



VIMAL JYOTHI ENGINEERING COLLEGE

JYOTHI NAGAR, CHEMPERI – 670632, KANNUR, KERALA

Affiliated to APJ Abdul Kalam Technological University, Approved by AICTE
ISO 9001 : 2015 Certified | Accredited by Institution of Engineers (India), NBA, NAAC
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NAAC Cycle 2

Criterion: 2.6.1

Semester : 1 - Course Code : ESL130 - Course Name : ELECTRICAL & ELECTRONICS WORKSHOP

Course Outcome Number	Course Outcome
1	Demonstrate safety measures against electric shocks
2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
4	Identify and test various electronic components
5	Draw circuit schematics with EDA tools
6	Assemble and test electronic circuits on boards
7	Work in a team with good interpersonal skills

Semester : 1 - Course Code : EST110 - Course Name : ENGINEERING GRAPHICS

Course Outcome Number	Course Outcome
1	Draw the projection of points and lines located in different quadrants
2	Prepare multiview orthographic projections of objects by visualizing them in different positions
3	Draw sectional views and develop surfaces of a given object
4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions
5	Convert 3D views to orthographic views and vice versa
6	Obtain multiview projections and solid models of objects using CAD tools

Semester : 1 - Course Code : EST130 - Course Name : BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcome Number	Course Outcome
1	Apply fundamental concepts and circuit laws to solve simple DC electric and magnetic circuits
2	Develop and solve models of magnetic circuits
3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
4	Describe working of a voltage amplifier
5	Outline the principle of an electronic instrumentation system
6	Explain the principle of radio and cellular communication

Semester : 1 - Course Code : HUN101 - Course Name : LIFE SKILLS

Course Outcome Number	Course Outcome
1	Define and Identify different life skills required in personal and professional life
2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
4	Take part in group discussions
5	Use appropriate thinking and problem solving techniques to solve new problems
6	Understand the basics of teamwork and leadership



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NAAC Cycle 2

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Semester : 1 - Course Code : MAT101 - Course Name : LINEAR ALGEBRA AND CALCULUS

Course Outcome Number	Course Outcome
1	solve the consistent system of linear equations and apply orthogonal to a quadratic form
2	find the maxima and minima of multivariable functions
3	find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas using double and triple integrals
4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
5	determine the power series expansion of a given function

Semester : 1 - Course Code : PHL120 - Course Name : ENGINEERING PHYSICS LAB

Course Outcome Number	Course Outcome
1	Apply modern instruments like CRO, strain gauge to measure the basic physical quantities viz. frequency and amplitude of a wave pattern, strain etc. Carryout measurement of wave pattern in a stretched string and the corresponding frequency values using a Melde's string apparatus
2	Determine the wavelength of monochromatic beam of light and thickness of micro-thin object etc. by forming Newton's rings pattern and an air wedge fringe pattern
3	Carryout the measurement of wavelength by diffraction of plane transmission grating and the spectra formed by a monochromatic beam of light and a laser
4	Determine the wavelength of a laser beam using the plane transmission grating. Measurement of numerical aperture of an optic fibre and evaluate the properties of a solar cell and LED through its I-V characteristics
5	Determine the velocity of ultrasonic waves in liquid using ultrasonic diffractometer. Compare the magnetic moment of various magnets and determine the magnetic flux density using deflection/vibration Magnetometer

Semester : 1 - Course Code : PHT100 - Course Name : ENGINEERING PHYSICS A (FOR CIRCUIT BRANCHES)

Course Outcome Number	Course Outcome
1	Compute the quantitative aspects of waves and oscillations in engineering systems
2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments
3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices
4	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems
5	Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system

Semester : 2 - Course Code : CYL120 - Course Name : ENGINEERING CHEMISTRY LAB

Course Outcome Number	Course Outcome
1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses



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2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

Semester : 2 - Course Code : CYT100 - Course Name : ENGINEERING CHEMISTRY

Course Outcome Number	Course Outcome
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields
2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
5	Study various types of water treatment methods to develop skills for treating wastewater

Semester : 2 - Course Code : ESL120 - Course Name : CIVIL & MECHANICAL WORKSHOP

Course Outcome Number	Course Outcome
1	Name different devices and tools used for civil engineering measurements
2	Explain the use of various tools and devices for various field measurements
3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work
4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing
5	Compare different techniques and devices used in civil engineering measurements
6	Identify Basic Mechanical workshop operations in accordance with the material and objects
7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
8	Apply appropriate safety measures with respect to the mechanical workshop trades

Semester : 2 - Course Code : EST100 - Course Name : ENGINEERING MECHANICS

Course Outcome Number	Course Outcome
1	Recall principles and theorems related to rigid body mechanics
2	Identify and describe the components of system of forces acting on the rigid body
3	Apply the conditions of equilibrium to various practical problems involving different force system
4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.



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NAAC Cycle 2

Criterion: 2.6.1

5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses
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Semester : 2 - Course Code : EST102 - Course Name : PROGRAMMING IN C

Course Outcome Number	Course Outcome
1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators
3	Write readable C programs with arrays, structure or union for storing the the data to be processed
4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
5	Write readable C programs which use pointers for array processing and parameter passing
6	Develop readable C programs with files for reading input and storing output
7	Understand the basics of computer hardware and software.

Semester : 2 - Course Code : EST120 - Course Name : BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
2	Explain different types of buildings, building components, building materials and building construction
3	Describe the importance, objectives and principles of surveying
4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
5	Discuss the Materials, energy systems, water management and environment for green buildings
6	Analyse thermodynamic cycles and calculate its efficiency
7	Illustrate the working and features of IC Engines
8	Explain the basic principles of Refrigeration and Air Conditioning
9	Describe the working of hydraulic machines
10	Explain the working of power transmission elements
11	Describe the basic manufacturing, metal joining and machining processes

Semester : 2 - Course Code : HUN102 - Course Name : PROFESSIONAL COMMUNICATION

Course Outcome Number	Course Outcome
1	Develop vocabulary and language skills relevant to engineering as a profession
2	Analyze, interpret and effectively summarize a variety of textual content
3	Create effective technical presentations
4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
6	Create professional and technical documents that are clear and adhering to all the necessary conventions



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Semester : 2 - Course Code : MAT102 - Course Name : VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Course Outcome Number	Course Outcome
1	Apply the concept of vector functions and learn to work with conservative vector field
2	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space
3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
4	Apply Laplace transforms to solve physical problems arising in engineering
5	Apply Fourier transforms to solve physical problems arising in engineering

Semester : 3 - Course Code : ECL201 - Course Name : SCIENTIFIC COMPUTING LABORATORY

Course Outcome Number	Course Outcome
1	Describe the needs and requirements of scientific computing and to familiarize one programming language for scientific computing and data visualization
2	Approximate an array/matrix with matrix decomposition.
3	Implement numerical integration and differentiation
4	Solve ordinary differential equations for engineering applications
5	Compute with exported data from instruments
6	Realize how periodic functions are constituted by sinusoids
7	Simulate random processes and understand their statistics

Semester : 3 - Course Code : ECL203 - Course Name : LOGIC DESIGN LAB

Course Outcome Number	Course Outcome
1	Design and demonstrate the functioning of various combinational and sequential circuits using Ics
2	Apply an industry compatible hardware description language to implement digital circuits
3	Implement digital circuits on FPGA boards and connect external hardware to the boards
4	Function effectively as an individual and in a team to accomplish the given task

Semester : 3 - Course Code : ECT201 - Course Name : SOLID STATE DEVICES

Course Outcome Number	Course Outcome
1	Apply Fermi-Dirac Distribution function and Compute carrier concentration at equilibrium and the parameters associated with generation, recombination and transport mechanism
2	Explain drift and diffusion currents in extrinsic semiconductors and Compute current density due to these effects
3	Define the current components and derive the current equation in a pn junction diode and bipolar junction transistor
4	Explain the basic MOS physics and derive the expressions for drain current in linear and saturation regions.
5	Discuss scaling of MOSFETs and short channel effects



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Semester : 3 - Course Code : ECT203 - Course Name : LOGIC CIRCUIT DESIGN

Course Outcome Number	Course Outcome
1	Explain the elements of digital system abstractions such as digital representations of information, digital logic and Boolean algebra
2	Create an implementation of a combinational logic function described by a truth table using and/or/inv gates/ muxes
3	Compare different types of logic families with respect to performance and efficiency
4	Design a sequential logic circuit using the basic building blocks like flip-flops
5	Design and analyze combinational and sequential logic circuits through gate level Verilog models

Semester : 3 - Course Code : ECT205 - Course Name : NETWORK THEORY

Course Outcome Number	Course Outcome
1	Apply Mesh / Node analysis or Network Theorems to obtain steady state response of the linear time invariant networks.
2	Apply Laplace Transforms to determine the transient behaviour of RLC networks.
3	Apply Network functions and Network Parameters to analyse the single port and two port networks.

Semester : 3 - Course Code : EST200 - Course Name : DESIGN AND ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the different concepts and principles involved in design engineering
2	Apply design thinking while learning and practicing engineering
3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering

Semester : 3 - Course Code : MAT201 - Course Name : PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS

Course Outcome Number	Course Outcome
1	Understand the concept and the solution of partial differential equation
2	Analyse and solve one dimensional wave equation and heat equation.
3	Understand complex functions, its continuity differentiability with the use of CauchyRiemann equations.
4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.

Semester : 3 - Course Code : MCN201 - Course Name : SUSTAINABLE ENGINEERING

Course Outcome Number	Course Outcome
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1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
2	Explain the different types of environmental pollution problems and their sustainable solutions
3	Discuss the environmental regulations and standards
4	Outline the concepts related to conventional and non-conventional energy
5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Semester : 4 - Course Code : AEL204 - Course Name : TRANSDUCERS AND MEASUREMENTS LAB

Course Outcome Number	Course Outcome
1	Make use of basic transducers for the measurement of physical variables like pressure ,temperature etc
2	Experiment with various measuring instruments and bridges
3	Implement sensor based measurement systems using modern tools

Semester : 4 - Course Code : AET206 - Course Name : MEASUREMENTS AND INSTRUMENTATION

Course Outcome Number	Course Outcome
1	Illustrate the working principles of electronic measuring instruments
2	Identify various types of errors in measuring systems and choose methods for minimization of the errors
3	Summarize the concepts of DC and AC bridges used in measurement systems
4	Apply the principles and functions of various types of Transducers in measuring systems
5	Explain the concepts of CRO, DSO, various recording devices and waveform analyzing instruments

Semester : 4 - Course Code : ECL202 - Course Name : ANALOG CIRCUITS AND SIMULATION LAB

Course Outcome Number	Course Outcome
1	Design and demonstrate the functioning of basic analog circuits using discrete components
2	Design and simulate the functioning of basic analog circuits using simulation tools
3	Function effectively as an individual and in a team to accomplish the given task

Semester : 4 - Course Code : ECT202 - Course Name : ANALOG CIRCUITS

Course Outcome Number	Course Outcome
1	Design analog signal processing circuits using diodes and first order RC circuit
2	Analyse basic amplifiers using BJT and MOSFET
3	Apply the principle of oscillator and regulated power supply circuits

Semester : 4 - Course Code : ECT204 - Course Name : SIGNALS AND SYSTEMS

Course Outcome Number	Course Outcome
1	Apply properties of signals and systems to classify them
2	Represent signals with the help of series and transforms



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3	Describe orthogonality of signals and convolution integral
4	Apply transfer function to compute the LTI response to input signals
5	Apply sampling theorem to discretize continuous time signals

Semester : 4 - Course Code : HUT200 - Course Name : PROFESSIONAL ETHICS

Course Outcome Number	Course Outcome
1	Understand the core values that shape the ethical behaviour of a professional.
2	Adopt a good character and follow an ethical life
3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
4	Solve moral and ethical problems through exploration and assessment by established experiments
5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Semester : 4 - Course Code : MAT204 - Course Name : PROBABILITY, RANDOM PROCESSES AND NUMERICAL METHODS

Course Outcome Number	Course Outcome
1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena
2	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena
3	Analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate
4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations

Semester : 4 - Course Code : MCN202 - Course Name : CONSTITUTION OF INDIA

Course Outcome Number	Course Outcome
1	Explain the background of the present constitution of India and features
2	Utilize the fundamental rights and duties
3	Understand the working of the union executive, parliament and judiciary
4	Understand the working of the state executive, legislature and judiciary
5	Utilize the special provisions and statutory institutions
6	Show national and patriotic spirit as responsible citizens of the country

Semester : 5 - Course Code : AEL331 - Course Name : ANALOG INTEGRATED CIRCUITS AND INSTRUMENTATION LAB

Course Outcome Number	Course Outcome
1	Design the linear and non-linear applications of an opamp and special application ICs.
2	Explain and compare the working of multivibrators using special application IC 555



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3	Illustrate the function of application specific ICs such as Voltage regulators, Data converters and PLL.
4	Explain the working of various transducers and their applications

Semester : 5 - Course Code : AEL333 - Course Name : EMBEDDED SYSTEMS LAB

Course Outcome Number	Course Outcome
1	Write an Assembly language program/Embedded C program for performing data manipulation.
2	Develop ALP/Embedded C Programs to interface microcontroller with peripherals
3	Perform programming/interfacing experiments with IDE for modern microcontrollers.

Semester : 5 - Course Code : AET301 - Course Name : CONTROL SYSTEMS

Course Outcome Number	Course Outcome
1	Analyze the control systems by transfer function approach
2	Get an adequate knowledge in the time response of systems & steady state error analysis
3	Learn the concept of stability of control systems and methods of stability analysis
4	Analyze the control systems using frequency domain method.
5	Apply the State Space Techniques to Control Systems.

Semester : 5 - Course Code : AET303 - Course Name : INDUSTRIAL INSTRUMENTATION

Course Outcome Number	Course Outcome
1	Understand the working of different types of temperature sensors
2	Familiarize with the various types of pressure measurement techniques
3	Study the working of various flow measurement devices
4	Familiarize with the working of anemometers and viscometers
5	Understand the various level measurement techniques

Semester : 5 - Course Code : AET305 - Course Name : COMPUTER ARCHITECTURE AND EMBEDDED SYSTEMS

Course Outcome Number	Course Outcome
1	Explain the processor architecture and operation.
2	Explain the architecture of 8051 microcontroller.
3	Develop programs using assembly language 8051.
4	Develop Programming concepts of Embedded programming in C.
5	Explain the concepts of RTOS based embedded system.

Semester : 5 - Course Code : AET307 - Course Name : ANALOG INTEGRATED CIRCUITS

Course Outcome Number	Course Outcome
1	Outline Op Amp fundamentals and differential amplifier configurations
2	Design operational amplifier circuits for various applications
3	Design Oscillators and active filters using opamps
4	Explain the working and applications of timer, VCO and PLL ICs
5	Outline the working of Voltage regulator IC's and Data converters



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Semester : 5 - Course Code : HUT310 - Course Name : MANAGEMENT FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Explain the characteristics of management in the contemporary context
2	Describe the functions of management
3	Demonstrate ability in decision making process and productivity analysis
4	Illustrate project management technique and develop a project schedule
5	Summarize the functional areas of management
6	Comprehend the concept of entrepreneurship and create business plans

Semester : 5 - Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community
5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level

Semester : 6 - Course Code : AED334 - Course Name : MINIPROJECT

Course Outcome Number	Course Outcome
1	Students will be able to practice acquired knowledge within the selected area of technology for project development
2	Identify, discuss and justify the technical aspects and design aspects of the project with a systematic approach
3	Reproduce, improve and refine technical aspects for engineering projects
4	Work as a team in development of technical projects
5	Communicate and report effectively project related activities and findings

Semester : 6 - Course Code : AEL332 - Course Name : POWER ELECTRONICS LAB

Course Outcome Number	Course Outcome
1	Design and demonstrate the functioning of basic power electronics circuits
2	Design and simulate the functioning of basic power electronics circuits using simulation tools
3	Function effectively as an individual and in a team to accomplish the given task

Semester : 6 - Course Code : AET302 - Course Name : DIGITAL SIGNAL PROCESSING



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Course Outcome Number	Course Outcome
1	Outline the fundamental properties relevant to DFT and explain the use of computationally efficient algorithms for finding DFT and IDFT
2	Develop filter response for linear phase FIR digital filters for given specifications
3	Develop filter transfer function for IIR digital filters for given specifications using design concepts of analog filter and analog-to-digital transformations
4	Implement FIR and IIR filter structures for a given system function
5	Explain architectural features of general purpose DSP processors and finite word length effects in DSP systems and filters

Semester : 6 - Course Code : AET304 - Course Name : PROCESS DYNAMICS AND CONTROL

Course Outcome Number	Course Outcome
1	Explain the characteristics and elements of process dynamics
2	Analyze a process control loop
3	Model and tune a feedback controller
4	Analyze multi-loop and multi variable controllers

Semester : 6 - Course Code : AET306 - Course Name : POWER ELECTRONICS

Course Outcome Number	Course Outcome
1	Explain the characteristics of important power semiconductor switches
2	Apply the principle of drive circuits and snubber circuits for power semiconductor switches
3	Build diode bridge rectifiers and Controlled rectifiers
4	Develop the principle of DC – DC Switch-Mode Converter.
5	Illustrate the principle of DC – AC Switch-Mode Inverter
6	Apply the principle of power electronics for various applications

Semester : 6 - Course Code : AET308 - Course Name : COMPREHENSIVE COURSE WORK

Course Outcome Number	Course Outcome
1	Design and analyze combinational and sequential logic circuits.
2	Apply the knowledge of fundamental network theory in analyzing any given network
3	Analyze continuous and discrete time systems in time and frequency domain using various transforms
4	Illustrate the basic principles involved in measurements and Instrumentation
5	Describe fundamental concepts of control systems and mathematical modelling of the system

Semester : 6 - Course Code : AET342 - Course Name : BIOMEDICAL INSTRUMENTATION

Course Outcome Number	Course Outcome
1	Describe the basic principles of physiological systems of human body
2	Illustrate the design principles and development of various biomedical instruments.
3	Explain the principle of patient monitoring systems and identify safety issues related to biomedical instrumentation.



