Objectives: The student will

CO I: Understand the Concepts of international trade and their applications

CO 2: Understand FDI, EXIM Policy , Govt. Institutes supporting Foreign Trade

CO 3: Understand Exchange Rate Management.

CO 4: Identify d the various : International Business Environment and organizations

Course Outcomes: The student will be able to

CO I: Apply the Concepts of international trade and their applications

CO 2: Comply with and benefit from FDI, EXIM Policies, the various schemes offered by Govt. Institutes supporting Foreign Trade

CO 3: Manage the Exchange Rate fluctuations for a particular organization.

CO 4: Make policies to take the benefit of and adapt to International Business Environment and organizations

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Elective: Marketing Management

Paper III

Paper 3: MBEIV - 13 – Consumer Buying Behaviour

Course Objectives: The student will

CO 1: Understand the Nature and Importance of CB, application of CB in Marketing , Consumer Research process.

CO 2: understand the application Consumer Decision making Process according to various Models of CB

CO 3: identify the Individual and group determinants of Consumer behaviour

CO 4: understand the application of CB

Course Outcomes: The student will

CO 1: enumerate the Nature and Importance of CB and apply CB in Marketing , Consumer Research process.

CO 2: apply Consumer Decision making Process according to various Models of CB

CO 3: Devise marketing policies incorporating the individual group determinants of Consumer behaviour

CO 4: understand the application of CB in cross cultural situations

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Elective: Financial Management

Paper III

MBEIV - 13 - Investment Environment and Wealth Management

Course Objectives: The student will

CO 1: understand the structure, institutions and functioning of the financial system

CO 2: understand insurance products and services

CO 3: understand mutual fund industry, the products offered and the investment strategies.

CO 4: understand Investor life cycle and investment goals, Investment options

Asset Allocation Strategies, Analysis and evaluation of Portfolio performance

Course Outcomes: The student will

CO 1: Explain the structure, institutions and functioning of the financial system and their inter dependencies

CO 2: choose among the various insurance products and services offered .

CO 3: Explain the functioning of mutual fund industry, the products offered and the investment strategies.

CO 4: Formulate investment goals and suggest Investment options as per the Investor life cycle and apply Asset Allocation Strategies, Analyse and evaluate the Portfolio performance

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Elective: Human Resource Management

Paper III

MBEIV - 13 – Industrial Relations & Labour Laws

Course Objectives:

CO 1: To introduce the concepts of IR, Background to IR, Evolution of IR in India

CO 2: To understand Concept of Industrial Conflicts/ Disputes

CO 3: To understand the provisions of Wage Legislations

CO 4: To understand the Social Security Legislations such as Workman's Compensation Act 1923, Employees State Insurance Act 1948 and Wage Legislations

Course Outcomes:

CO 1: To enumerate the concepts of IR, Background to IR, Evolution of IR in India

CO 2: To apply the fundamental concepts of and background of to understand the Wage Legislations

CO 3: To adopt the resolution methods of Industrial Conflicts/ Disputes in practice

CO 4: To comply with the provisions to comply with the provisions of Social Security Legislations such as Workman's Compensation Act 1923, Employees State Insurance Act 1948 and Wage Legislations

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Program Education Objectives for Two Year MBA Course

Program Education Objective:

PEO1:
The students will be able to apply management knowledge in real life situation by using appropriate methodology, tools and also display team work, learning agility, critical thinking.

PEO2:
Students will develop professional skills and ethical behavior that prepare them for immediate employment and for life-long learning in advanced areas of management and related fields.

PEO3:
Students will demonstrate their ability to adapt to a rapidly changing environment by having learned and applied new skills and new competencies, through display of leadership.

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Program Outcome for Two Year MBA Course

PO1: Ability to integrate and apply Academic and functional knowledge to tackle business problems and offer solutions in the interest of various stakeholders of the organization.

PO2: Conduct surveys/investigations to analyze complex business situations and interpret data and synthesize information to provide valid conclusions.

PO3: Create, select and apply appropriate resources, tools and techniques with an understanding of limitations of resources.

PO4: Function effectively as a member or a leader in diverse teams on multi-disciplinary platforms along with lifelong learning ability.

PO5: Communicate effectively on various business specific issues within the organization and society at large with an ability to comprehend, effective report writing, design documentation and effective presentations.

PO6: Demonstrate understanding of societal health, safety, literacy etc and consequent responsibilities relevant to managerial aspects.

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