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4	Describe the applications of medical imaging techniques in biomedical instrumentation
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Semester : 6 - Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production.
3	Determine the functional requirement of a firm under various competitive conditions.
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
5	Determine the impact of changes in global economic policies on the business opportunities of a firm

Semester : 7 - Course Code : AED415 - Course Name : PROJECT PHASE I

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 7 - Course Code : AEL411 - Course Name : PROCESS CONTROL LAB

Course Outcome Number	Course Outcome
1	Analyze and study the responses of various combinations of P, I, D controls for controlling basic processes like level, temperature, etc.
2	Tune controllers for processes using different methods
3	Analyze the performance of complex controls- cascade, feed forward and ratio
4	Implement process controls using computerized control
5	Acquire familiarity with usage of simulation tools for mathematical computation, processing and virtual instrumentation for process control applications

Semester : 7 - Course Code : AEQ413 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest
3	Prepare a presentation about an academic document
4	Give a presentation about an academic document



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NAAC Cycle 2

Criterion: 2.6.1

5	Prepare a technical report
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Semester : 7 - Course Code : AET401 - Course Name : COMMUNICATION ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the basic components of a communication system
2	Apply the concepts of random processes to LTI systems.
3	Illustrate the concepts of various analog communication techniques
4	Apply source coding techniques in digital communication system
5	Apply digital modulation techniques in communication system

Semester : 7 - Course Code : AET423 - Course Name : SCADA AND DISTRIBUTED CONTROL SYSTEMS

Course Outcome Number	Course Outcome
1	Explain the architecture and I/O processing of PLC
2	Apply the concepts of PLC programming and apply it to solve real life problems
3	Describe the implementation of SCADA system in industrial automation
4	Illustrate DCS architecture
5	Explain various interfacing techniques and algorithms used in DCS

Semester : 7 - Course Code : CET415 - Course Name : ENVIRONMENTAL IMPACT ASSESSMENT

Course Outcome Number	Course Outcome
1	Explain the need for minimizing the environmental impacts of developmental activities
2	Outline environmental legislation & clearance procedure in the country
3	Prepare an environmental impact assessment report
4	Conduct an environmental audit

Semester : 7 - Course Code : CST445 - Course Name : PYTHON FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs (Cognitive Knowledge level: Apply)
2	Illustrate uses of conditional (if, if-else, if-elif-else and switch-case) and iterative (while and for) statements in Python programs (Cognitive Knowledge level: Apply)
3	Develop programs by utilizing the modules Lists, Tuples, Sets and Dictionaries in Python (Cognitive Knowledge level: Apply)
4	Implement Object Oriented programs with exception handling (Cognitive Knowledge level: Apply)
5	Analyze, Interpret, and Visualize data according to the target application (Cognitive Knowledge level: Apply)
6	Develop programs in Python to process data stored in files by utilizing the modules Numpy, Matplotlib, and Pandas (Cognitive Knowledge level: Apply)

Semester : 7 - Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENGINEERING



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Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Describe the theories of accident causation and preventive measures of industrial accidents.
2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)
4	Describe various hazards associated with different machines and mechanical material handling.
5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)

Semester : 7 - Course Code : MET445 - Course Name : RENEWABLE ENERGY ENGINEERING

Course Outcome Number	Course Outcome
1	Explain renewable energy sources and evaluate the implication of renewable energy. To predict solar radiation at a location
2	Explain solar energy collectors, storages, solar cell characteristics and applications
3	Explain the different types of wind power machines and control strategies of wind turbines
4	Explain the ocean energy and conversion devices and different Geothermal sources
5	Explain biomass energy conversion devices. Calculate the Net Present value and payback period

Semester : 8 - Course Code : AED416 - Course Name : PROJECT PHASE II

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 8 - Course Code : AET402 - Course Name : VLSI CIRCUIT DESIGN

Course Outcome Number	Course Outcome
1	Design and analyze CMOS Inverters
2	Explain CMOS fabrication process and prepare physical layout for various MOS Circuits
3	Design and analyze various Combinational Logic Circuits
4	Design and analyze Sequential Logic Circuits and Datapath Subsystems
5	Design and analyze various types of Memories



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 8 - Course Code : AET424 - Course Name : SOFT COMPUTING

Course Outcome Number	Course Outcome
1	Define and explain soft computing techniques and their applications, build statistical learning models
2	Analyze various neural network architectures and Support Vector Machine
3	Define the fuzzy systems. Understand the genetic algorithm concepts and their applications
4	Identify and select a suitable Soft Computing technique to solve the real world problems; construct a solutions and implement a Soft Computing systems

Semester : 8 - Course Code : AET468 - Course Name : OPTICAL INSTRUMENTATION

Course Outcome Number	Course Outcome
1	Explain the basic concepts of fiber optics
2	Learn the basic concepts of fiber optic sensors and fiber connection techniques
3	Elaborate study of various types of Interferometers
4	Acquire basic knowledge in Laser and discuss its applications

Semester : 8 - Course Code : AET476 - Course Name : ROBOTICS AND INDUSTRIAL AUTOMATION

Course Outcome Number	Course Outcome
1	Design and implement automated systems using pneumatics
2	Provide hydraulic solutions for designing automated systems
3	Devise Assembly automated systems using feeders, orienteers and escapement devices
4	Perform selection of gripping mechanism for robotic application
5	Perform kinematic and dynamic analyses with simulation

DEPARTMENT OF CIVIL ENGINEERING

Semester : 1 - Course Code : ESL130 - Course Name : ELECTRICAL & ELECTRONICS WORKSHOP

Course Outcome Number	Course Outcome
1	Demonstrate safety measures against electric shocks
2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
4	Identify and test various electronic components
5	Draw circuit schematics with EDA tools
6	Assemble and test electronic circuits on boards
7	Work in a team with good interpersonal skills

Semester : 1 - Course Code : EST110 - Course Name : ENGINEERING GRAPHICS

Course Outcome Number	Course Outcome
1	Draw the projection of points and lines located in different quadrants



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NAAC Cycle 2

Criterion: 2.6.1

2	Prepare multiview orthographic projections of objects by visualizing them in different positions
3	Draw sectional views and develop surfaces of a given object
4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions
5	Convert 3D views to orthographic views and vice versa
6	Obtain multiview projections and solid models of objects using CAD tools

Semester : 1 - Course Code : EST130 - Course Name : BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcome Number	Course Outcome
1	Apply fundamental concepts and circuit laws to solve simple DC electric and magnetic circuits
2	Develop and solve models of magnetic circuits
3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
4	Describe working of a voltage amplifier
5	Outline the principle of an electronic instrumentation system
6	Explain the principle of radio and cellular communication

Semester : 1 - Course Code : HUN101 - Course Name : LIFE SKILLS

Course Outcome Number	Course Outcome
1	Define and Identify different life skills required in personal and professional life
2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
4	Take part in group discussions
5	Use appropriate thinking and problem solving techniques to solve new problems
6	Understand the basics of teamwork and leadership

Semester : 1 - Course Code : MAT101 - Course Name : LINEAR ALGEBRA AND CALCULUS

Course Outcome Number	Course Outcome
1	solve the consistent system of linear equations and apply orthogonal to a quadratic form
2	find the maxima and minima of multivariable functions
3	find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas using double and triple integrals
4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
5	determine the power series expansion of a given function

Semester : 1 - Course Code : PHL120 - Course Name : ENGINEERING PHYSICS LAB

Course Outcome Number	Course Outcome
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Criterion: 2.6.1

1	Apply modern instruments like CRO, strain gauge to measure the basic physical quantities viz. frequency and amplitude of a wave pattern, strain etc. Carryout measurement of wave pattern in a stretched string and the corresponding frequency values using a Melde's string apparatus
2	Determine the wavelength of monochromatic beam of light and thickness of micro-thin object etc. by forming Newton's rings pattern and an air wedge fringe pattern
3	Carryout the measurement of wavelength by diffraction of plane transmission grating and the spectra formed by a monochromatic beam of light and a laser
4	Determine the wavelength of a laser beam using the plane transmission grating. Measurement of numerical aperture of an optic fibre and evaluate the properties of a solar cell and LED through its I-V characteristics
5	Determine the velocity of ultrasonic waves in liquid using ultrasonic diffractometer. Compare the magnetic moment of various magnets and determine the magnetic flux density using deflection/vibration Magnetometer

Semester : 1 - Course Code : PHT110 - Course Name : ENGINEERING PHYSICS(FOR NON-CIRCUIT BRANCHES)

Course Outcome Number	Course Outcome
1	Compute the quantitative aspects of waves and oscillations in engineering systems
2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments
3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices
4	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment
5	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications

Semester : 2 - Course Code : CYL120 - Course Name : ENGINEERING CHEMISTRY LAB

Course Outcome Number	Course Outcome
1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

Semester : 2 - Course Code : CYT100 - Course Name : ENGINEERING CHEMISTRY



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Course Outcome Number	Course Outcome
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields
2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
5	Study various types of water treatment methods to develop skills for treating wastewater

Semester : 2 - Course Code : ESL120 - Course Name : CIVIL & MECHANICAL WORKSHOP

Course Outcome Number	Course Outcome
1	Name different devices and tools used for civil engineering measurements
2	Explain the use of various tools and devices for various field measurements
3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work
4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing
5	Identify Basic Mechanical workshop operations in accordance with the material and objects
6	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
7	Apply appropriate safety measures with respect to the mechanical workshop trades

Semester : 2 - Course Code : EST100 - Course Name : ENGINEERING MECHANICS

Course Outcome Number	Course Outcome
1	Recall principles and theorems related to rigid body mechanics
2	Identify and describe the components of system of forces acting on the rigid body
3	Apply the conditions of equilibrium to various practical problems involving different force system
4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Semester : 2 - Course Code : EST102 - Course Name : PROGRAMMING IN C

Course Outcome Number	Course Outcome
1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators
3	Write readable C programs with arrays, structure or union for storing the the data to be processed



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NAAC Cycle 2

Criterion: 2.6.1

4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
5	Write readable C programs which use pointers for array processing and parameter passing
6	Develop readable C programs with files for reading input and storing output
7	Understand the basics of computer hardware and software.

Semester : 2 - Course Code : EST120 - Course Name : BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering
2	Explain different types of buildings, building components, building materials and building construction
3	Describe the importance, objectives and principles of surveying
4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
5	Discuss the Materials, energy systems, water management and environment for green buildings
6	Analyse thermodynamic cycles and calculate its efficiency
7	Illustrate the working and features of IC Engines
8	Explain the basic principles of Refrigeration and Air Conditioning
9	Describe the working of hydraulic machines
10	Explain the working of power transmission elements
11	Describe the basic manufacturing, metal joining and machining processes

Semester : 2 - Course Code : HUN102 - Course Name : PROFESSIONAL COMMUNICATION

Course Outcome Number	Course Outcome
1	Develop vocabulary and language skills relevant to engineering as a profession
2	Analyze, interpret and effectively summarize a variety of textual content
3	Create effective technical presentations
4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
6	Create professional and technical documents that are clear and adhering to all the necessary conventions

Semester : 2 - Course Code : MAT102 - Course Name : VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Course Outcome Number	Course Outcome
1	Apply the concept of vector functions and learn to work with conservative vector field
2	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space
3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
4	Apply Laplace transforms to solve physical problems arising in engineering
5	Apply Fourier transforms to solve physical problems arising in engineering



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 3 - Course Code : CEL201 - Course Name : CIVIL ENGINEERING PLANNING & DRAFTING LAB

Course Outcome Number	Course Outcome
1	Illustrate ability to organise civil engineering drawings systematically and professionally
2	Prepare building drawings as per the specified guidelines
3	Assess a complete building drawing to include all necessary information
4	Create a digital form of the building plan using any drafting software

Semester : 3 - Course Code : CEL203 - Course Name : SURVEY LAB

Course Outcome Number	Course Outcome
1	Use conventional surveying tools such as chain/tape and compass for plotting and area determination
2	Apply levelling principles in field
3	Solve triangulation problems using theodolite
4	Employ total station for field surveying
5	Demonstrate the use of distomat and handheld GPS

Semester : 3 - Course Code : CET201 - Course Name : MECHANICS OF SOLIDS

Course Outcome Number	Course Outcome
1	Recall the fundamental terms and theorems associated with mechanics of linear elastic deformable bodies
2	Explain the behavior and response of various structural elements under various loading conditions.
3	Apply the principles of solid mechanics to calculate internal stresses/strains, stress resultants and strain energies in structural elements subjected to axial/transverse loads and bending/twisting moments.
4	Choose appropriate principles or formula to find the elastic constants of materials making use of the information available
5	Perform stress transformations, identify principal planes/stresses and maximum shear stress at a point in a structural member
6	Analyse the given structural member to calculate the safe load or proportion the cross section to carry the load safely

Semester : 3 - Course Code : CET203 - Course Name : FLUID MECHANICS AND HYDRAULICS

Course Outcome Number	Course Outcome
1	Recall the relevant principles of hydrostatics and hydraulics of pipes and open channels
2	Identify or describe the type, characteristics or properties of fluid flow
3	Estimate the fluid pressure, perform the stability check of bodies under hydrostatic condition
4	Compute discharge through pipes or estimate the forces on pipe bends by applying hydraulic principles of continuity, energy and/or momentum



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NAAC Cycle 2

Criterion: 2.6.1

5	Analyze or compute the flow through open channels, perform the design of prismatic channels
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Semester : 3 - Course Code : CET205 - Course Name : SURVEYING & GEOMATICS

Course Outcome Number	Course Outcome
1	Apply surveying techniques and principles of leveling for the preparation of contour maps, computation of area-volume and ske
2	Apply the principles of surveying for triangulation
3	Apply different methods of traverse surveying and traverse balancing
4	Identify the possible errors in surveying and apply the corrections in field measurements
5	Apply the basic knowledge of setting out of different types of curves
6	Employ surveying techniques using advanced surveying equipments

Semester : 3 - Course Code : HUT200 - Course Name : PROFESSIONAL ETHICS

Course Outcome Number	Course Outcome
1	Understand the core values that shape the ethical behaviour of a professional.
2	Adopt a good character and follow an ethical life
3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
4	Solve moral and ethical problems through exploration and assessment by established experiments
5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Semester : 3 - Course Code : MAT201 - Course Name : PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS

Course Outcome Number	Course Outcome
1	Understand the concept and the solution of partial differential equation
2	Analyse and solve one dimensional wave equation and heat equation.
3	Understand complex functions, its continuity differentiability with the use of CauchyRiemann equations.
4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.

Semester : 3 - Course Code : MCN201 - Course Name : SUSTAINABLE ENGINEERING

Course Outcome Number	Course Outcome
1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
2	Explain the different types of environmental pollution problems and their sustainable solutions
3	Discuss the environmental regulations and standards
4	Outline the concepts related to conventional and non-conventional energy



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Criterion: 2.6.1

5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles
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Semester : 4 - Course Code : CEL202 - Course Name : MATERIAL TESTING LAB - I

Course Outcome Number	Course Outcome
1	The understand the behaviour of engineering materials under various forms and stages of loading
2	Characterize the elastic properties of various materials
3	Evaluate the strength and stiffness properties of engineering materials under various loading conditions

Semester : 4 - Course Code : CEL204 - Course Name : FLUID MECHANICS LAB

Course Outcome Number	Course Outcome
1	Apply fundamental knowledge of Fluid Mechanics to corresponding experiments
2	Apply theoretical concepts in Fluid Mechanics to respective experiments
3	Analyse experimental data and interpret the results
4	Document the experimentation in prescribed manner

Semester : 4 - Course Code : CET202 - Course Name : ENGINEERING GEOLOGY

Course Outcome Number	Course Outcome
1	Recall the fundamental concepts of surface processes, subsurface process, minerals, rocks, groundwater and geological factors in civil engineering constructions
2	Identify and describe the surface processes, subsurface process, earth materials, groundwater and geological factors in civil engineering constructions
3	Apply the basic concepts of surface and subsurface processes, minerals, rocks, groundwater and geological characteristics in civil engineering constructions
4	Analyze and classify geological processes, earth materials and groundwater
5	Evaluation of geological factors in civil engineering constructions

Semester : 4 - Course Code : CET204 - Course Name : GEOTECHNICAL ENGINEERING - I

Course Outcome Number	Course Outcome
1	Explain the fundamental concepts of basic and engineering properties of soil
2	Describe the laboratory testing methods for determining soil parameters
3	Solve the basic properties of soil by applying functional relationships
4	Calculate the engineering properties of soil by applying the laboratory test results and the fundamental concepts of soil mechanics
5	Analyze the soil properties to identify and classify the soil

Semester : 4 - Course Code : CET206 - Course Name : TRANSPORTATION ENGINEERING

Course Outcome Number	Course Outcome
1	Apply the basic principles of Highway planning and design highway geometric elements



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Criterion: 2.6.1

2	Apply standard code specifications in judging the quality of highway materials; designing mixes and pavements
3	Explain phenomena in road traffic by collection, analysis and interpretation of traffic data through surveys; creative design of traffic control facilities
4	Understand about railway systems, tunnel, harbour and docks
5	Express basics of airport engineering and design airport elements

Semester : 4 - Course Code : CET296 - Course Name : GEOGRAPHICAL INFORMATION SYSTEMS

Course Outcome Number	Course Outcome
1	To define terms, basic concepts and operations in GIS
2	To identify various data types and their characteristics
3	To illustrate various approaches of spatial data analysis and their significance in decision making
4	To demonstrate the application of GIS and allied technologies across diverse fields
5	To understand the basics of remote sensing and GPS

Semester : 4 - Course Code : EST200 - Course Name : DESIGN AND ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the different concepts and principles involved in design engineering
2	Apply design thinking while learning and practicing engineering
3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering

Semester : 4 - Course Code : MAT202 - Course Name : PROBABILITY, STATISTICS AND NUMERICAL METHODS

Course Outcome Number	Course Outcome
1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena
2	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena
3	Perform statistical inferences concerning characteristics of a population based on attributes of samples drawn from the population
4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations

Semester : 4 - Course Code : MCN202 - Course Name : CONSTITUTION OF INDIA

Course Outcome Number	Course Outcome
1	Explain the background of the present constitution of India and features
2	Utilize the fundamental rights and duties
3	Understand the working of the union executive, parliament and judiciary
4	Understand the working of the state executive, legislature and judiciary
5	Utilize the special provisions and statutory institutions



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Criterion: 2.6.1

6	Show national and patriotic spirit as responsible citizens of the country
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Semester : 5 - Course Code : CEL331 - Course Name : MATERIAL TESTING LAB II

Course Outcome Number	Course Outcome
1	To describe the basic properties of various construction materials
2	Characterize the physical and mechanical properties of various construction materials
3	Interpret the quality of various construction materials as per IS Codal provisions

Semester : 5 - Course Code : CEL333 - Course Name : GEOTECHNICAL ENGINEERING LAB

Course Outcome Number	Course Outcome
1	Identify and classify soil based on standard geotechnical experimental methods
2	Perform and analyze permeability tests
3	Interpret engineering behavior of soils based on test results
4	Perform laboratory compaction, CBR and in-place density test for fill quality control in the field
5	Evaluate the strength of soil by performing various tests viz. direct shear test, unconfined compressive strength test and triaxial shear test
6	Evaluate settlement characteristics of soils

Semester : 5 - Course Code : CET 305 - Course Name : GEOTECHNICAL ENGINEERING - II

Course Outcome Number	Course Outcome
1	Understand soil exploration methods
2	Explain the basic concepts, theories and methods of analysis in foundation engineering
3	Calculate bearing capacity, pile capacity, foundation settlement and earth pressure
4	Analyze shallow and deep foundations
5	Solve the field problems related to geotechnical engineering

Semester : 5 - Course Code : CET301 - Course Name : STRUCTURAL ANALYSIS - I

Course Outcome Number	Course Outcome
1	Apply the principles of solid mechanics to analyse trusses
2	Apply various methods to determine deflections in statically determinate structures
3	Identify the problems with static indeterminacy and understand the basic concepts of tackling such problems by means of the method of consistent deformations and energy principles
4	Apply specific methods such as slope deflection and moment distribution methods of structural analysis for typical structures with different characteristics
5	Apply suitable methods of analysis for various types of structures including cables, suspension bridges and arches
6	Analyze the effects of moving loads on structures using influence lines

Semester : 5 - Course Code : CET303 - Course Name : DESIGN OF CONCRETE STRUCTURES

Course Outcome Number	Course Outcome
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NAAC Cycle 2

Criterion: 2.6.1

1	Recall the fundamental concepts of limit state design and code provisions for design of concrete members under bending, shear, compression and torsion.
2	Analyse reinforced concrete sections to determine the ultimate capacity in bending, shear and compression
3	Design and detail beams, slab, stairs and footings using IS code provisions
4	Design and detail columns using IS code and SP 16 design charts
5	Explain the criteria for earthquake resistant design of structures and ductile detailing of concrete structures subjected to seismic forces

Semester : 5 - Course Code : CET307 - Course Name : HYDROLOGY & WATER RESOURCES
ENGINEERING

Course Outcome Number	Course Outcome
1	Describe and estimate the different components of hydrologic cycle by processing hydro-meteorological data
2	Determine the crop water requirements for the design of irrigation canals by recollecting the principles of irrigation engineering
3	Perform the estimation of streamflow and/or describe the river behavior and control structures
4	Describe and apply the principles of reservoir engineering to estimate the capacity of reservoirs and their useful life
5	Demonstrate the principles of groundwater engineering and apply them for computing the yield of aquifers and wells

Semester : 5 - Course Code : CET309 - Course Name : CONSTRUCTION TECHNOLOGY AND
MANAGEMENT

Course Outcome Number	Course Outcome
1	Describe the properties of materials used in construction
2	Explain the properties of concrete and its determination
3	Describe the various elements of building construction
4	Explain the technologies for construction
5	Describe the procedure for planning and executing public works
6	Apply scheduling techniques in project planning and control

Semester : 5 - Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community
5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions



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NAAC Cycle 2

Criterion: 2.6.1

6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level
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Semester : 5 - Course Code : CEL331 - Course Name : MATERIAL TESTING LAB II

Course Outcome Number	Course Outcome
1	To describe the basic properties of various construction materials
2	Characterize the physical and mechanical properties of various construction materials
3	Interpret the quality of various construction materials as per IS Codal provisions

Semester : 5 - Course Code : CEL333 - Course Name : GEOTECHNICAL ENGINEERING LAB

Course Outcome Number	Course Outcome
1	Identify and classify soil based on standard geotechnical experimental methods
2	Perform and analyze permeability tests
3	Interpret engineering behavior of soils based on test results
4	Perform laboratory compaction, CBR and in-place density test for fill quality control in the field
5	Evaluate the strength of soil by performing various tests viz. direct shear test, unconfined compressive strength test and triaxial shear test
6	Evaluate settlement characteristics of soils

Semester : 5 - Course Code : CET 305 - Course Name : GEOTECHNICAL ENGINEERING - II

Course Outcome Number	Course Outcome
1	Understand soil exploration methods
2	Explain the basic concepts, theories and methods of analysis in foundation engineering
3	Calculate bearing capacity, pile capacity, foundation settlement and earth pressure
4	Analyze shallow and deep foundations
5	Solve the field problems related to geotechnical engineering

Semester : 5 - Course Code : CET301 - Course Name : STRUCTURAL ANALYSIS - I

Course Outcome Number	Course Outcome
1	Apply the principles of solid mechanics to analyse trusses
2	Apply various methods to determine deflections in statically determinate structures
3	Identify the problems with static indeterminacy and understand the basic concepts of tackling such problems by means of the method of consistent deformations and energy principles
4	Apply specific methods such as slope deflection and moment distribution methods of structural analysis for typical structures with different characteristics
5	Apply suitable methods of analysis for various types of structures including cables, suspension bridges and arches
6	Analyze the effects of moving loads on structures using influence lines

Semester : 5 - Course Code : CET303 - Course Name : DESIGN OF CONCRETE STRUCTURES



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Recall the fundamental concepts of limit state design and code provisions for design of concrete members under bending, shear, compression and torsion.
2	Analyse reinforced concrete sections to determine the ultimate capacity in bending, shear and compression
3	Design and detail beams, slab, stairs and footings using IS code provisions
4	Design and detail columns using IS code and SP 16 design charts
5	Explain the criteria for earthquake resistant design of structures and ductile detailing of concrete structures subjected to seismic forces

Semester : 5 - Course Code : CET307 - Course Name : HYDROLOGY & WATER RESOURCES ENGINEERING

Course Outcome Number	Course Outcome
1	Describe and estimate the different components of hydrologic cycle by processing hydro-meteorological data
2	Determine the crop water requirements for the design of irrigation canals by recollecting the principles of irrigation engineering
3	Perform the estimation of streamflow and/or describe the river behavior and control structures
4	Describe and apply the principles of reservoir engineering to estimate the capacity of reservoirs and their useful life
5	Demonstrate the principles of groundwater engineering and apply them for computing the yield of aquifers and wells

Semester : 5 - Course Code : CET309 - Course Name : CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Course Outcome Number	Course Outcome
1	Describe the properties of materials used in construction
2	Explain the properties of concrete and its determination
3	Describe the various elements of building construction
4	Explain the technologies for construction
5	Describe the procedure for planning and executing public works
6	Apply scheduling techniques in project planning and control

Semester : 5 - Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community



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NAAC Cycle 2

Criterion: 2.6.1

5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level

Semester : 6 - Course Code : CEL332 - Course Name : TRANSPORTATION ENGINEERING LAB

Course Outcome Number	Course Outcome
1	Analyse the suitability of soil as a pavement subgrade material
2	Assess the suitability of aggregates as a pavement construction material
3	Characterize bitumen based on its properties so as to recommend it as a pavement construction material
4	Design bituminous mixes for pavement layers
5	Assess functional adequacy of pavements based on roughness of pavement surface.

Semester : 6 - Course Code : CEL334 - Course Name : CIVIL ENGINEERING SOFTWARE LAB

Course Outcome Number	Course Outcome
1	To undertake analysis and design of multi-storeyed framed structure, schedule a given set of project activities using a software
2	To prepare design details of different structural components, implementation plan for a project
3	To prepare a technical document on engineering activities like surveying , structural design and project planning

Semester : 6 - Course Code : CET302 - Course Name : STRUCTURAL ANALYSIS - II

Course Outcome Number	Course Outcome
1	Understand the principles of plastic theory and its applications in structural analysis
2	Examine the type of structure and decide on the method of analysis
3	Apply approximate methods of analysis for framed structures to ascertain stress resultants approximately but quickly
4	Apply the force method to analyse framed structures
5	Apply the displacement methods to analyse framed structures.
6	Remember basic dynamics, understand the basic principles of structural dynamics and apply the same to simple structures.

Semester : 6 - Course Code : CET304 - Course Name : ENVIRONMENTAL ENGINEERING

Course Outcome Number	Course Outcome
1	To appreciate the role of environmental engineering in improving the quality of environment
2	To plan for collection and conveyance of water and waste water
3	To enhance natural water purification processes in an engineered environment
4	To decide on appropriate technology for water and waste water treatment

Semester : 6 - Course Code : CET306 - Course Name : DESIGN OF HYDRAULIC STRUCTURES



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Elucidate the causes of failure, principles of design of different components of hydraulic structures
2	Describe the features of canal structures and perform the design of alluvial canals
3	Perform the hydraulic design of minor irrigation structures such as cross drainage works, canal falls, cross regulator
4	Prepare the scaled drawings of different minor irrigation structures
5	Describe the design principles and features of dams and perform the stability analysis of gravity dams

Semester : 6 - Course Code : CET308 - Course Name : COMPREHENSIVE COURSE WORK

Course Outcome Number	Course Outcome
1	Learn to prepare for a competitive examination
2	Comprehend the questions in Civil Engineering field and answer them with confidence
3	Communicate effectively with faculty in scholarly environments
4	Analyze the comprehensive knowledge gained in basic courses in the field of Civil Engineering

Semester : 6 - Course Code : CET352 - Course Name : ADVANCED CONCRETE TECHNOLOGY

Course Outcome Number	Course Outcome
1	To recall the properties and testing procedure of concrete materials as per IS code
2	To describe the procedure of determining the properties of fresh and hardened concrete
3	To design concrete mix using IS Code Methods.
4	To explain nondestructive testing of concrete
5	To describe the various special types of concretes

Semester : 6 - Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production.
3	Determine the functional requirement of a firm under various competitive conditions.
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
5	Determine the impact of changes in global economic policies on the business opportunities of a firm.

Semester : 6 - Course Code : CEL332 - Course Name : TRANSPORTATION ENGINEERING LAB

Course Outcome Number	Course Outcome
1	Analyse the suitability of soil as a pavement subgrade material
2	Assess the suitability of aggregates as a pavement construction material



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NAAC Cycle 2

Criterion: 2.6.1

3	Characterize bitumen based on its properties so as to recommend it as a pavement construction material
4	Design bituminous mixes for pavement layers
5	Assess functional adequacy of pavements based on roughness of pavement surface.

Semester : 6 - Course Code : CEL334 - Course Name : CIVIL ENGINEERING SOFTWARE LAB

Course Outcome Number	Course Outcome
1	To undertake analysis and design of multi-storeyed framed structure, schedule a given set of project activities using a software
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1	Understand the principles of plastic theory and its applications in structural analysis
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4	Apply the force method to analyse framed structures
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Semester : 6 - Course Code : CET304 - Course Name : ENVIRONMENTAL ENGINEERING

Course Outcome Number	Course Outcome
1	To appreciate the role of environmental engineering in improving the quality of environment
2	To plan for collection and conveyance of water and waste water
3	To enhance natural water purification processes in an engineered environment
4	To decide on appropriate technology for water and waste water treatment

Semester : 6 - Course Code : CET306 - Course Name : DESIGN OF HYDRAULIC STRUCTURES

Course Outcome Number	Course Outcome
1	Elucidate the causes of failure, principles of design of different components of hydraulic structures
2	Describe the features of canal structures and perform the design of alluvial canals
3	Perform the hydraulic design of minor irrigation structures such as cross drainage works, canal falls, cross regulator
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Semester : 6 - Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production.
3	Determine the functional requirement of a firm under various competitive conditions.
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
5	Determine the impact of changes in global economic policies on the business opportunities of a firm.

Semester : 7 - Course Code : AET425 - Course Name : BIOMEDICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the basic idea about the biomedical engineering technology
2	Explain the principle and working of different types of bio medical electronic equipment/device
3	Understand the electrical muscle activities and to measure it
4	Analyze the brain wave activities and abnormalities
5	Illustrate the principles of modern medical diagnosing machines

Semester : 7 - Course Code : CE451 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest
3	Prepare a presentation about an academic document



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NAAC Cycle 2

Criterion: 2.6.1

4	Prepare a technical report
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Semester : 7 - Course Code : CED415 - Course Name : PROJECT PHASE I

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).

Semester : 7 - Course Code : CEL411 - Course Name : ENVIRONMENTAL ENGG LAB

Course Outcome Number	Course Outcome
1	Analyse various physico-chemical and biological parameters of water
2	Compare the quality of water with drinking water standards and recommend its suitability for drinking purposes

Semester : 7 - Course Code : CET401 - Course Name : DESIGN OF STEEL STRUCTURES

Course Outcome Number	Course Outcome
1	Explain the behavior and properties of structural steel members to resist various structural forces and actions and apply the relevant codes of practice
2	Analyses the behavior of structural steel members and undertake design at both serviceability and ultimate limit states
3	Explain the theoretical and practical aspects of Design of composite Steel Structure along with the planning and design aspects
4	Apply a diverse knowledge of Design of Steel engineering practices applied to real life problems
5	Demonstrate experience in the implementation of design of structures on engineering concepts which are applied in field Structural Engineering

Semester : 7 - Course Code : CET423 - Course Name : GROUND IMPROVEMENT TECHNIQUES

Course Outcome Number	Course Outcome
1	Classify different ground improvement methods based on the soil suitability
2	Outline the basic concept/ design aspects of various ground improvement methods
3	Identify the construction procedure of different ground improvement methods
4	Choose different application of geosynthetics and soil stabilisation in Ground improvement

Semester : 7 - Course Code : CST445 - Course Name : PYTHON FOR ENGINEERS



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs (Cognitive Knowledge level: Apply)
2	Illustrate uses of conditional (if, if-else, if-elif-else and switch-case) and iterative (while and for) statements in Python programs (Cognitive Knowledge level: Apply)
3	Develop programs by utilizing the modules Lists, Tuples, Sets and Dictionaries in Python (Cognitive Knowledge level: Apply)
4	Implement Object Oriented programs with exception handling (Cognitive Knowledge level: Apply)
5	Analyze, Interpret, and Visualize data according to the target application (Cognitive Knowledge level: Apply)
6	Develop programs in Python to process data stored in files by utilizing the modules Numpy, Matplotlib, and Pandas (Cognitive Knowledge level: Apply)

Semester : 7 - Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the theories of accident causation and preventive measures of industrial accidents.
2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping.
3	Explain different issues in construction industries.
4	Describe various hazards associated with different machines and mechanical material handling.
5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards.

Semester : 7 - Course Code : MET445 - Course Name : RENEWABLE ENERGY ENGINEERING

Course Outcome Number	Course Outcome
1	Explain renewable energy sources and evaluate the implication of renewable energy. To predict solar radiation at a location
2	Explain solar energy collectors, storages, solar cell characteristics and applications
3	Explain the different types of wind power machines and control strategies of wind turbines
4	Explain the ocean energy and conversion devices and different Geothermal sources
5	Explain biomass energy conversion devices. Calculate the Net Present value and payback period

Semester : 7 - Course Code : CE451 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest
3	Prepare a presentation about an academic document
4	Prepare a presentation about an academic document
5	Prepare a technical report



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 7 - Course Code : CED415 - Course Name : PROJECT PHASE I

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 7 - Course Code : CEL411 - Course Name : ENVIRONMENTAL ENGG LAB

Course Outcome Number	Course Outcome
1	Analyse various physico-chemical and biological parameters of water
2	Compare the quality of water with drinking water standards and recommend its suitability for drinking purposes

Semester : 7 - Course Code : CET401 - Course Name : DESIGN OF STEEL STRUCTURES

Course Outcome Number	Course Outcome
1	Explain the behavior and properties of structural steel members to resist various structural forces and actions and apply the relevant codes of practice
2	Analyses the behavior of structural steel members and undertake design at both serviceability and ultimate limit states
3	Explain the theoretical and practical aspects of Design of composite Steel Structure along with the planning and design aspects
4	Apply a diverse knowledge of Design of Steel engineering practices applied to real life problems
5	Demonstrate experience in the implementation of design of structures on engineering concepts which are applied in field Structural Engineering

Semester : 7 - Course Code : CET423 - Course Name : GROUND IMPROVEMENT TECHNIQUES

Course Outcome Number	Course Outcome
1	Classify different ground improvement methods based on the soil suitability
2	Outline the basic concept/ design aspects of various ground improvement methods
3	Identify the construction procedure of different ground improvement methods
4	Choose different application of geosynthetics and soil stabilisation in Ground improvement

Semester : 7 - Course Code : CST445 - Course Name : PYTHON FOR ENGINEERS



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs
2	Illustrate uses of conditional (if, if-else, if-elif-else and switch-case) and iterative (while and for) statements in Python programs
3	Develop programs by utilizing the modules Lists, Tuples, Sets and Dictionaries in Python
4	Implement Object Oriented programs with exception handling
5	Analyze, Interpret, and Visualize data according to the target application
6	Develop programs in Python to process data stored in files by utilizing the modules Numpy, Matplotlib, and Pandas

Semester : 7 - Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the theories of accident causation and preventive measures of industrial accidents.
2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping.
3	Explain different issues in construction industries.
4	Describe various hazards associated with different machines and mechanical material handling.
5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards.

Semester : 7 - Course Code : MET445 - Course Name : RENEWABLE ENERGY ENGINEERING

Course Outcome Number	Course Outcome
1	Explain renewable energy sources and evaluate the implication of renewable energy. To predict solar radiation at a location
2	Explain solar energy collectors, storages, solar cell characteristics and applications
3	Explain the different types of wind power machines and control strategies of wind turbines
4	Explain the ocean energy and conversion devices and different Geothermal sources
5	Explain biomass energy conversion devices. Calculate the Net Present value and payback period

Semester : 8 - Course Code : CED416 - Course Name : PROJECT PHASE II

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 8 - Course Code : CET402 - Course Name : QUANTITY SURVEYING AND VALUATION

Course Outcome Number	Course Outcome
1	Define basic terms related to estimation, quantity surveying and contract document
2	Interpret the item of work from drawings and explain its general specification and unit of measurement
3	Make use of given data from CPWD DAR/DSR for calculating the unit rate of different items of work associated with building construction
4	Develop detailed measurement (including BBS) and BoQ of a various work like buildings, earthwork for road, sanitary and water supply work
5	Explain various basic terms related to valuation of land and building
6	Develop valuation of buildings using different methods of valuation.

Semester : 8 - Course Code : CET404 - Course Name : COMPREHENSIVE COURSE VIVA

Course
Outcome
Details not
available For
Course

Semester : 8 - Course Code : CET424 - Course Name : GEOENVIRONMENTAL ENGINEERING

Course Outcome Number	Course Outcome
1	Outline the geo-environmental considerations of waste containment
2	Explain the contaminant transport mechanism
3	Choose the suitable system for waste containment and its various components
4	Plan suitable remediation method for contaminated site

Semester : 8 - Course Code : CET438 - Course Name : AIRPORT, SEAPORT AND HARBOUR ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the basic principles of planning and design for site selection, Airport components based on air traffic characteristics
2	Explain the basic design principles of Runway orientation, basic runway length and corrections required, Geometric design of runways, Design of taxiways and aprons, Terminal area planning,
3	Explain various aspects such as Airport markings, Lighting of runway approaches, taxiways and aprons, Air traffic control methods
4	Explain the basic principles ,site selection characteristics ,lay out ,break waters, quays, piers, wharves, jetties, transit sheds and warehouses - navigational aids - light houses, signals - types - Moorings
5	Explain the basics of Docks – Functions and types - dry docks, wet docks arrangement of basins and docks

Semester : 8 - Course Code : CET456 - Course Name : REPAIR AND REHABILITATION OF BUILDINGS

Course Outcome Number	Course Outcome
1	Recall the basics ideas and theories associated with Concrete technology and Masonry structures.



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NAAC Cycle 2

Criterion: 2.6.1

2	Understand the need and methodology of repair and rehabilitation of structures, the various mechanisms used, and tools for diagnosis of structures
3	Identifying the criterions for repairing / maintenance and the types and properties of repair materials used in site. Learn various techniques for repairing dam- aged and corroded structures
4	Proposing wholesom solutions for maintenance/re?habilitation and applying methodologies for repair- ing structures or demolishing structures.
5	Analyse and asses the damage to structures using various tests

Semester : 8 - Course Code : CED416 - Course Name : PROJECT PHASE II

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 8 - Course Code : CET402 - Course Name : QUANTITY SURVEYING AND VALUATION

Course Outcome Number	Course Outcome
1	Define basic terms related to estimation, quantity surveying and contract document
2	Interpret the item of work from drawings and explain its general specification and unit of measurement
3	Make use of given data from CPWD DAR/DSR for calculating the unit rate of different items of work associated with building construction
4	Develop detailed measurement (including BBS) and BoQ of a various work like buildings, earthwork for road, sanitary and water supply work
5	Explain various basic terms related to valuation of land and building
6	Develop valuation of buildings using different methods of valuation.

Semester : 8 - Course Code : CET404 - Course Name : COMPREHENSIVE COURSE VIVA

Course
Outcome
Details not
available For
Course

Semester : 8 - Course Code : CET424 - Course Name : GEOENVIRONMENTAL ENGINEERING

Course Outcome Number	Course Outcome
1	Outline the geo-environmental considerations of waste containment
2	Explain the contaminant transport mechanism
3	Choose the suitable system for waste containment and its various components
4	Plan suitable remediation method for contaminated site



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 8 - Course Code : CET438 - Course Name : AIRPORT, SEAPORT AND HARBOUR
ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the basic principles of planning and design for site selection, Airport components based on air traffic characteristics
2	Explain the basic design principles of Runway orientation, basic runway length and corrections required, Geometric design of runways, Design of taxiways and aprons, Terminal area planning,
3	Explain various aspects such as Airport markings, Lighting of runway approaches, taxiways and aprons, Air traffic control methods
4	Explain the basic principles ,site selection characteristics ,lay out ,break waters, quays, piers, wharves, jetties, transit sheds and warehouses - navigational aids - light houses, signals - types - Moorings
5	Explain the basics of Docks – Functions and types - dry docks, wet docks arrangement of basins and docks

Semester : 8 - Course Code : CET456 - Course Name : REPAIR AND REHABILITATION OF BUILDINGS

Course Outcome Number	Course Outcome
1	Recall the basics ideas and theories associated with Concrete technology and Masonry structures.
2	Understand the need and methodology of repair and rehabilitation of structures, the various mechanisms used, and tools for diagnosis of structures
3	Identifying the criterions for repairing / maintenance and the types and properties of repair materials used in site. Learn various techniques for repairing dam- aged and corroded structures
4	Proposing wholesom solutions for maintenance/re?habilitation and applying methodologies for repair- ing structures or demolishing structures.
5	Analyse and asses the damage to structures using various tests

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Semester : 1- Course Code : CYL120 - Course Name : ENGINEERING CHEMISTRY LAB

Course Outcome Number	Course Outcome
1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments



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NAAC Cycle 2

Criterion: 2.6.1

6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum
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Semester : 1- Course Code : CYT100 - Course Name : ENGINEERING CHEMISTRY

Course Outcome Number	Course Outcome
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields
2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
5	Study various types of water treatment methods to develop skills for treating wastewater

Semester : 1- Course Code : ESL120 - Course Name : CIVIL & MECHANICAL WORKSHOP

Course Outcome Number	Course Outcome
1	Name different devices and tools used for civil engineering measurements
2	Explain the use of various tools and devices for various field measurements
3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work
4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing
5	Compare different techniques and devices used in civil engineering measurements
6	Identify Basic Mechanical workshop operations in accordance with the material and objects
7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
8	Apply appropriate safety measures with respect to the mechanical workshop trades

Semester : 1- Course Code : EST100 - Course Name : ENGINEERING MECHANICS

Course Outcome Number	Course Outcome
1	Recall principles and theorems related to rigid body mechanics
2	Identify and describe the components of system of forces acting on the rigid body
3	Apply the conditions of equilibrium to various practical problems involving different force system
4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Semester : 1- Course Code : EST120 - Course Name : BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcome Number	Course Outcome
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NAAC Cycle 2

Criterion: 2.6.1

1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering
2	Explain different types of buildings, building components, building materials and building construction
3	Describe the importance, objectives and principles of surveying
4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
5	Discuss the Materials, energy systems, water management and environment for green buildings
6	Analyse thermodynamic cycles and calculate its efficiency
7	Illustrate the working and features of IC Engines
8	Explain the basic principles of Refrigeration and Air Conditioning
9	Describe the working of hydraulic machines
10	Explain the working of power transmission elements
11	Describe the basic manufacturing, metal joining and machining processes

Semester : 1- Course Code : HUN101 - Course Name : LIFE SKILLS

Course Outcome Number	Course Outcome
1	Define and Identify different life skills required in personal and professional life
2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
4	Take part in group discussions
5	Use appropriate thinking and problem solving techniques to solve new problems
6	Understand the basics of teamwork and leadership

Course Outcome Number	Course Outcome
1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

Semester : 1 - Course Code : CYT100 - Course Name : ENGINEERING CHEMISTRY

Course Outcome Number	Course Outcome
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields



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NAAC Cycle 2

Criterion: 2.6.1

2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
5	Study various types of water treatment methods to develop skills for treating wastewater

Semester : 1 - Course Code : ESL120 - Course Name : CIVIL & MECHANICAL WORKSHOP

Course Outcome Number	Course Outcome
1	Name different devices and tools used for civil engineering measurements
2	Explain the use of various tools and devices for various field measurements
3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work
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5	Compare different techniques and devices used in civil engineering measurements
6	Identify Basic Mechanical workshop operations in accordance with the material and objects
7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
8	Apply appropriate safety measures with respect to the mechanical workshop trades

Semester : 1 - Course Code : EST100 - Course Name : ENGINEERING MECHANICS

Course Outcome Number	Course Outcome
1	Recall principles and theorems related to rigid body mechanics
2	Identify and describe the components of system of forces acting on the rigid body
3	Apply the conditions of equilibrium to various practical problems involving different force system
4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Semester : 1 - Course Code : EST120 - Course Name : BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering
2	Explain different types of buildings, building components, building materials and building construction
3	Describe the importance, objectives and principles of surveying
4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
5	Discuss the Materials, energy systems, water management and environment for green buildings
6	Analyse thermodynamic cycles and calculate its efficiency
7	Illustrate the working and features of IC Engines
8	Explain the basic principles of Refrigeration and Air Conditioning



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NAAC Cycle 2

Criterion: 2.6.1

9	Describe the working of hydraulic machines
10	Explain the working of power transmission elements
11	Describe the basic manufacturing, metal joining and machining processes

Semester : 1 - Course Code : HUN101 - Course Name : LIFE SKILLS

Course Outcome Number	Course Outcome
1	Define and Identify different life skills required in personal and professional life
2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
4	Take part in group discussions
5	Use appropriate thinking and problem solving techniques to solve new problems
6	Understand the basics of teamwork and leadership

Semester : 1 - Section : C - Course Code : CYL120 - Course Name : ENGINEERING CHEMISTRY LAB

Course Outcome Number	Course Outcome
1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

Semester : 1 - Section : C - Course Code : CYT100 - Course Name : ENGINEERING CHEMISTRY

Course Outcome Number	Course Outcome
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields
2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
5	Study various types of water treatment methods to develop skills for treating wastewater

Semester : 1 - Section : C - Course Code : ESL120 - Course Name : CIVIL & MECHANICAL WORKSHOP



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NAAC Cycle 2

Criterion: 2.6.1

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Semester : 1 - Section : C - Course Code : EST100 - Course Name : ENGINEERING MECHANICS

Course Outcome Number	Course Outcome
1	Recall principles and theorems related to rigid body mechanics
2	Identify and describe the components of system of forces acting on the rigid body
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4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Semester : 1 - Section : C - Course Code : EST120 - Course Name : BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
2	Explain different types of buildings, building components, building materials and building construction
3	Describe the importance, objectives and principles of surveying
4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
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8	Explain the basic principles of Refrigeration and Air Conditioning
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10	Explain the working of power transmission elements
11	Describe the basic manufacturing, metal joining and machining processes

Semester : 1 - Section : C - Course Code : HUN101 - Course Name : LIFE SKILLS

Course Outcome Number	Course Outcome
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NAAC Cycle 2

Criterion: 2.6.1

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2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
4	Take part in group discussions
5	Use appropriate thinking and problem solving techniques to solve new problems
6	Understand the basics of teamwork and leadership

Semester : 1 - Section : C - Course Code : MAT101 - Course Name : LINEAR ALGEBRA AND CALCULUS

Course Outcome Number	Course Outcome
1	solve the consistent system of linear equations and apply orthogonal to a quadratic form
2	find the maxima and minima of multivariable functions
3	find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas using double and triple integrals
4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
5	determine the power series expansion of a given function

Semester : 3- Course Code : CSL201 - Course Name : DATA STRUCTURES

LAB

Course Outcome Number	Course Outcome
1	Write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements
2	Write a time/space efficient program to sort a list of records based on a given key in the record
3	Examine a given Data Structure to determine its space complexity and time complexities of operations on it
4	Design and implement an efficient data structure to represent given data
5	Write a time/space efficient program to convert an arithmetic expression from one notation to another
6	Write a program using linked lists to simulate Memory Allocation and Garbage Collection

Semester : 3- Course Code : CSL203 - Course Name : OBJECT ORIENTED PROGRAMMING LAB (IN JAVA)

Course Outcome Number	Course Outcome
1	Implement the Object Oriented concepts - constructors, inheritance, method overloading & overriding and polymorphism in Java
2	Implement programs in Java which use datatypes, operators, control statements, built in packages & interfaces, Input/Output streams and Files
3	Implement robust application programs in Java using exception handling
4	Implement application programs in Java using multithreading and database connectivity



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NAAC Cycle 2

Criterion: 2.6.1

5	Implement Graphical User Interface based application programs by utilizing event handling features and Swing in Java
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Semester : 3- Course Code : CST201 - Course Name : DATA STRUCTURES

Course Outcome Number	Course Outcome
1	Design an algorithm for a computational task and calculate the time/space complexities of that algorithm
2	Identify the suitable data structure (array or linked list) to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem
3	Write an algorithm to find the solution of a computational problem by selecting an appropriate data structure (binary tree/graph) to represent a data item to be processed
4	Store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set
5	Select appropriate sorting algorithms to be used in specific circumstances
6	Design and implement Data Structures for solving real world problems efficiently

Semester : 3- Course Code : CST203 - Course Name : LOGIC SYSTEM DESIGN

Course Outcome Number	Course Outcome
1	Illustrate decimal, binary, octal, hexadecimal and BCD number systems, perform conversions among them and do the operations - complementation, addition, subtraction, multiplication and division on binary numbers
2	Simplify a given Boolean Function and design a combinational circuit to implement the simplified function using Digital Logic Gates
3	Design combinational circuits - Adders, Code Convertors, Decoders, Magnitude Comparators, Parity Generator/Checker and design the Programmable Logic Devices - ROM and PLA.
4	Design sequential circuits - Registers, Counters and Shift Registers
5	Use algorithms to perform addition and subtraction on binary, BCD and floating point numbers

Semester : 3- Course Code : CST205 - Course Name : OBJECT ORIENTED PROGRAMMING USING JAVA

Course Outcome Number	Course Outcome
1	Write Java programs using the object oriented concepts - classes, objects, constructors, data hiding, inheritance and polymorphism
2	Utilise datatypes, operators, control statements, built in packages & interfaces, Input/Output Streams and Files in Java to develop programs
3	Illustrate how robust programs can be written in Java using exception handling mechanism
4	Write application programs in Java using multithreading and database connectivity
5	Write Graphical User Interface based application programs by utilising event handling features and Swing in Java



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NAAC Cycle 2

Criterion: 2.6.1

6	Practically apply knowledge of software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML.
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Semester : 3- Course Code : EST200 - Course Name : DESIGN AND ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the different concepts and principles involved in design engineering
2	Apply design thinking while learning and practicing engineering
3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Semester : 3- Course Code : MAT203 - Course Name : DISCRETE MATHEMATICAL STRUCTURES

Course Outcome Number	Course Outcome
1	Learn the fundamentals of enumeration or counting techniques and methods of arrangements and derangements
2	Learn the fundamentals of propositional logic and predicate calculus and apply to test the validity of statements
3	Learn the ideas of relations, functions equivalence relation POSET and it's application
4	Understand the recurrence relation and apply the method of solving different type of recurrence relations using generating functions
5	Understand Fundamentals of Algebraic structures its properties such as monoid groups and ring

Semester : 3- Course Code : MCN201 - Course Name : SUSTAINABLE ENGINEERING

Course Outcome Number	Course Outcome
1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
2	Explain the different types of environmental pollution problems and their sustainable solutions
3	Discuss the environmental regulations and standards
4	Outline the concepts related to conventional and non-conventional energy
5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Semester : 3 - Course Code : CSL201 - Course Name : DATA STRUCTURES LAB

Course Outcome Number	Course Outcome
1	Write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements
2	Write a time/space efficient program to sort a list of records based on a given key in the record
3	Examine a given Data Structure to determine its space complexity and time complexities of operations on it
4	Design and implement an efficient data structure to represent given data



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NAAC Cycle 2

Criterion: 2.6.1

5	Write a time/space efficient program to convert an arithmetic expression from one notation to another
6	Write a program using linked lists to simulate Memory Allocation and Garbage Collection

Semester : 3 - Course Code : CSL203 - Course Name : OBJECT ORIENTED PROGRAMMING LAB (IN JAVA)

Course Outcome Number	Course Outcome
1	Implement the Object Oriented concepts - constructors, inheritance, method overloading & overriding and polymorphism in Java
2	Implement programs in Java which use datatypes, operators, control statements, built in packages & interfaces, Input/Output streams and Files
3	Implement robust application programs in Java using exception handling
4	Implement application programs in Java using multithreading and database connectivity
5	Implement Graphical User Interface based application programs by utilizing event handling features and Swing in Java

Semester : 3 - Course Code : CST201 - Course Name : DATA STRUCTURES

Course Outcome Number	Course Outcome
1	Design an algorithm for a computational task and calculate the time/space complexities of that algorithm
2	Identify the suitable data structure (array or linked list) to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem
3	Write an algorithm to find the solution of a computational problem by selecting an appropriate data structure (binary tree/graph) to represent a data item to be processed
4	Store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set
5	Select appropriate sorting algorithms to be used in specific circumstances
6	Design and implement Data Structures for solving real world problems efficiently

Semester : 3 - Course Code : CST203 - Course Name : LOGIC SYSTEM DESIGN

Course Outcome Number	Course Outcome
1	Illustrate decimal, binary, octal, hexadecimal and BCD number systems, perform conversions among them and do the operations - complementation, addition, subtraction, multiplication and division on binary numbers
2	Simplify a given Boolean Function and design a combinational circuit to implement the simplified function using Digital Logic Gates
3	Design combinational circuits - Adders, Code Convertors, Decoders, Magnitude Comparators, Parity Generator/Checker and design the Programmable Logic Devices - ROM and PLA.
4	Design sequential circuits - Registers, Counters and Shift Registers



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NAAC Cycle 2

Criterion: 2.6.1

5	Use algorithms to perform addition and subtraction on binary, BCD and floating point numbers
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Semester : 3 - Course Code : CST205 - Course Name : OBJECT ORIENTED PROGRAMMING USING JAVA

Course Outcome Number	Course Outcome
1	Write Java programs using the object oriented concepts - classes, objects, constructors, data hiding, inheritance and polymorphism
2	Utilise datatypes, operators, control statements, built in packages & interfaces, Input/ Output Streams and Files in Java to develop programs
3	Illustrate how robust programs can be written in Java using exception handling mechanism
4	Write application programs in Java using multithreading and database connectivity
5	Write Graphical User Interface based application programs by utilising event handling features and Swing in Java
6	Practically apply knowledge of software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML.

Semester : 3 - Course Code : EST200 - Course Name : DESIGN AND ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the different concepts and principles involved in design engineering
2	Apply design thinking while learning and practicing engineering
3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Semester : 3 - Course Code : MAT203 - Course Name : DISCRETE MATHEMATICAL STRUCTURES

Course Outcome Number	Course Outcome
1	Learn the fundamentals of enumeration or counting techniques and method of arrangements and derangements
2	Learn the fundamentals of propositional logic and predicate Calculus and apply it to test the validity of statements
3	Learn the ideas of relation functions equivalence relation POSET and its application
4	Understand recurrence relation and apply the method of solving different type of recurrence relation using generation functions
5	Understand fundamentals of Algebraic structures its properties such as monoid groups and ring

Semester : 3 - Course Code : MCN201 - Course Name : SUSTAINABLE ENGINEERING

Course Outcome Number	Course Outcome
1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
2	Explain the different types of environmental pollution problems and their sustainable solutions



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NAAC Cycle 2

Criterion: 2.6.1

3	Discuss the environmental regulations and standards
4	Outline the concepts related to conventional and non-conventional energy
5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Semester : 3 - Section : C - Course Code : CSL201 - Course Name : DATA STRUCTURES
LAB

Course Outcome Number	Course Outcome
1	Write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements
2	Write a time/space efficient program to sort a list of records based on a given key in the record
3	Examine a given Data Structure to determine its space complexity and time complexities of operations on it
4	Design and implement an efficient data structure to represent given data
5	Write a time/space efficient program to convert an arithmetic expression from one notation to another
6	Write a program using linked lists to simulate Memory Allocation and Garbage Collection

Semester : 3 - Section : C - Course Code : CSL203 - Course Name : OBJECT ORIENTED PROGRAMMING
LAB (IN JAVA)

Course Outcome Number	Course Outcome
1	Implement the Object Oriented concepts - constructors, inheritance, method overloading & overriding and polymorphism in Java
2	Implement programs in Java which use datatypes, operators, control statements, built in packages & interfaces, Input/Output streams and Files
3	Implement robust application programs in Java using exception handling
4	Implement application programs in Java using multithreading and database connectivity
5	Implement Graphical User Interface based application programs by utilizing event handling features and Swing in Java

Semester : 3 - Section : C - Course Code : CST201 - Course Name : DATA
STRUCTURES

Course Outcome Number	Course Outcome
1	Design an algorithm for a computational task and calculate the time/space complexities of that algorithm
2	Identify the suitable data structure (array or linked list) to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem
3	Write an algorithm to find the solution of a computational problem by selecting an appropriate data structure (binary tree/graph) to represent a data item to be processed
4	Store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set



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NAAC Cycle 2

Criterion: 2.6.1

5	Select appropriate sorting algorithms to be used in specific circumstances
6	Design and implement Data Structures for solving real world problems efficiently

Semester : 3 - Section : C - Course Code : CST203 - Course Name : LOGIC SYSTEM DESIGN

Course Outcome Number	Course Outcome
1	Illustrate decimal, binary, octal, hexadecimal and BCD number systems, perform conversions among them and do the operations - complementation, addition, subtraction, multiplication and division on binary numbers
2	Simplify a given Boolean Function and design a combinational circuit to implement the simplified function using Digital Logic Gates
3	Design combinational circuits - Adders, Code Convertors, Decoders, Magnitude Comparators, Parity Generator/Checker and design the Programmable Logic Devices - ROM and PLA.
4	Design sequential circuits - Registers, Counters and Shift Registers
5	Use algorithms to perform addition and subtraction on binary, BCD and floating point numbers

Semester : 3 - Section : C - Course Code : CST205 - Course Name : OBJECT ORIENTED PROGRAMMING USING JAVA

Course Outcome Number	Course Outcome
1	Write Java programs using the object oriented concepts - classes, objects, constructors, data hiding, inheritance and polymorphism
2	Utilise datatypes, operators, control statements, built in packages & interfaces, Input/ Output Streams and Files in Java to develop programs
3	Illustrate how robust programs can be written in Java using exception handling mechanism
4	Write application programs in Java using multithreading and database connectivity
5	Write Graphical User Interface based application programs by utilising event handling features and Swing in Java
6	Practically apply knowledge of software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML

Semester : 3 - Section : C - Course Code : EST200 - Course Name : DESIGN AND ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the different concepts and principles involved in design engineering
2	Apply design thinking while learning and practicing engineering
3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Semester : 3 - Section : C - Course Code : MAT203 - Course Name : DISCRETE MATHEMATICAL STRUCTURES

Course Outcome Number	Course Outcome
1	Learn the fundamentals of propositional logic and predicate calculus and apply it to test the validity of statements



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NAAC Cycle 2

Criterion: 2.6.1

2	Learn the fundamentals of enumeration or counting techniques and method of arrangements and derangements
3	Learn the ideas of relation functions equivalence relation POSET and its application
4	Understand recurrence relation and apply the method of solving different type of recurrence relation using generation functions
5	Understand fundamentals of Algebraic structures its properties such as monoid groups and ring

Semester : 3 - Section : C - Course Code : MCN201 - Course Name : SUSTAINABLE ENGINEERING

Course Outcome Number	Course Outcome
1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
2	Explain the different types of environmental pollution problems and their sustainable solutions
3	Discuss the environmental regulations and standards
4	Outline the concepts related to conventional and non-conventional energy
5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Semester : 4- Course Code : CSL202 - Course Name : DIGITAL LAB

Course Outcome Number	Course Outcome
1	Design and implement combinational logic circuits using Logic Gates (Cognitive Knowledge Level: Apply)
2	Design and implement sequential logic circuits using Integrated Circuits (Cognitive Knowledge Level: Apply)
3	Simulate functioning of digital circuits using programs written in a Hardware Description Language (Cognitive Knowledge Level: Apply)
4	Function effectively as an individual and in a team to accomplish a given task of designing and implementing digital circuits (Cognitive Knowledge Level: Apply)

Semester : 4- Course Code : CSL204 - Course Name : OPERATING SYSTEMS LAB

Course Outcome Number	Course Outcome
1	Illustrate the use of systems calls in Operating Systems. (Cognitive knowledge: Understand)
2	Implement Process Creation and Inter Process Communication in Operating Systems. (Cognitive knowledge: Apply)
3	Implement First Come First Served, Shortest Job First, Round Robin and Prioritybased CPU Scheduling Algorithms. (Cognitive knowledge: Apply)
4	Illustrate the performance of First In First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms. (Cognitive knowledge: Apply)
5	Implement modules for Deadlock Detection and Deadlock Avoidance in Operating Systems. (Cognitive knowledge: Apply)
6	Implement modules for Storage Management and Disk Scheduling in Operating Systems. (Cognitive knowledge: Apply)

Semester : 4- Course Code : CST202 - Course Name : COMPUTER ORGANIZATION AND ARCHITECTURE



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Recognize and express the relevance of basic components, I/O organization and pipelining schemes in a digital computer (Cognitive knowledge: Understand)
2	Explain the types of memory systems and mapping functions used in memory systems
3	Demonstrate the control signals required for the execution of a given instruction (Cognitive Knowledge Level: Apply)
4	Illustrate the design of Arithmetic Logic Unit and explain the usage of registers in it (Cognitive Knowledge Level: Apply)
5	Explain the implementation aspects of arithmetic algorithms in a digital computer (Cognitive Knowledge Level: Apply)
6	Develop the control logic for a given arithmetic problem (Cognitive Knowledge Level: Apply)

Semester : 4- Course Code : CST204 - Course Name : DATABASE MANAGEMENT SYSTEMS

Course Outcome Number	Course Outcome
1	Summarize and exemplify fundamental nature and characteristics of database systems
2	Model real word scenarios given as informal descriptions, using Entity Relationship diagrams. (Cognitive Knowledge Level: Apply)
3	Model and design solutions for efficiently representing and querying data using relational model (Cognitive Knowledge Level: Analyze)
4	Demonstrate the features of indexing and hashing in database applications (Cognitive Knowledge Level: Apply)
5	Discuss and compare the aspects of Concurrency Control and Recovery in Database systems (Cognitive Knowledge Level: Apply)
6	Explain various types of NoSQL databases

Semester : 4- Course Code : CST206 - Course Name : OPERATING SYSTEMS

Course Outcome Number	Course Outcome
1	Explain the relevance, structure and functions of Operating Systems in computing devices. (Cognitive knowledge: Understand)
2	Illustrate the concepts of process management and process scheduling mechanisms employed in Operating Systems. (Cognitive knowledge: Understand)
3	Explain process synchronization in Operating Systems and illustrate process synchronization mechanisms using Mutex Locks, Semaphores and Monitors (Cognitive knowledge: Understand)
4	Explain any one method for detection, prevention, avoidance and recovery for managing deadlocks in Operating Systems. (Cognitive knowledge: Understand)
5	Explain the memory management algorithms in Operating Systems. (Cognitive knowledge: Understand)
6	Explain the security aspects and algorithms for file and storage management in Operating Systems. (Cognitive knowledge: Understand)

Semester : 4- Course Code : HUT200 - Course Name : PROFESSIONAL ETHICS

Course Outcome Number	Course Outcome
1	Understand the core values that shape the ethical behaviour of a professional.



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NAAC Cycle 2

Criterion: 2.6.1

2	Adopt a good character and follow an ethical life
3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
4	Solve moral and ethical problems through exploration and assessment by established experiments
5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Semester : 4- Course Code : MAT206 - Course Name : GRAPH THEORY

Course Outcome Number	Course Outcome
1	Explain vertices and their properties, types of paths, classification of graphs and trees & their properties.
2	Demonstrate the fundamental theorems on Eulerian and Hamiltonian graphs.
3	Illustrate the working of Prim's and Kruskal's algorithms for finding minimum cost spanning tree and Dijkstra's and Floyd-Warshall algorithms for finding shortest paths. (Cognitive Knowledge Level: Apply)
4	Explain planar graphs, their properties and an application for planar graphs. (Cognitive Knowledge Level: Apply)
5	Illustrate how one can represent a graph in a computer. (Cognitive Knowledge Level: Apply)
6	Explain the Vertex Color problem in graphs and illustrate an example application for vertex coloring. (Cognitive Knowledge Level: Apply)

Semester : 4- Course Code : MCN202 - Course Name : CONSTITUTION OF INDIA

Course Outcome Number	Course Outcome
1	Explain the background of the present constitution of India and features
2	Utilize the fundamental rights and duties
3	Understand the working of the union executive, parliament and judiciary
4	Understand the working of the state executive, legislature and judiciary
5	Utilize the special provisions and statutory institutions
6	Show national and patriotic spirit as responsible citizens of the country

Semester : 4 - Course Code : CSL202 - Course Name : DIGITAL LAB

Course Outcome Number	Course Outcome
1	Design and implement combinational logic circuits using Logic Gates (Cognitive Knowledge Level: Apply)
2	Design and implement sequential logic circuits using Integrated Circuits (Cognitive Knowledge Level: Apply)
3	Simulate functioning of digital circuits using programs written in a Hardware Description Language (Cognitive Knowledge Level: Apply)
4	Function effectively as an individual and in a team to accomplish a given task of designing and implementing digital circuits (Cognitive Knowledge Level: Apply)

Semester : 4 - Course Code : CSL204 - Course Name : OPERATING SYSTEMS LAB

Course Outcome Number	Course Outcome
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NAAC Cycle 2

Criterion: 2.6.1

1	Illustrate the use of systems calls in Operating Systems. (Cognitive knowledge: Understand)
2	Implement Process Creation and Inter Process Communication in Operating Systems. (Cognitive knowledge: Apply)
3	Implement First Come First Served, Shortest Job First, Round Robin and Prioritybased CPU Scheduling Algorithms. (Cognitive knowledge: Apply)
4	Illustrate the performance of First In First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms. (Cognitive knowledge: Apply)
5	Implement modules for Deadlock Detection and Deadlock Avoidance in Operating Systems. (Cognitive knowledge: Apply)
6	Implement modules for Storage Management and Disk Scheduling in Operating Systems. (Cognitive knowledge: Apply)

Semester : 4 - Course Code : CST202 - Course Name : COMPUTER ORGANIZATION AND ARCHITECTURE

Course Outcome Number	Course Outcome
1	Recognize and express the relevance of basic components, I/O organization and pipelining schemes in a digital computer (Cognitive knowledge: Understand)
2	Explain the types of memory systems and mapping functions used in memory systems
3	Demonstrate the control signals required for the execution of a given instruction (Cognitive Knowledge Level: Apply)
4	Illustrate the design of Arithmetic Logic Unit and explain the usage of registers in it (Cognitive Knowledge Level: Apply)
5	Explain the implementation aspects of arithmetic algorithms in a digital computer (Cognitive Knowledge Level: Apply)
6	Develop the control logic for a given arithmetic problem (Cognitive Knowledge Level: Apply)

Semester : 4 - Course Code : CST204 - Course Name : DATABASE MANAGEMENT SYSTEMS

Course Outcome Number	Course Outcome
1	Summarize and exemplify fundamental nature and characteristics of database systems
2	Model real word scenarios given as informal descriptions, using Entity Relationship diagrams. (Cognitive Knowledge Level: Apply)
3	Model and design solutions for efficiently representing and querying data using relational model (Cognitive Knowledge Level: Analyze)
4	Demonstrate the features of indexing and hashing in database applications (Cognitive Knowledge Level: Apply)
5	Discuss and compare the aspects of Concurrency Control and Recovery in Database systems (Cognitive Knowledge Level: Apply)
6	Explain various types of NoSQL databases

Semester : 4 - Course Code : CST206 - Course Name : OPERATING SYSTEMS

Course Outcome Number	Course Outcome
1	Explain the relevance, structure and functions of Operating Systems in computing devices. (Cognitive knowledge: Understand)
2	Illustrate the concepts of process management and process scheduling mechanisms employed in Operating Systems. (Cognitive knowledge: Understand)



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NAAC Cycle 2

Criterion: 2.6.1

3	Explain process synchronization in Operating Systems and illustrate process synchronization mechanisms using Mutex Locks, Semaphores and Monitors (Cognitive knowledge: Understand)
4	Explain any one method for detection, prevention, avoidance and recovery for managing deadlocks in Operating Systems. (Cognitive knowledge: Understand)
5	Explain the memory management algorithms in Operating Systems. (Cognitive knowledge: Understand)
6	Explain the security aspects and algorithms for file and storage management in Operating Systems. (Cognitive knowledge: Understand)

Semester : 4 - Course Code : HUT200 - Course Name : PROFESSIONAL ETHICS

Course Outcome Number	Course Outcome
1	Understand the core values that shape the ethical behaviour of a professional.
2	Adopt a good character and follow an ethical life
3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
4	Solve moral and ethical problems through exploration and assessment by established experiments
5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Semester : 4 - Course Code : MAT206 - Course Name : GRAPH THEORY

Course Outcome Number	Course Outcome
1	Explain vertices and their properties, types of paths, classification of graphs and trees & their properties.
2	Demonstrate the fundamental theorems on Eulerian and Hamiltonian graphs.
3	Illustrate the working of Prim's and Kruskal's algorithms for finding minimum cost spanning tree and Dijkstra's and Floyd-Warshall algorithms for finding shortest paths. (Cognitive Knowledge Level: Apply)
4	Explain planar graphs, their properties and an application for planar graphs. (Cognitive Knowledge Level: Apply)
5	Illustrate how one can represent a graph in a computer. (Cognitive Knowledge Level: Apply)
6	Explain the Vertex Color problem in graphs and illustrate an example application for vertex coloring. (Cognitive Knowledge Level: Apply)

Semester : 4 - Course Code : MCN202 - Course Name : CONSTITUTION OF INDIA

Course Outcome Number	Course Outcome
1	Explain the background of the present constitution of India and features
2	Utilize the fundamental rights and duties
3	Understand the working of the union executive, parliament and judiciary
4	Understand the working of the state executive, legislature and judiciary
5	Utilize the special provisions and statutory institutions
6	Show national and patriotic spirit as responsible citizens of the country

Semester : 4 - Section : C - Course Code : CSL202 - Course Name : DIGITAL LAB



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Design and implement combinational logic circuits using Logic Gates (Cognitive Knowledge Level: Apply)
2	Design and implement sequential logic circuits using Integrated Circuits (Cognitive Knowledge Level: Apply)
3	Simulate functioning of digital circuits using programs written in a Hardware Description Language (Cognitive Knowledge Level: Apply)
4	Function effectively as an individual and in a team to accomplish a given task of designing and implementing digital circuits (Cognitive Knowledge Level: Apply)

Semester : 4 - Section : C - Course Code : CSL204 - Course Name : OPERATING SYSTEMS LAB

Course Outcome Number	Course Outcome
1	Illustrate the use of systems calls in Operating Systems. (Cognitive knowledge: Understand)
2	Implement Process Creation and Inter Process Communication in Operating Systems. (Cognitive knowledge: Apply)
3	Implement First Come First Served, Shortest Job First, Round Robin and Prioritybased CPU Scheduling Algorithms. (Cognitive knowledge: Apply)
4	Illustrate the performance of First In First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms. (Cognitive knowledge: Apply)
5	Implement modules for Deadlock Detection and Deadlock Avoidance in Operating Systems. (Cognitive knowledge: Apply)
6	Implement modules for Storage Management and Disk Scheduling in Operating Systems. (Cognitive knowledge: Apply)

Semester : 4 - Section : C - Course Code : CST202 - Course Name : COMPUTER ORGANIZATION AND ARCHITECTURE

Course Outcome Number	Course Outcome
1	Recognize and express the relevance of basic components, I/O organization and pipelining schemes in a digital computer (Cognitive knowledge: Understand)
2	Explain the types of memory systems and mapping functions used in memory systems
3	Demonstrate the control signals required for the execution of a given instruction (Cognitive Knowledge Level: Apply)
4	Illustrate the design of Arithmetic Logic Unit and explain the usage of registers in it (Cognitive Knowledge Level: Apply)
5	Explain the implementation aspects of arithmetic algorithms in a digital computer (Cognitive Knowledge Level:Apply)
6	Develop the control logic for a given arithmetic problem (Cognitive Knowledge Level: Apply)

Semester : 4 - Section : C - Course Code : CST204 - Course Name : DATABASE MANAGEMENT SYSTEMS

Course Outcome Number	Course Outcome
1	Summarize and exemplify fundamental nature and characteristics of database systems
2	Model real word scenarios given as informal descriptions, using Entity Relationship diagrams. (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

3	Model and design solutions for efficiently representing and querying data using relational model (Cognitive Knowledge Level: Analyze)
4	Demonstrate the features of indexing and hashing in database applications (Cognitive Knowledge Level: Apply)
5	Discuss and compare the aspects of Concurrency Control and Recovery in Database systems (Cognitive Knowledge Level: Apply)
6	Explain various types of NoSQL databases

Semester : 4 - Section : C - Course Code : CST206 - Course Name : OPERATING SYSTEMS

Course Outcome Number	Course Outcome
1	Explain the relevance, structure and functions of Operating Systems in computing devices. (Cognitive knowledge: Understand)
2	Illustrate the concepts of process management and process scheduling mechanisms employed in Operating Systems. (Cognitive knowledge: Understand)
3	Explain process synchronization in Operating Systems and illustrate process synchronization mechanisms using Mutex Locks, Semaphores and Monitors (Cognitive knowledge: Understand)
4	Explain any one method for detection, prevention, avoidance and recovery for managing deadlocks in Operating Systems. (Cognitive knowledge: Understand)
5	Explain the memory management algorithms in Operating Systems. (Cognitive knowledge: Understand)
6	Explain the security aspects and algorithms for file and storage management in Operating Systems. (Cognitive knowledge: Understand)

Semester : 4 - Section : C - Course Code : HUT200 - Course Name : PROFESSIONAL ETHICS

Course Outcome Number	Course Outcome
1	Understand the core values that shape the ethical behaviour of a professional.
2	Adopt a good character and follow an ethical life
3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
4	Solve moral and ethical problems through exploration and assessment by established experiments
5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Semester : 4 - Section : C - Course Code : MAT206 - Course Name : GRAPH THEORY

Course Outcome Number	Course Outcome
1	Explain vertices and their properties, types of paths, classification of graphs and trees & their properties.
2	Demonstrate the fundamental theorems on Eulerian and Hamiltonian graphs.
3	Illustrate the working of Prim's and Kruskal's algorithms for finding minimum cost spanning tree and Dijkstra's and Floyd-Warshall algorithms for finding shortest paths. (Cognitive Knowledge Level: Apply)
4	Explain planar graphs, their properties and an application for planar graphs. (Cognitive Knowledge Level: Apply)
5	Illustrate how one can represent a graph in a computer. (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

6	Explain the Vertex Color problem in graphs and illustrate an example application for vertex coloring. (Cognitive Knowledge Level: Apply)
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Semester : 4 - Section : C - Course Code : MCN202 - Course Name : CONSTITUTION OF INDIA

Course Outcome Number	Course Outcome
1	Explain the background of the present constitution of India and features
2	Utilize the fundamental rights and duties
3	Understand the working of the union executive, parliament and judiciary
4	Understand the working of the state executive, legislature and judiciary
5	Utilize the special provisions and statutory institutions
6	Show national and patriotic spirit as responsible citizens of the country

Semester : 5- Course Code : CSL331 - Course Name : SYSTEM SOFTWARE AND MICROPROCESSORS LAB

Course Outcome Number	Course Outcome
1	Develop 8086 programs and execute it using a microprocessor kit. (Cognitive Knowledge Level: Apply)
2	Develop 8086 programs and, debug and execute it using MASM assemblers (Cognitive Knowledge Level: Apply)
3	Develop and execute programs to interface stepper motor, 8255, 8279 and digital to analog converters with 8086 trainer kit (Cognitive Knowledge Level: Apply)
4	Implement and execute different scheduling and paging algorithms in OS (Cognitive Knowledge Level: Apply)
5	Design and implement assemblers, Loaders and macroprocessors. (Cognitive Knowledge Level: Apply)

Semester : 5- Course Code : CSL333 - Course Name : DATABASE MANAGEMENT SYSTEMS LAB

Course Outcome Number	Course Outcome
1	Design database schema for a given real world problem-domain using standard design and modeling approaches. (Cognitive Knowledge Level: Apply)
2	Construct queries using SQL for database creation, interaction, modification, and updation. (Cognitive Knowledge Level: Apply)
3	Design and implement triggers and cursors. (Cognitive Knowledge Level: Apply)
4	Implement procedures, functions, and control structures using PL/SQL. (Cognitive Knowledge Level: Apply)
5	Perform CRUD operations in NoSQL Databases. (Cognitive Knowledge Level: Apply)
6	Develop database applications using front-end tools and back-end DBMS.(Cognitive Knowledge Level: Create)

Semester : 5- Course Code : CST301 - Course Name : FORMAL LANGUAGES AND AUTOMATA THEORY

Course Outcome Number	Course Outcome
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NAAC Cycle 2

Criterion: 2.6.1

1	Classify a given formal language into Regular, Context-Free, Context Sensitive, Recursive or Recursively Enumerable. [Cognitive knowledge level: Understand]
2	Explain a formal representation of a given regular language as a finite state automaton, regular grammar, regular expression and Myhill-Nerode relation. [Cognitive knowledge level: Understand]
3	Design a Pushdown Automaton and a Context-Free Grammar for a given context-free language. [Cognitive knowledge level : Apply]
4	Design Turing machines as language acceptors or transducers. [Cognitive knowledge level: Apply]
5	Explain the notion of decidability. [Cognitive knowledge level: Understand]

Semester : 5- Course Code : CST303 - Course Name : COMPUTER NETWORKS

Course Outcome Number	Course Outcome
1	Explain the features of computer networks, protocols, and network design models (Cognitive Knowledge: Understand)
2	Describe the fundamental characteristics of the physical layer and identify the usage in network communication (Cognitive Knowledge: Apply)
3	Explain the design issues of data link layer, link layer protocols, bridges and switches (Cognitive Knowledge: Understand)
4	Illustrate wired LAN protocols (IEEE 802.3) and wireless LAN protocols (IEEE 802.11) (Cognitive Knowledge: Understand)
5	Select appropriate routing algorithms, congestion control techniques, and Quality of Service requirements for a network (Cognitive Knowledge: Apply)
6	Illustrate the functions and protocols of the network layer, transport layer, and application layer in inter-networking (Cognitive Knowledge: Understand)

Semester : 5- Course Code : CST305 - Course Name : SYSTEM SOFTWARE

Course Outcome Number	Course Outcome
1	Distinguish softwares into system and application software categories.
2	Identify standard and extended architectural features of machines. (Cognitive Knowledge Level: Apply)
3	Identify machine dependent features of system software (Cognitive Knowledge Level: Apply)
4	Identify machine independent features of system software.
5	Design algorithms for system softwares and analyze the effect of data structures.(Cognitive Knowledge Level: Apply)
6	Understand the features of device drivers and editing & debugging tools.

Semester : 5- Course Code : CST307 - Course Name : MICROPROCESSORS AND MICROCONTROLLERS

Course Outcome Number	Course Outcome
1	Illustrate the architecture, modes of operation and addressing modes of microprocessors (Cognitive knowledge: Understand)



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NAAC Cycle 2

Criterion: 2.6.1

2	Develop 8086 assembly language programs. (Cognitive Knowledge Level: Apply)
3	Demonstrate interrupts, its handling and programming in 8086. (Cognitive Knowledge Level: Apply))
4	Illustrate how different peripherals (8255,8254,8257) and memory are interfaced with microprocessors.
5	Outline features of microcontrollers and develop low level programs. (Cognitive Knowledge Level: Understand)

Semester : 5- Course Code : CST309 - Course Name : MANAGEMENT OF SOFTWARE SYSTEMS

Course Outcome Number	Course Outcome
1	Demonstrate Traditional and Agile Software Development approaches (Cognitive Knowledge Level: Apply)
2	Prepare Software Requirement Specification and Software Design for a given problem. (Cognitive Knowledge Level: Apply)
3	Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project. (Cognitive Knowledge Level: Apply)
4	Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework. (Cognitive Knowledge Level: Apply)
5	Utilize SQA practices, Process Improvement techniques and Technology advancements in cloud based software models and containers & microservices. (Cognitive Knowledge Level: Apply)

Semester : 5- Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community
5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level

Semester : 5 - Course Code : CSL331 - Course Name : SYSTEM SOFTWARE AND MICROPROCESSORS LAB

Course Outcome Number	Course Outcome
1	Develop 8086 and 8051 programs and execute it using a microprocessor/microcontroller kit. (Cognitive Knowledge Level: Apply)
2	Develop 8086 programs and, debug and execute it using MASM assemblers (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

3	Develop and execute programs to interface stepper motor, 8255, 8279 and digital to analog converters with 8086 trainer kit (Cognitive Knowledge Level: Apply)
4	Implement and execute different scheduling and paging algorithms in OS (Cognitive Knowledge Level: Apply)
5	Design and implement assemblers, Loaders and macroprocessors. (Cognitive Knowledge Level: Apply)

Semester : 5 - Course Code : CSL333 - Course Name : DATABASE MANAGEMENT SYSTEMS LAB

Course Outcome Number	Course Outcome
1	Design database schema for a given real world problem-domain using standard design and modeling approaches. (Cognitive Knowledge Level: Apply)
2	Construct queries using SQL for database creation, interaction, modification, and updation. (Cognitive Knowledge Level: Apply)
3	Design and implement triggers and cursors. (Cognitive Knowledge Level: Apply)
4	Implement procedures, functions, and control structures using PL/SQL. (Cognitive Knowledge Level: Apply)
5	Perform CRUD operations in NoSQL Databases. (Cognitive Knowledge Level: Apply)
6	Develop database applications using front-end tools and back-end DBMS. (Cognitive Knowledge Level: Create) 66

Semester : 5 - Course Code : CST301 - Course Name : FORMAL LANGUAGES AND AUTOMATA THEORY

Course Outcome Number	Course Outcome
1	Classify a given formal language into Regular, Context-Free, Context Sensitive, Recursive or Recursively Enumerable. [Cognitive knowledge level: Understand]
2	Explain a formal representation of a given regular language as a finite state automaton, regular grammar, regular expression and Myhill-Nerode relation. [Cognitive knowledge level: Understand]
3	Design a Pushdown Automaton and a Context-Free Grammar for a given context-free language. [Cognitive knowledge level : Apply]
4	Design Turing machines as language acceptors or transducers. [Cognitive knowledge level: Apply]
5	Explain the notion of decidability. [Cognitive knowledge level: Understand]

Semester : 5 - Course Code : CST303 - Course Name : COMPUTER NETWORKS

Course Outcome Number	Course Outcome
1	Explain the features of computer networks, protocols, and network design models (Cognitive Knowledge: Understand)
2	Describe the fundamental characteristics of the physical layer and identify the usage in network communication (Cognitive Knowledge: Apply)
3	Explain the design issues of data link layer, link layer protocols, bridges and switches (Cognitive Knowledge: Understand)



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NAAC Cycle 2

Criterion: 2.6.1

4	Illustrate wired LAN protocols (IEEE 802.3) and wireless LAN protocols (IEEE 802.11) (Cognitive Knowledge: Understand)
5	Select appropriate routing algorithms, congestion control techniques, and Quality of Service requirements for a network (Cognitive Knowledge: Apply)
6	Illustrate the functions and protocols of the network layer, transport layer, and application layer in inter-networking (Cognitive Knowledge: Understand)

Semester : 5 - Course Code : CST305 - Course Name : SYSTEM SOFTWARE

Course Outcome Number	Course Outcome
1	Distinguish softwares into system and application software categories.
2	Identify standard and extended architectural features of machines. (Cognitive Knowledge Level: Apply)
3	Identify machine dependent features of system software (Cognitive Knowledge Level: Apply)
4	Identify machine independent features of system software.
5	Design algorithms for system softwares and analyze the effect of data structures.(Cognitive Knowledge Level: Apply)
6	Understand the features of device drivers and editing & debugging tools.

Semester : 5 - Course Code : CST307 - Course Name : MICROPROCESSORS AND MICROCONTROLLERS

Course Outcome Number	Course Outcome
1	Illustrate the architecture, modes of operation and addressing modes of microprocessors (Cognitive knowledge: Understand)
2	Develop 8086 assembly language programs. (Cognitive Knowledge Level: Apply)
3	Demonstrate interrupts, its handling and programming in 8086. (Cognitive Knowledge Level: Apply))
4	Illustrate how different peripherals (8255,8254,8257) and memory are interfaced with microprocessors.
5	Outline features of microcontrollers and develop low level programs. (Cognitive Knowledge Level: Understand)

Semester : 5 - Course Code : CST309 - Course Name : MANAGEMENT OF SOFTWARE SYSTEMS

Course Outcome Number	Course Outcome
1	Demonstrate Traditional and Agile Software Development approaches (Cognitive Knowledge Level: Apply)
2	Prepare Software Requirement Specification and Software Design for a given problem. (Cognitive Knowledge Level: Apply)
3	Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project. (Cognitive Knowledge Level: Apply)
4	Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework. (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

5	Utilize SQA practices, Process Improvement techniques and Technology advancements in cloud based software models and containers & microservices. (Cognitive Knowledge Level: Apply)
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Semester : 5 - Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community
5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level

Semester : 5 - Section : C - Course Code : CSL331 - Course Name : SYSTEM SOFTWARE AND MICROPROCESSORS LAB

Course Outcome Number	Course Outcome
1	Develop 8086 programs and execute it using a microprocessor kit. (Cognitive Knowledge Level: Apply)
2	Develop 8086 programs and, debug and execute it using MASM assemblers (Cognitive Knowledge Level: Apply)
3	Develop and execute programs to interface stepper motor, 8255, 8279 and digital to analog converters with 8086 trainer kit (Cognitive Knowledge Level: Apply)
4	Implement and execute different scheduling and paging algorithms in OS (Cognitive Knowledge Level: Apply)
5	Design and implement assemblers, Loaders and macroprocessors. (Cognitive Knowledge Level: Apply)

Semester : 5 - Section : C - Course Code : CSL333 - Course Name : DATABASE MANAGEMENT SYSTEMS LAB

Course Outcome Number	Course Outcome
1	Design database schema for a given real world problem-domain using standard design and modeling approaches. (Cognitive Knowledge Level: Apply)
2	Construct queries using SQL for database creation, interaction, modification, and updation. (Cognitive Knowledge Level: Apply)
3	Design and implement triggers and cursors. (Cognitive Knowledge Level: Apply)
4	Implement procedures, functions, and control structures using PL/SQL. (Cognitive Knowledge Level: Apply)
5	Perform CRUD operations in NoSQL Databases. (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

6	Develop database applications using front-end tools and back-end DBMS. (Cognitive Knowledge Level: Create) 66
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Semester : 5 - Section : C - Course Code : CST301 - Course Name : FORMAL LANGUAGES AND AUTOMATA THEORY

Course Outcome Number	Course Outcome
1	Classify a given formal language into Regular, Context-Free, Context Sensitive, Recursive or Recursively Enumerable. [Cognitive knowledge level: Understand]
2	Explain a formal representation of a given regular language as a finite state automaton, regular grammar, regular expression and Myhill-Nerode relation. [Cognitive knowledge level: Understand]
3	Design a Pushdown Automaton and a Context-Free Grammar for a given context-free language. [Cognitive knowledge level : Apply]
4	Design Turing machines as language acceptors or transducers. [Cognitive knowledge level: Apply]
5	Explain the notion of decidability. [Cognitive knowledge level: Understand]

Semester : 5 - Section : C - Course Code : CST305 - Course Name : SYSTEM SOFTWARE

Course Outcome Number	Course Outcome
1	Distinguish softwares into system and application software categories.
2	Identify standard and extended architectural features of machines. (Cognitive Knowledge Level: Apply)
3	Identify machine dependent features of system software (Cognitive Knowledge Level: Apply)
4	Identify machine independent features of system software.
5	Design algorithms for system softwares and analyze the effect of data structures.(Cognitive Knowledge Level: Apply)
6	Understand the features of device drivers and editing & debugging tools.

Semester : 5 - Section : C - Course Code : CST307 - Course Name : MICROPROCESSORS AND MICROCONTROLLERS

Course Outcome Number	Course Outcome
1	Illustrate the architecture, modes of operation and addressing modes of microprocessors (Cognitive knowledge: Understand)
2	Develop 8086 assembly language programs. (Cognitive Knowledge Level: Apply)
3	Demonstrate interrupts, its handling and programming in 8086. (Cognitive Knowledge Level: Apply))
4	Illustrate how different peripherals (8255,8254,8257) and memory are interfaced with microprocessors.
5	Outline features of microcontrollers and develop low level programs. (Cognitive Knowledge Level: Understand)



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 5 - Section : C - Course Code : CST309 - Course Name : MANAGEMENT OF SOFTWARE SYSTEMS

Course Outcome Number	Course Outcome
1	Demonstrate Traditional and Agile Software Development approaches (Cognitive Knowledge Level: Apply)
2	Prepare Software Requirement Specification and Software Design for a given problem. (Cognitive Knowledge Level: Apply)
3	Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project. (Cognitive Knowledge Level: Apply)
4	Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework. (Cognitive Knowledge Level: Apply)
5	Utilize SQA practices, Process Improvement techniques and Technology advancements in cloud based software models and containers & microservices. (Cognitive Knowledge Level: Apply)

Semester : 5 - Section : C - Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community
5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level

Semester : 6- Course Code : CSD334 - Course Name : MINI PROJECT

Course Outcome Number	Course Outcome
1	Identify technically and economically feasible problems (Cognitive Knowledge Level: Apply)
2	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes (Cognitive Knowledge Level: Apply)
3	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions of minimal complexity by using modern tools & advanced programming techniques (Cognitive Knowledge Level: Apply)
4	Prepare technical report and deliver presentation (Cognitive Knowledge Level: Apply)
5	Apply engineering and management principles to achieve the goal of the project (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 6- Course Code : CSL332 - Course Name : NETWORKING LAB

Course Outcome Number	Course Outcome
1	Use network related commands and configuration files in Linux Operating System,
2	Develop network application programs and protocols,
3	Analyze network traffic using network monitoring tools,
4	Design and setup a network and configure different network protocols,
5	Develop simulation of fundamental network concepts using a network simulator,

Semester : 6- Course Code : CST302 - Course Name : COMPILER DESIGN

Course Outcome Number	Course Outcome
1	Explain the phases in compilation process(lexical analysis, syntax analysis, semantic analysis, intermediate code generation, code optimization and code generation) and model a lexical analyzer
2	Model language syntax using Context Free Grammar and develop parse tree representation using leftmost and rightmost derivations
3	Compare different types of parsers(Bottom-up and Top-down) and construct parser for a given grammar
4	Build Syntax Directed Translation for a context free grammar, compare various storage allocation strategies and classify intermediate representations
5	Illustrate code optimization and code generation techniques in compilation

Semester : 6- Course Code : CST304 - Course Name : COMPUTER GRAPHICS AND IMAGE PROCESSING

Course Outcome Number	Course Outcome
1	Describe the working principles of graphics devices
2	Illustrate line drawing, circle drawing and polygon filling algorithms
3	Demonstrate geometric representations, transformations on 2D & 3D objects, clipping algorithms and projection algorithms
4	Summarize visible surface detection method
5	Summarize the concepts of digital image representation, processing and demonstrate pixel relationships(Cognitive Knowledge level: Apply)
6	Solve image enhancement and segmentation problems using spatial domain techniques(Cognitive Knowledge level: Apply)

Semester : 6- Course Code : CST306 - Course Name : ALGORITHM ANALYSIS AND DESIGN

Course Outcome Number	Course Outcome
1	Analyze any given algorithm and express its time and space complexities in asymptotic notations. (Cognitive Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

2	Derive recurrence equations and solve it using Iteration, Recurrence Tree, Substitution and Master's Method to compute time complexity of algorithms. (Cognitive Level: Apply)
3	Illustrate Graph traversal algorithms & applications and Advanced Data structures like AVL trees and Disjoint set operations. (Cognitive Level: Apply)
4	Demonstrate Divide-and-conquer, Greedy Strategy, Dynamic programming, Branch-and Bound and Backtracking algorithm design techniques (Cognitive Level: Apply)
5	Classify a problem as computationally tractable or intractable, and discuss strategies to address intractability (Cognitive Level: Understand)
6	Identify the suitable design strategy to solve a given problem. (Cognitive Level: Analyze)

Semester : 6- Course Code : CST308 - Course Name : COMPREHENSIVE COURSE WORK

Course Outcome Number	Course Outcome
1	Comprehend the concepts of discrete mathematical structures
2	Comprehend the concepts and applications of data structures
3	Comprehend the concepts, functions and algorithms in Operating System)
4	Comprehend the organization and architecture of computer systems
5	Comprehend the fundamental principles of database design and manipulation
6	Comprehend the concepts in formal languages and automata theory Cognitive Knowledge Level: Understand)

Semester : 6- Course Code : CST362 - Course Name : PROGRAMMING IN PYTHON

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs (Cognitive Knowledge level: Apply)
2	Illustrate uses of conditional (if, if-else and if-elif-else) and iterative (while and for) statements in Python programs. (Cognitive Knowledge level: Apply)
3	Develop programs by utilizing the Python programming constructs such as Lists, Tuples, Sets and Dictionaries. (Cognitive Knowledge level: Apply)
4	Develop graphical user interface for solutions using Python libraries. (Cognitive Knowledge level: Apply)
5	Implement Object Oriented programs with exception handling. (Cognitive Knowledge level: Apply)
6	Write programs in Python to process data stored in files by utilizing Numpy, Matplotlib, and Pandas. (Cognitive Knowledge level: Apply)

Semester : 6- Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

3	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)

Semester : 6 - Course Code : CSD334 - Course Name : MINI PROJECT

Course Outcome Number	Course Outcome
1	Identify technically and economically feasible problems (Cognitive Knowledge Level: Apply)
2	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes (Cognitive Knowledge Level: Apply)
3	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions of minimal complexity by using modern tools & advanced programming techniques (Cognitive Knowledge Level: Apply)
4	Prepare technical report and deliver presentation (Cognitive Knowledge Level: Apply)
5	Apply engineering and management principles to achieve the goal of the project (Cognitive Knowledge Level: Apply)

Semester : 6 - Course Code : CSL332 - Course Name : NETWORKING LAB

Course Outcome Number	Course Outcome
1	Use network related commands and configuration files in Linux Operating System,
2	Develop network application programs and protocols,
3	Analyze network traffic using network monitoring tools,
4	Design and setup a network and configure different network protocols,
5	Develop simulation of fundamental network concepts using a network simulator,

Semester : 6 - Course Code : CST302 - Course Name : COMPILER DESIGN

Course Outcome Number	Course Outcome
1	Explain the phases in compilation process (lexical analysis, syntax analysis, semantic analysis, intermediate code generation, code optimization and code generation) and model a lexical analyzer (Cognitive Knowledge Level: Apply)
2	Model language syntax using Context Free Grammar and develop parse tree representation using leftmost and rightmost derivations (Cognitive Knowledge Level: Apply)
3	Compare different types of parsers (Bottom-up and Top-down) and construct parser for a given grammar (Cognitive Knowledge Level: Apply)
4	Build Syntax Directed Translation for a context free grammar, compare various storage allocation strategies and classify intermediate representations (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

5	Illustrate code optimization and code generation techniques in compilation
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Semester : 6 - Course Code : CST304 - Course Name : COMPUTER GRAPHICS AND IMAGE PROCESSING

Course Outcome Number	Course Outcome
1	Describe the working principles of graphics devices
2	Illustrate line drawing, circle drawing and polygon filling algorithms(Cognitive Knowledge level: Apply)
3	Demonstrate geometric representations, transformations on 2D & 3D objects, clipping algorithms and projection algorithms(Cognitive Knowledge level: Apply)
4	Summarize visible surface detection methods(Cognitive Knowledge level: Understand)
5	Summarize the concepts of digital image representation, processing and demonstrate pixel relationships(Cognitive Knowledge level: Apply)
6	Solve image enhancement and segmentation problems using spatial domain techniques(Cognitive Knowledge level: Apply)

Semester : 6 - Course Code : CST306 - Course Name : ALGORITHM ANALYSIS AND DESIGN

Course Outcome Number	Course Outcome
1	Analyze any given algorithm and express its time and space complexities in asymptotic notations. (Cognitive Level: Apply)
2	Derive recurrence equations and solve it using Iteration, Recurrence Tree, Substitution and Master's Method to compute time complexity of algorithms. (Cognitive Level: Apply)
3	Illustrate Graph traversal algorithms & applications and Advanced Data structures like AVL trees and Disjoint set operations. (Cognitive Level: Apply)
4	Demonstrate Divide-and-conquer, Greedy Strategy, Dynamic programming, Branch-and Bound and Backtracking algorithm design techniques (Cognitive Level: Apply)
5	Classify a problem as computationally tractable or intractable, and discuss strategies to address intractability (Cognitive Level: Understand)
6	Identify the suitable design strategy to solve a given problem. (Cognitive Level: Analyze)

Semester : 6 - Course Code : CST308 - Course Name : COMPREHENSIVE COURSE WORK

Course Outcome Number	Course Outcome
1	Comprehend the concepts of discrete mathematical structures
2	Comprehend the concepts and applications of data structures
3	Comprehend the concepts, functions and algorithms in Operating System)
4	Comprehend the organization and architecture of computer systems
5	Comprehend the fundamental principles of database design and manipulation
6	Comprehend the concepts in formal languages and automata theory Cognitive Knowledge Level: Understand)

Semester : 6 - Course Code : CST362 - Course Name : PROGRAMMING IN PYTHON



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs (Cognitive Knowledge level: Apply)
2	Illustrate uses of conditional (if, if-else and if-elif-else) and iterative (while and for) statements in Python programs. (Cognitive Knowledge level: Apply)
3	Develop programs by utilizing the Python programming constructs such as Lists, Tuples, Sets and Dictionaries. (Cognitive Knowledge level: Apply)
4	Develop graphical user interface for solutions using Python libraries. (Cognitive Knowledge level: Apply)
5	Implement Object Oriented programs with exception handling. (Cognitive Knowledge level: Apply)
6	Write programs in Python to process data stored in files by utilizing Numpy, Matplotlib, and Pandas. (Cognitive Knowledge level: Apply)

Semester : 6 - Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
3	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)

Semester : 6 - Section : C - Course Code : CSD334 - Course Name : MINI PROJECT

Course Outcome Number	Course Outcome
1	Identify technically and economically feasible problems (Cognitive Knowledge Level: Apply)
2	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes (Cognitive Knowledge Level: Apply)
3	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions of minimal complexity by using modern tools & advanced programming techniques (Cognitive Knowledge Level: Apply)
4	Prepare technical report and deliver presentation (Cognitive Knowledge Level: Apply)
5	Apply engineering and management principles to achieve the goal of the project (Cognitive Knowledge Level: Apply)

Semester : 6 - Section : C - Course Code : CSL332 - Course Name : NETWORKING LAB

Course Outcome Number	Course Outcome
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NAAC Cycle 2

Criterion: 2.6.1

1	Use network related commands and configuration files in Linux Operating System,
2	Develop network application programs and protocols, (Cognitive Knowledge Level: Apply)
3	Analyze network traffic using network monitoring tools, (Cognitive Knowledge Level: Apply)
4	Design and setup a network and configure different network protocols, (Cognitive Knowledge Level: Apply)
5	Develop simulation of fundamental network concepts using a network simulator, (Cognitive Knowledge Level: Apply)

Semester : 6 - Section : C - Course Code : CST302 - Course Name : COMPILER DESIGN

Course Outcome Number	Course Outcome
1	Explain the phases in compilation process(lexical analysis, syntax analysis, semantic analysis, intermediate code generation, code optimization and code generation) and model a lexical analyzer (Cognitive Knowledge Level: Apply)
2	Model language syntax using Context Free Grammar and develop parse tree representation using leftmost and rightmost derivations (Cognitive Knowledge Level: Apply)
3	Compare different types of parsers(Bottom-up and Top-down) and construct parser for a given grammar (Cognitive Knowledge Level: Apply)
4	Build Syntax Directed Translation for a context free grammar, compare various storage allocation strategies and classify intermediate representations (Cognitive Knowledge Level: Apply)
5	Illustrate code optimization and code generation techniques in compilation (Cognitive Knowledge Level: Apply)

Semester : 6 - Section : C - Course Code : CST304 - Course Name : COMPUTER GRAPHICS AND IMAGE PROCESSING

Course Outcome Number	Course Outcome
1	Describe the working principles of graphics devices
2	Illustrate line drawing, circle drawing and polygon filling algorithms(Cognitive Knowledge level: Apply)
3	Demonstrate geometric representations, transformations on 2D & 3D objects, clipping algorithms and projection algorithms(Cognitive Knowledge level: Apply)
4	Summarize visible surface detection methods(Cognitive Knowledge level: Understand)
5	Summarize the concepts of digital image representation, processing and demonstrate pixel relationships(Cognitive Knowledge level: Apply)
6	Solve image enhancement and segmentation problems using spatial domain techniques(Cognitive Knowledge level: Apply)

Semester : 6 - Section : C - Course Code : CST306 - Course Name : ALGORITHM ANALYSIS AND DESIGN

Course Outcome Number	Course Outcome
1	Analyze any given algorithm and express its time and space complexities in asymptotic notations.
2	Derive recurrence equations and solve it using Iteration, Recurrence Tree, Substitution and Master's Method to compute time complexity of algorithms.



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NAAC Cycle 2

Criterion: 2.6.1

3	Illustrate Graph traversal algorithms & applications and Advanced Data structures like AVL trees and Disjoint set operations.
4	Demonstrate Divide-and-conquer, Greedy Strategy, Dynamic programming, Branch-and Bound and Backtracking algorithm design techniques
5	Classify a problem as computationally tractable or intractable, and discuss strategies to address intractability
6	Identify the suitable design strategy to solve a given problem.

Semester : 6 - Section : C - Course Code : CST308 - Course Name : COMPREHENSIVE COURSE WORK

Course Outcome Number	Course Outcome
1	Comprehend the concepts of discrete mathematical structures
2	Comprehend the concepts and applications of data structures
3	Comprehend the concepts, functions and algorithms in Operating System)
4	Comprehend the organization and architecture of computer systems
5	Comprehend the fundamental principles of database design and manipulation
6	Comprehend the concepts in formal languages and automata theory Cognitive Knowledge Level: Understand)

Semester : 6 - Section : C - Course Code : CST362 - Course Name : PROGRAMMING IN PYTHON

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs
2	Illustrate uses of conditional (if, if-else and if-elif-else) and iterative (while and for) statements in Python programs.
3	Develop programs by utilizing the Python programming constructs such as Lists, Tuples, Sets and Dictionaries.
4	Develop graphical user interface for solutions using Python libraries.
5	Implement Object Oriented programs with exception handling.
6	Write programs in Python to process data stored in files by utilizing Numpy, Matplotlib, and Pandas.

Semester : 6 - Section : C - Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production
3	Determine the functional requirement of a firm under various competitive conditions
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
5	Determine the impact of changes in global economic policies on the business opportunities of a firm



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 7- Course Code : AET425 - Course Name : BIOMEDICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the basic idea about the biomedical engineering technology
1	Describe the basic idea about the biomedical engineering technology
2	Explain the principle and working of different types of bio medical electronic equipment/device
2	Explain the principle and working of different types of bio medical electronic equipment/device
3	Understand the electrical muscle activities and to measure it
3	Understand the electrical muscle activities and to measure it
4	Analyze the brain wave activities and abnormalities
4	Analyze the brain wave activities and abnormalities
5	Illustrate the principles of modern medical diagnosing machines
5	Illustrate the principles of modern medical diagnosing machines

Semester : 7- Course Code : CET415 - Course Name : ENVIRONMENTAL IMPACT ASSESSMENT

Course Outcome Number	Course Outcome
1	Explain the need for minimizing the environmental impacts of developmental activities
2	Outline environmental legislation & clearance procedure in the country
3	Outline environmental legislation & clearance procedure in the country
4	Prepare an environmental impact assessment report
5	Conduct an environmental audit

Semester : 7- Course Code : CSD415 - Course Name : PROJECT PHASE I

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply)
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).

Semester : 7- Course Code : CSL411 - Course Name : COMPILER LAB

Course Outcome Number	Course Outcome
1	Implement lexical analyzer using the tool LEX. (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

2	Implement Syntax analyzer using the tool YACC. (Cognitive Knowledge Level: Apply)
3	Design NFA and DFA for a problem and write programs to perform operations on it. (Cognitive Knowledge Level: Apply)
4	Design and Implement Top-Down parsers. (Cognitive Knowledge Level: Apply)
5	Design and Implement Bottom-Up parsers. (Cognitive Knowledge Level: Apply)
6	Implement intermediate code for expressions. (Cognitive Knowledge Level: Apply)

Semester : 7- Course Code : CSQ413 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
3	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
4	Give a presentation about an academic document (Cognitive knowledge level: Apply).
5	Prepare a technical report (Cognitive knowledge level: Create)

Semester : 7- Course Code : CST401 - Course Name : ARTIFICIAL INTELLIGENCE

Course Outcome Number	Course Outcome
1	Explain the fundamental concepts of intelligent systems and their architecture, (Cognitive Knowledge Level, Understanding)
2	Illustrate uninformed and informed search techniques for problem solving in intelligent systems. (Cognitive Knowledge Level: Understanding)
3	Solve Constraint Satisfaction Problems using search techniques. (Cognitive Knowledge Level: Apply)
4	Represent AI domain knowledge using logic systems and use inference techniques for reasoning in intelligent systems. (Cognitive Knowledge Level: Apply)
5	Illustrate different types of learning techniques used in intelligent systems

Semester : 7- Course Code : CST463 - Course Name : WEB PROGRAMMING

Course Outcome Number	Course Outcome
1	Use HyperText Markup Language (HTML) for authoring web pages and understand the fundamentals of WWW.
2	Construct and visually format responsive, interactive web pages using CSS and JavaScript (JS) (Cognitive Knowledge Level: Apply)
3	Construct websites using advanced sever side programming tool PHP (Cognitive Knowledge Level: Apply)
4	Develop dynamic web applications using PHP and perform MySQL database operations. (Cognitive Knowledge Level: Apply)
5	Explain the importance of object exchange formats using JSON and the MVC based web application development frameworks (Laravel)

Semester : 7- Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENGINEERING

Course Outcome Number	Course Outcome
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NAAC Cycle 2

Criterion: 2.6.1

1	Describe the theories of accident causation and preventive measures of industrial accidents.
2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)
4	Describe various hazards associated with different machines and mechanical material handling.
5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)

Semester : 7- Course Code : MET445 - Course Name : RENEWABLE ENERGY ENGINEERING

Course Outcome Number	Course Outcome
1	Explain renewable energy sources and evaluate the implication of renewable energy. To predict solar radiation at a location
2	Explain solar energy collectors, storages, solar cell characteristics and applications
3	Explain the different types of wind power machines and control strategies of wind turbines
4	Explain the ocean energy and conversion devices and different Geothermal sources
5	Explain biomass energy conversion devices. Calculate the Net Present value and payback period

Semester : 7 - Course Code : AET425 - Course Name : BIOMEDICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the basic idea about the biomedical engineering technology
2	Explain the principle and working of different types of bio medical electronic equipment/device
3	Understand the electrical muscle activities and to measure it
4	Analyze the brain wave activities and abnormalities
5	Illustrate the principles of modern medical diagnosing machines

Semester : 7 - Course Code : CET415 - Course Name : ENVIRONMENTAL IMPACT ASSESSMENT

Course Outcome Number	Course Outcome
1	Explain the need for minimizing the environmental impacts of developmental activities
2	Outline environmental legislation & clearance procedure in the country
3	Outline environmental legislation & clearance procedure in the country
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Semester : 7 - Course Code : CSD415 - Course Name : PROJECT PHASE I



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply)
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).

Semester : 7 - Course Code : CSL411 - Course Name : COMPILER LAB

Course Outcome Number	Course Outcome
1	Implement lexical analyzer using the tool LEX. (Cognitive Knowledge Level: Apply)
2	Implement Syntax analyzer using the tool YACC. (Cognitive Knowledge Level: Apply)
3	Design NFA and DFA for a problem and write programs to perform operations on it. (Cognitive Knowledge Level: Apply)
4	Design and Implement Top-Down parsers. (Cognitive Knowledge Level: Apply)
5	Design and Implement Bottom-Up parsers. (Cognitive Knowledge Level: Apply)
6	Implement intermediate code for expressions. (Cognitive Knowledge Level: Apply)

Semester : 7 - Course Code : CSQ413 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
3	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
4	Give a presentation about an academic document (Cognitive knowledge level: Apply).
5	Prepare a technical report (Cognitive knowledge level: Create)

Semester : 7 - Course Code : CST401 - Course Name : ARTIFICIAL INTELLIGENCE

Course Outcome Number	Course Outcome
1	Explain the fundamental concepts of intelligent systems and their architecture, (Cognitive Knowledge Level, Understanding)
2	Illustrate uninformed and informed search techniques for problem solving in intelligent systems. (Cognitive Knowledge Level: Understanding)
3	Solve Constraint Satisfaction Problems using search techniques. (Cognitive Knowledge Level: Apply)
4	Represent AI domain knowledge using logic systems and use inference techniques for reasoning in intelligent systems. (Cognitive Knowledge Level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

5 | Illustrate different types of learning techniques used in intelligent systems

Semester : 7 - Course Code : CST463 - Course Name : WEB PROGRAMMING

Course Outcome Number	Course Outcome
1	Use HyperText Markup Language (HTML) for authoring web pages and understand the fundamentals of WWW.
2	Construct and visually format responsive, interactive web pages using CSS and JavaScript (JS) (Cognitive Knowledge Level: Apply)
3	Construct websites using advanced sever side programming tool PHP (Cognitive Knowledge Level: Apply)
4	Develop dynamic web applications using PHP and perform MySQL database operations. (Cognitive Knowledge Level: Apply)
5	Explain the importance of object exchange formats using JSON and the MVC based web application development frameworks (Laravel)

Semester : 7 - Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENINERNG

Course Outcome Number	Course Outcome
1	Describe the theories of accident causation and preventive measures of industrial accidents.
2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)
4	Describe various hazards associated with different machines and mechanical material handling.
5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)

Semester : 8- Course Code : CSD416 - Course Name : PROJECT PHASE II

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 8- Course Code : CST402 - Course Name : DISTRIBUTED COMPUTING



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Summarize various aspects of distributed computation model and logical time
2	Illustrate election algorithm, global snapshot algorithm and termination detection algorithm.
3	Compare token based, non-token based and quorum based mutual exclusion algorithms.
4	Recognize the significance of deadlock detection and shared memory in distributed systems
5	Explain the concepts of failure recovery and consensus
6	Illustrate distributed file system architectures

Semester : 8- Course Code : CST426 - Course Name : CLIENT SERVER ARCHITECTURE

Course Outcome Number	Course Outcome
1	Explain the basics of client/server systems and the driving force behind the development of client/server systems
2	Outline the architecture and classifications of client/server systems
3	Choose the appropriate client/server network services for a typical application
4	Describe management services and issues in network
5	Compare and summarize the web extensions and choose appropriate web services standards for an application

Semester : 8- Course Code : CST428 - Course Name : BLOCKCHAIN TECHNOLOGIES

Course Outcome Number	Course Outcome
1	Illustrate the cryptographic building blocks of blockchain technology
2	Explain the fundamental concepts of blockchain technology
3	Summarize the classification of consensus algorithms
4	Explain the concepts of first decentralized cryptocurrency bitcoin
5	Explain the use of smart contracts and its use cases
6	Develop simple applications using Solidity language on Ethereum platform

Semester : 8- Course Code : CST434 - Course Name : NETWORK SECURITY PROTOCOLS

Course Outcome Number	Course Outcome
1	Explain authentication protocols, X.509 authentication service and Public Key Infrastructure (PKI)
2	Identify the security mechanisms in E mail security services
3	Summarize the network and transport layer security services provided in a secure communication scenario
4	Describe real time communication security and application layer security protocols
5	Explain the concepts of firewalls and wireless network security

Semester : 8 - Course Code : CSD416 - Course Name : PROJECT PHASE II

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications



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NAAC Cycle 2

Criterion: 2.6.1

3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 8 - Course Code : CST402 - Course Name : DISTRIBUTED COMPUTING

Course Outcome Number	Course Outcome
1	Summarize various aspects of distributed computation model and logical time
2	Illustrate election algorithm, global snapshot algorithm and termination detection algorithm.
3	Compare token based, non-token based and quorum based mutual exclusion algorithms.
4	Recognize the significance of deadlock detection and shared memory in distributed systems
5	Explain the concepts of failure recovery and consensus
6	Illustrate distributed file system architectures

Semester : 8 - Course Code : CST426 - Course Name : CLIENT SERVER ARCHITECTURE

Course Outcome Number	Course Outcome
1	Explain the basics of client/server systems and the driving force behind the development of client/server systems
2	Outline the architecture and classifications of client/server systems
3	Choose the appropriate client/server network services for a typical application
4	Describe management services and issues in network
5	Compare and summarize the web extensions and choose appropriate web services standards for an application

Semester : 8 - Course Code : CST434 - Course Name : NETWORK SECURITY PROTOCOLS

Course Outcome Number	Course Outcome
1	Explain authentication protocols, X.509 authentication service and Public Key Infrastructure (PKI)
2	Identify the security mechanisms in E mail security services
3	Summarize the network and transport layer security services provided in a secure communication scenario
4	Describe real time communication security and application layer security protocols
5	Explain the concepts of firewalls and wireless network security

Semester : 8 - Course Code : CST458 - Course Name : SOFTWARE TESTING

Course Outcome Number	Course Outcome
1	List a range of different software testing techniques and be able to apply specific unit testing method to the projects using Junit



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Criterion: 2.6.1

2	Illustrate using appropriate tools the mutation testing method for a given piece of code to identify hidden defects that can't be detected using other testing methods
3	Explain graph coverage criteria in terms of control flow graph and data flow graph for a given program
4	Demonstrate the importance of black-box approaches in terms of domain and functional testing
5	Illustrate the use of PEX tool with symbolic execution

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Semester : 1 - Course Code : CYL120 - Course Name : ENGINEERING CHEMISTRY LAB

Course Outcome Number	Course Outcome
1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

Semester : 1 - Course Code : CYT100 - Course Name : ENGINEERING CHEMISTRY

Course Outcome Number	Course Outcome
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields
2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
5	Study various types of water treatment methods to develop skills for treating wastewater

Semester : 1 - Course Code : ESL120 - Course Name : CIVIL & MECHANICAL WORKSHOP

Course Outcome Number	Course Outcome
1	Name different devices and tools used for civil engineering measurements
2	Explain the use of various tools and devices for various field measurements
3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work



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NAAC Cycle 2

Criterion: 2.6.1

4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing
5	Compare different techniques and devices used in civil engineering measurements
6	Identify Basic Mechanical workshop operations in accordance with the material and objects
7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
8	Apply appropriate safety measures with respect to the mechanical workshop trades

Semester : 1 - Course Code : EST100 - Course Name : ENGINEERING MECHANICS

Course Outcome Number	Course Outcome
1	Recall principles and theorems related to rigid body mechanics
2	Identify and describe the components of system of forces acting on the rigid body
3	Apply the conditions of equilibrium to various practical problems involving different force system
4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Semester : 1 - Course Code : EST120 - Course Name : BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
2	Explain different types of buildings, building components, building materials and building construction
3	Describe the importance, objectives and principles of surveying
4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
5	Discuss the Materials, energy systems, water management and environment for green buildings
6	Analyse thermodynamic cycles and calculate its efficiency
7	Illustrate the working and features of IC Engines
8	Explain the basic principles of Refrigeration and Air Conditioning
9	Describe the working of hydraulic machines
10	Explain the working of power transmission elements
11	Describe the basic manufacturing, metal joining and machining processes

Semester : 1 - Course Code : HUN101 - Course Name : LIFE SKILLS

Course Outcome Number	Course Outcome
1	Define and Identify different life skills required in personal and professional life
2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
4	Take part in group discussions
5	Use appropriate thinking and problem solving techniques to solve new problems
6	Understand the basics of teamwork and leadership



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 1 - Course Code : MAT101 - Course Name : LINEAR ALGEBRA AND CALCULUS

Course Outcome Number	Course Outcome
1	solve the consistent system of linear equations and apply orthogonal to a quadratic form
2	find the maxima and minima of multivariable functions
3	find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas using double and triple integrals
4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
5	determine the power series expansion of a given function

Semester : 2 - Course Code : ESL130 - Course Name : ELECTRICAL & ELECTRONICS WORKSHOP

Course Outcome Number	Course Outcome
1	Demonstrate safety measures against electric shocks
2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
4	Identify and test various electronic components
5	Draw circuit schematics with EDA tools
6	Assemble and test electronic circuits on boards
7	Work in a team with good interpersonal skills

Semester : 2 - Course Code : EST102 - Course Name : PROGRAMMING IN C

Course Outcome Number	Course Outcome
1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators
3	Write readable C programs with arrays, structure or union for storing the the data to be processed
4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
5	Write readable C programs which use pointers for array processing and parameter passing
6	Develop readable C programs with files for reading input and storing output
7	Understand the basics of computer hardware ans software

Semester : 2 - Course Code : EST110 - Course Name : ENGINEERING GRAPHICS

Course Outcome Number	Course Outcome
1	Draw the projection of points and lines located in different quadrants
2	Prepare multiview orthographic projections of objects by visualizing them in different positions
3	Draw sectional views and develop surfaces of a given object
4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions



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NAAC Cycle 2

Criterion: 2.6.1

5	Convert 3D views to orthographic views and vice versa
6	Obtain multiview projections and solid models of objects using CAD tools

Semester : 2 - Course Code : EST130 - Course Name : BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcome Number	Course Outcome
1	Apply fundamental concepts and circuit laws to solve simple DC electric and magnetic circuits
2	Develop and solve models of magnetic circuits
3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
4	Describe working of a voltage amplifier
5	Outline the principle of an electronic instrumentation system
6	Explain the principle of radio and cellular communication

Semester : 2 - Course Code : HUN102 - Course Name : PROFESSIONAL COMMUNICATION

Course Outcome Number	Course Outcome
1	Develop vocabulary and language skills relevant to engineering as a profession
2	Analyze, interpret and effectively summarize a variety of textual content
3	Create effective technical presentations
4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
6	Create professional and technical documents that are clear and adhering to all the necessary conventions

Semester : 2 - Course Code : MAT102 - Course Name : VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Course Outcome Number	Course Outcome
1	Apply the concept of vector functions and learn to work with conservative vector field
2	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space
3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
4	Apply Laplace transforms to solve physical problems arising in engineering
5	Apply Fourier transforms to solve physical problems arising in engineering

Semester : 2 - Course Code : PHL120 - Course Name : ENGINEERING PHYSICS LAB

Course Outcome Number	Course Outcome
1	Apply modern instruments like CRO, strain gauge to measure the basic physical quantities viz. frequency and amplitude of a wave pattern, strain etc. Carryout measurement of wave pattern in a stretched string and the corresponding frequency values using a Melde's string apparatus
2	Determine the wavelength of monochromatic beam of light and thickness of micro-thin object etc. by forming Newton's rings pattern and an air wedge fringe pattern



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NAAC Cycle 2

Criterion: 2.6.1

3	Carryout the measurement of wavelength by diffraction of plane transmission grating and the spectra formed by a monochromatic beam of light and a laser
4	Determine the wavelength of a laser beam using the plane transmission grating.Measurement of numerical aperture of an optic fibre and evaluate the properties of a solar cell and LED through its I-V characteristics
5	Determine the velocity of ultrasonic waves in liquid using ultrasonic diffractometer.Compare the magnetic moment of various magnets and determine the magnetic flux density using deflection/vibration Magnetometer

Semester : 2 - Course Code : PHT100 - Course Name : ENGINEERING PHYSICS A (FOR CIRCUIT BRANCHES)

Course Outcome Number	Course Outcome
1	Compute the quantitative aspects of waves and oscillations in engineering systems
2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments
3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices
4	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems
5	Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system

Semester : 3 - Course Code : ECL201 - Course Name : SCIENTIFIC COMPUTING LABORATORY

Course Outcome Number	Course Outcome
1	Describe the needs and requirements of scientific computing and to familiarize one programming language for scientific computing and data visualization
2	Approximate an array/matrix with matrix decomposition
3	Implement numerical integration and differentiation
4	Solve ordinary differential equations for engineering applications
5	Compute with exported data from instruments
6	Realize how periodic functions are constituted by sinusoids
7	Simulate random processes and understand their statistics

Semester : 3 - Course Code : ECL203 - Course Name : LOGIC DESIGN LAB

Course Outcome Number	Course Outcome
1	Design and demonstrate the functioning of various combinational and sequential circuits using ICs
2	Apply an industry compatible hardware description language to implement digital circuits
3	Implement digital circuits on FPGA boards and connect external hardware to the boards
4	Function effectively as an individual and in a team to accomplish the given task

Semester : 3 - Course Code : ECT201 - Course Name : SOLID STATE DEVICES

Course Outcome Number	Course Outcome
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1	Apply Fermi-Dirac Distribution function and Compute carrier concentration at equilibrium and the parameters associated with generation, recombination and transport mechanism
2	Explain drift and diffusion currents in extrinsic semiconductors and Compute current density due to these effects
3	Define the current components and derive the current equation in a pn junction diode and bipolar junction transistor
4	Explain the basic MOS physics and derive the expressions for drain current in linear and saturation regions.
5	Discuss scaling of MOSFETs and short channel effects

Semester : 3 - Course Code : ECT203 - Course Name : LOGIC CIRCUIT DESIGN

Course Outcome Number	Course Outcome
1	Explain the elements of digital system abstractions such as digital representations of information, digital logic and Boolean algebra
2	Create an implementation of a combinational logic function described by a truth table using and/or/inv gates/ muxes
3	Compare different types of logic families with respect to performance and efficiency
4	Design a sequential logic circuit using the basic building blocks like flip-flops
5	Design and analyze combinational and sequential logic circuits through gate level Verilog models

Semester : 3 - Course Code : ECT205 - Course Name : NETWORK THEORY

Course Outcome Number	Course Outcome
1	Apply Mesh / Node analysis or Network Theorems to obtain steady state response of the linear time invariant networks.
2	Apply Laplace Transforms to determine the transient behaviour of RLC networks.
3	Apply Network functions and Network Parameters to analyse the single port and two port networks.

Semester : 3 - Course Code : EST200 - Course Name : DESIGN AND ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the different concepts and principles involved in design engineering
2	Apply design thinking while learning and practicing engineering
3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Semester : 3 - Course Code : MAT201 - Course Name : PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS

Course Outcome Number	Course Outcome
1	Understand the concept and the solution of partial differential equation
2	Analyse and solve one dimensional wave equation and heat equation.
3	Understand complex functions, its continuity differentiability with the use of CauchyRiemann equations.



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NAAC Cycle 2

Criterion: 2.6.1

4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.

Semester : 3 - Course Code : MCN201 - Course Name : SUSTAINABLE ENGINEERING

Course Outcome Number	Course Outcome
1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
2	Explain the different types of environmental pollution problems and their sustainable solutions
3	Discuss the environmental regulations and standards
4	Outline the concepts related to conventional and non-conventional energy
5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Semester : 4 - Course Code : ECL202 - Course Name : ANALOG CIRCUITS AND SIMULATION LAB

Course Outcome Number	Course Outcome
1	Design and demonstrate the functioning of basic analog circuits using discrete components
2	Design and simulate the functioning of basic analog circuits using simulation tools
3	Function effectively as an individual and in a team to accomplish the given task

Semester : 4 - Course Code : ECL204 - Course Name : MICROCONTROLLER LAB

Course Outcome Number	Course Outcome
1	Write an Assembly language program/Embedded C program for performing data manipulation
2	Develop ALP/Embedded C Programs to interface microcontroller with peripherals
3	Perform programming/interfacing experiments with IDE for modern microcontrollers

Semester : 4 - Course Code : ECT202 - Course Name : ANALOG CIRCUITS

Course Outcome Number	Course Outcome
1	Design analog signal processing circuits using diodes and first order RC circuit
2	Analyse basic amplifiers using BJT and MOSFET
3	Apply the principle of oscillator and regulated power supply circuits

Semester : 4 - Course Code : ECT204 - Course Name : SIGNALS AND SYSTEMS

Course Outcome Number	Course Outcome
1	Apply properties of signals and systems to classify them
2	Represent signals with the help of series and transforms
3	Describe orthogonality of signals and convolution integral
4	Apply transfer function to compute the LTI response to input signals
5	Apply sampling theorem to discretize continuous time signals



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 4 - Course Code : ECT206 - Course Name : COMPUTER ARCHITECTURE AND MICROCONTROLLERS

Course Outcome Number	Course Outcome
1	Explain the functional units, I/O and memory management w,r,t a typical computer architecture
2	Distinguish between microprocessor and microcontroller
3	Develop simple programs using assembly language programming
4	Interface 8051 microcontroller with peripheral devices using ALP/Embedded C
5	Familiarize system software and Advanced RISC Machine Architecture

Semester : 4 - Course Code : HUT200 - Course Name : PROFESSIONAL ETHICS

Course Outcome Number	Course Outcome
1	Understand the core values that shape the ethical behaviour of a professional.
2	Adopt a good character and follow an ethical life
3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
4	Solve moral and ethical problems through exploration and assessment by established experiments
5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Semester : 4 - Course Code : MAT204 - Course Name : PROBABILITY, RANDOM PROCESSES AND NUMERICAL METHODS

Course Outcome Number	Course Outcome
1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena
2	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena
3	Analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate
4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations

Semester : 4 - Course Code : MCN202 - Course Name : CONSTITUTION OF INDIA

Course Outcome Number	Course Outcome
1	Explain the background of the present constitution of India and features
2	Utilize the fundamental rights and duties
3	Understand the working of the union executive, parliament and judiciary
4	Understand the working of the state executive, legislature and judiciary
5	Utilize the special provisions and statutory institutions
6	Show national and patriotic spirit as responsible citizens of the country



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 5 - Course Code : ECL331 - Course Name : ANALOG INTEGRATED CIRCUITS
AND SIMULATION LAB

Course Outcome Number	Course Outcome
1	Use data sheets of basic Analog Integrated Circuits and design and implement application circuits using Analog Ics
2	Design and simulate the application circuits with Analog Integrated Circuits using simulation tools
3	Function effectively as an individual and in a team to accomplish the given task

Semester : 5 - Course Code : ECL333 - Course Name : DIGITAL SIGNAL PROCESSING
LABORATORY

Course Outcome Number	Course Outcome
1	Simulate digital signals
2	verify the properties of DFT computationally
3	Familiarize the DSP hardware and interface with computer
4	Implement LTI systems with linear convolution
5	Implement FFT and IFFT and use it on real time signals
6	Implement FIR low pass filter
7	Implement real time LTI systems with block convolution and FFT

Semester : 5 - Course Code : ECT301 - Course Name : LINEAR INTEGRATED CIRCUITS

Course Outcome Number	Course Outcome
1	Understand Op Amp fundamentals and differential amplifier configurations
2	Design operational amplifier circuits for various applications
3	Design Oscillators and active filters using opamps
4	Explain the working and applications of timer, VCO and PLL ICs
5	Outline the working of Voltage regulator IC's and Data converters

Semester : 5 - Course Code : ECT303 - Course Name : DIGITAL SIGNAL
PROCESSING

Course Outcome Number	Course Outcome
1	State and prove the fundamental properties and relations relevant to DFT and solve basic problems involving DFT based filtering methods
2	Compute DFT and IDFT using DIT and DIF radix-2 FFT algorithms
3	Design linear phase FIR filters and IIR filters for a given specification
4	Illustrate the various FIR and IIR filter structures for the realization of the given system function
5	Explain the basic multi-rate DSP operations decimation and interpolation in both time and frequency domains using supported mathematical equations
6	Explain the architecture of DSP processor (TMS320C67xx) and the finite word length effects

Semester : 5 - Course Code : ECT305 - Course Name : ANALOG AND DIGITAL
COMMUNICATION



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Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Explain the existent analog communication systems
2	Apply the concepts of random processes to LTI systems
3	Apply waveform coding techniques in digital transmission
4	Apply GS procedure to develop digital receivers
5	Apply equalizer design to counteract ISI
6	Apply digital modulation techniques in signal transmission

Semester : 5 - Course Code : ECT307 - Course Name : CONTROL SYSTEMS

Course Outcome Number	Course Outcome
1	Analyse electromechanical systems by mathematical modelling and derive their transfer functions
2	Determine Transient and Steady State behaviour of systems using standard test signals
3	Determine absolute stability and relative stability of a system
4	Apply frequency domain techniques to assess the system performance and to design a control system with suitable compensation techniques
5	Analyse system Controllability and Observability using state space representation

Semester : 5 - Course Code : HUT310 - Course Name : MANAGEMENT FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Explain the characteristics of management in the contemporary context
2	Describe the functions of management
3	Demonstrate ability in decision making process and productivity analysis
4	Illustrate project management technique and develop a project schedule
5	Summarize the functional areas of management
6	Comprehend the concept of entrepreneurship and create business plans

Semester : 5 - Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community
5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 6 - Course Code : ECD334 - Course Name : MINIPROJECT

Course Outcome Number	Course Outcome
1	Be able to practice acquired knowledge within the selected area of technology for project development
2	Identify, discuss and justify the technical aspects and design aspects of the project with a systematic approach.
3	Reproduce, improve and refine technical aspects for engineering projects
4	Work as a team in development of technical projects
5	Communicate and report effectively project related activities and findings

Semester : 6 - Course Code : ECL332 - Course Name : COMMUNICATION LAB

Course Outcome Number	Course Outcome
1	Setup simple prototype circuits for waveform coding and digital modulation techniques working in a team
2	Simulate the error performance of a digital communication system using standard binary and M -ary modulation schemes
3	Develop hands-on skills to emulate a communication system with software-designed-radio working in a team

Semester : 6 - Course Code : ECT302 - Course Name : ELECTROMAGNETICS

Course Outcome Number	Course Outcome
1	To summarize the basic mathematical concepts related to electromagnetic vector fields.
2	Analyse Maxwell's equation in different forms and apply them to diverse engineering problems.
3	To analyse electromagnetic wave propagation and wave polarization
4	To analyse the characteristics of transmission lines and solve the transmission line problems using Smith chart.
5	To analyse and evaluate the propagation of EM waves in Wave guides

Semester : 6 - Course Code : ECT304 - Course Name : VLSI CIRCUIT DESIGN

Course Outcome Number	Course Outcome
1	Explain the various methodologies in ASIC and FPGA design
2	Design VLSI Logic circuits with various MOSFET logic families
3	Compare different types of memory elements.
4	Design and analyse data path elements such as Adders and multipliers
5	Explain MOSFET fabrication techniques and layout design rules

Semester : 6 - Course Code : ECT306 - Course Name : INFORMATION THEORY AND CODING

Course Outcome Number	Course Outcome
1	Explain measures of information – entropy, conditional entropy, mutual information
2	Apply Shannon's source coding theorem for data compression.
3	Apply the concept of channel capacity for characterize limits of error-free transmission



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NAAC Cycle 2

Criterion: 2.6.1

4	Apply linear block codes for error detection and correction
5	Apply algebraic codes with reduced structural complexity for error correction
6	Understand encoding and decoding of convolutional and LDPC codes

Semester : 6 - Course Code : ECT308 - Course Name : COMPREHENSIVE COURSE WORK

Course Outcome Number	Course Outcome
1	Apply the knowledge of circuit theorems and solid state physics to solve the problems in electronic Circuits
2	Design a logic circuit for a specific application
3	Design linear IC circuits for linear and non-linear circuit applications
4	Explain basic signal processing operations and Filter designs
5	Explain existent analog and digital communication systems

Semester : 6 - Course Code : ECT352 - Course Name : DIGITAL IMAGE PROCESSING

Course Outcome Number	Course Outcome
1	Distinguish / Analyse the various concepts and mathematical transforms necessary for image processing
2	Differentiate and interpret the various image enhancement techniques
3	Illustrate image segmentation algorithm
4	Understand the basic image compression techniques

Semester : 6 - Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level)
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production
3	Determine the functional requirement of a firm under various competitive conditions
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
5	Determine the impact of changes in global economic policies on the business opportunities of a firm

Semester : 7 - Course Code : AET425 - Course Name : BIOMEDICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the basic idea about the biomedical engineering technology
1	Describe the basic idea about the biomedical engineering technology
2	Explain the principle and working of different types of bio medical electronic equipment/device
2	Explain the principle and working of different types of bio medical electronic equipment/device
3	Understand the electrical muscle activities and to measure it
3	Understand the electrical muscle activities and to measure it



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NAAC Cycle 2

Criterion: 2.6.1

4	Analyze the brain wave activities and abnormalities
4	Analyze the brain wave activities and abnormalities
5	Illustrate the principles of modern medical diagnosing machines
5	Illustrate the principles of modern medical diagnosing machines

Semester : 7 - Course Code : CET415 - Course Name : ENVIRONMENTAL IMPACT ASSESSMENT

Course Outcome Number	Course Outcome
1	Explain the need for minimizing the environmental impacts of developmental activities
2	Outline environmental legislation & clearance procedure in the country
3	Outline environmental legislation & clearance procedure in the country
4	Prepare an environmental impact assessment report
5	Conduct an environmental audit

Semester : 7 - Course Code : CSE445 - Course Name : PYTHON FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs (Cognitive Knowledge level: Apply)
2	Illustrate uses of conditional (if, if-else, if-elif-else and switch-case) and iterative (while and for) statements in Python programs (Cognitive Knowledge level: Apply)
3	Develop programs by utilizing the modules Lists, Tuples, Sets and Dictionaries in Python (Cognitive Knowledge level: Apply)
4	Implement Object Oriented programs with exception handling (Cognitive Knowledge level: Apply)
5	Analyze, Interpret, and Visualize data according to the target application (Cognitive Knowledge level: Apply)
6	Develop programs in Python to process data stored in files by utilizing the modules Numpy, Matplotlib, and Pandas (Cognitive Knowledge level: Apply)

Semester : 7 - Course Code : ECD415 - Course Name : PROJECT PHASE I

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains.
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze)
6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).

Semester : 7 - Course Code : ECL411 - Course Name : ELECTROMAGNETICS LAB



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Familiarize the basic Microwave components and to analyse few microwave measurements and its parameters.
2	Understand the principles of fiber-optic communications and the different kind of losses, signal distortion and other signal degradation factors.
3	Design and simulate basic antenna experiments with simulation tools.

Semester : 7 - Course Code : ECQ413 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply)
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze)
3	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
4	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
5	Prepare a technical report (Cognitive knowledge level: Create)

Semester : 7 - Course Code : ECT401 - Course Name : MICROWAVES AND ANTENNAS

Course Outcome Number	Course Outcome
1	Understand the basic concept of antennas and its parameters.
2	Analyze the far field pattern of Short dipole and Half wave dipole antenna
3	Design of various broad band antennas, arrays and its radiation patterns
4	Illustrate the principle of operation of cavity resonators and various microwave sources
5	Explain various microwave hybrid circuits and microwave semiconductor devices

Semester : 7 - Course Code : ECT413 - Course Name : OPTICAL FIBER COMMUNICATION

Course Outcome Number	Course Outcome
1	Understand the working and classification of optical fibers in terms of propagation modes
2	Solve problems of transmission characteristics and losses in optical fiber
3	Explain the constructional features and the characteristics of optical sources and detectors
4	Describe the operations of optical amplifiers
5	Understand the concept of WDM, FSO and LiFi

Semester : 7 - Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the theories of accident causation and preventive measures of industrial accidents.



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NAAC Cycle 2

Criterion: 2.6.1

2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)
4	Describe various hazards associated with different machines and mechanical material handling.
5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)

Semester : 7 - Course Code : MET445 - Course Name : RENEWABLE ENERGY ENGINEERING

Course Outcome Number	Course Outcome
1	Explain renewable energy sources and evaluate the implication of renewable energy. To predict solar radiation at a location
2	Explain solar energy collectors, storages, solar cell characteristics and applications
3	Explain the different types of wind power machines and control strategies of wind turbines
4	Explain the ocean energy and conversion devices and different Geothermal sources
5	Explain biomass energy conversion devices. Calculate the Net Present value and payback period

Semester : 8 - Course Code : ECD416 - Course Name : PROJECT PHASE II

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 8 - Course Code : ECT402 - Course Name : WIRELESS COMMUNICATION

Course Outcome Number	Course Outcome
1	Summarize the basics of cellular system and cellular design fundamentals
2	Describe the wireless channel models and discuss capacity of wireless channels
3	Analyze the performance of the modulation techniques for flat-fading channels and multicarrier modulation
4	Illustrate how receiver performance can be enhanced by various diversity techniques
5	Identify advantages of various equalization techniques and multiple-access techniques in wireless communication
6	Calculate system parameters such antenna height, range, maximum usable frequency in different modes of radio wave propagation



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Criterion: 2.6.1

Semester : 8 - Course Code : ECT416 - Course Name : MODERN COMMUNICATION SYSTEMS

Course Outcome Number	Course Outcome
1	Explain OFDM, OFDMA and SC-FDMA techniques used in cellular communication
2	Discuss the different wireless communication standards for short range communication
3	Explain the IoT architecture and various connectivity technologies used in IoT Systems
4	Understand the various communication standards for connected autonomous vehicles
5	Explain the significance and architecture of software defined radio and cognitive radio

Semester : 8 - Course Code : ECT468 - Course Name : RENEWABLE ENERGY SYSTEMS

Course Outcome Number	Course Outcome
1	Understand the need, importance and scope of various Non-Conventional sources of energy
2	Outline the concepts and technologies related to renewable energy systems using wind and Solar-PV
3	Understand the integration of smart grid with renewable energy systems
4	Explain the concept of distribution management system
5	Describe the fundamentals of Smart metering

Semester : 8 - Course Code : ECT474 - Course Name : ENTREPRENEURSHIP

Course Outcome Number	Course Outcome
1	Discuss the fundamental concepts of entrepreneurship
2	Understand entrepreneurial motivation and motivation theories
3	Analyze types of enterprises and ownership structure
4	Apply project evaluation methods
5	Evaluate enterprise financial strength
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING	

Semester : 1 -Course Code : CYL120 - Course Name : ENGINEERING CHEMISTRY LAB

Course Outcome Number	Course Outcome
1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

Semester : 1 -Course Code : CYT100 - Course Name : ENGINEERING CHEMISTRY



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields
2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
5	Study various types of water treatment methods to develop skills for treating wastewater
5	Study various types of water treatment methods to develop skills for treating wastewater

Semester : 1 -Course Code : ESL120 - Course Name : CIVIL & MECHANICAL WORKSHOP

Course Outcome Number	Course Outcome
1	Name different devices and tools used for civil engineering measurements
2	Explain the use of various tools and devices for various field measurements
3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work
4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing
5	Compare different techniques and devices used in civil engineering measurements
6	Identify Basic Mechanical workshop operations in accordance with the material and objects
7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
8	Apply appropriate safety measures with respect to the mechanical workshop trades

Semester : 1 -Course Code : EST100 - Course Name : ENGINEERING MECHANICS

Course Outcome Number	Course Outcome
1	Recall principles and theorems related to rigid body mechanics
2	Identify and describe the components of system of forces acting on the rigid body
3	Apply the conditions of equilibrium to various practical problems involving different force system
4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Semester : 1 -Course Code : EST120 - Course Name : BASICS OF CIVIL & MECHANICAL ENGINEERING



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
2	Explain different types of buildings, building components, building materials and building construction
3	Describe the importance, objectives and principles of surveying
4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
5	Discuss the Materials, energy systems, water management and environment for green buildings
6	Analyse thermodynamic cycles and calculate its efficiency
7	Illustrate the working and features of IC Engines
8	Explain the basic principles of Refrigeration and Air Conditioning
9	Describe the working of hydraulic machines
10	Explain the working of power transmission elements
11	Describe the basic manufacturing, metal joining and machining processes

Semester : 1 -Course Code : HUN101 - Course Name : LIFE SKILLS

Course Outcome Number	Course Outcome
1	Define and Identify different life skills required in personal and professional life
2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
4	Take part in group discussions
5	Use appropriate thinking and problem solving techniques to solve new problems
6	Understand the basics of teamwork and leadership

Semester : 1 -Course Code : MAT101 - Course Name : LINEAR ALGEBRA AND CALCULUS

Course Outcome Number	Course Outcome
1	solve the consistent system of linear equations and apply orthogonal to a quadratic form
2	find the maxima and minima of multivariable functions
3	find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas using double and triple integrals
4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
5	determine the power series expansion of a given function

Semester : 2 -Course Code : ESL130 - Course Name : ELECTRICAL & ELECTRONICS WORKSHOP

Course Outcome Number	Course Outcome
1	Demonstrate safety measures against electric shocks
2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
4	Identify and test various electronic components



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NAAC Cycle 2

Criterion: 2.6.1

5	Draw circuit schematics with EDA tools
6	Assemble and test electronic circuits on boards
7	Work in a team with good interpersonal skills

Semester : 2 -Course Code : EST102 - Course Name : PROGRAMMING IN C

Course Outcome Number	Course Outcome
1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators
3	Write readable C programs with arrays, structure or union for storing the the data to be processed
4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
5	Write readable C programs which use pointers for array processing and parameter passing
6	Develop readable C programs with files for reading input and storing output
7	Understand the basics of computer hardware ans software

Semester : 2 -Course Code : EST110 - Course Name : ENGINEERING GRAPHICS

Course Outcome Number	Course Outcome
1	Draw the projection of points and lines located in different quadrants
2	Prepare multiview orthographic projections of objects by visualizing them in different positions
3	Draw sectional views and develop surfaces of a given object
4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions
5	Convert 3D views to orthographic views and vice versa
6	Obtain multiview projections and solid models of objects using CAD tools

Semester : 2 -Course Code : EST130 - Course Name : BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcome Number	Course Outcome
1	Apply fundamental concepts and circuit laws to solve simple DC electric and magnetic circuits
2	Develop and solve models of magnetic circuits
3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
4	Describe working of a voltage amplifier
5	Outline the principle of an electronic instrumentation system
6	Explain the principle of radio and cellular communication

Semester : 2 -Course Code : HUN102 - Course Name : PROFESSIONAL COMMUNICATION

Course Outcome Number	Course Outcome
1	Develop vocabulary and language skills relevant to engineering as a profession
2	Analyze, interpret and effectively summarize a variety of textual content



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NAAC Cycle 2

Criterion: 2.6.1

3	Create effective technical presentations
4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
6	Create professional and technical documents that are clear and adhering to all the necessary conventions

Semester : 2 -Course Code : MAT102 - Course Name : VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Course Outcome Number	Course Outcome
1	Apply the concept of vector functions and learn to work with conservative vector field
2	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space
3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
4	Apply Laplace transforms to solve physical problems arising in engineering
5	Apply Fourier transforms to solve physical problems arising in engineering

Semester : 2 -Course Code : PHL120 - Course Name : ENGINEERING PHYSICS LAB

Course Outcome Number	Course Outcome
1	Apply modern instruments like CRO, strain gauge to measure the basic physical quantities viz. frequency and amplitude of a wave pattern, strain etc. Carryout measurement of wave pattern in a stretched string and the corresponding frequency values using a Melde's string apparatus
2	Determine the wavelength of monochromatic beam of light and thickness of micro-thin object etc. by forming Newton's rings pattern and an air wedge fringe pattern
3	Carryout the measurement of wavelength by diffraction of plane transmission grating and the spectra formed by a monochromatic beam of light and a laser
4	Determine the wavelength of a laser beam using the plane transmission grating. Measurement of numerical aperture of an optic fibre and evaluate the properties of a solar cell and LED through its I-V characteristics
5	Determine the velocity of ultrasonic waves in liquid using ultrasonic diffractometer. Compare the magnetic moment of various magnets and determine the magnetic flux density using deflection/vibration Magnetometer

Semester : 2 -Course Code : PHT100 - Course Name : ENGINEERING PHYSICS A (FOR CIRCUIT BRANCHES)

Course Outcome Number	Course Outcome
1	Compute the quantitative aspects of waves and oscillations in engineering systems
2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments
3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices
4	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems
5	Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 3 -Course Code : EEL201 - Course Name : CIRCUITS AND MEASUREMENTS LAB

Course Outcome Number	Course Outcome
1	Analyse voltage current relations of RLC circuits
2	Verify DC network theorems by setting up various electric circuits
3	Measure power in a single and three phase circuits by various methods
4	Calibrate various meters used in electrical systems
5	Determine magnetic characteristics of different electrical devices
6	Analyse the characteristics of various types of transducer systems
7	Determine electrical parameters using various bridges
8	Analyse the performance of various electronic devices for an instrumentation systems and, to develop the team management and documentation capabilities

Semester : 3 -Course Code : EEL203 - Course Name : ANALOG ELECTRONICS LAB

Course Outcome Number	Course Outcome
1	Use the various electronic instruments and for conducting experiments
2	Design and develop various electronic circuits using diodes and Zener diodes.
3	Design and implement amplifier and oscillator circuits using BJT and JFET
4	Design and implement basic circuits using IC (OPAMP and 555 timers).
5	Simulate electronic circuits using any circuit simulation software
6	Use PCB layout software for circuit design

Semester : 3 -Course Code : EET201 - Course Name : CIRCUITS AND NETWORKS

Course Outcome Number	Course Outcome
1	Apply circuit theorems to simplify and solve complex DC and AC electric networks.
2	Analyse dynamic DC and AC circuits and develop the complete response to excitations
3	Solve dynamic circuits by applying transformation to s-domain.
4	Analyse three-phase networks in Y and Δ configurations.
5	Solve series /parallel resonant circuits.
6	Develop the representation of two-port networks using network parameters and analyse.

Semester : 3 -Course Code : EET203 - Course Name : MEASUREMENTS AND INSTRUMENTATION

Course Outcome Number	Course Outcome
1	Identify and analyse the factors affecting performance of measuring system
2	Choose appropriate instruments for the measurement of voltage, current in ac and dc measurements
3	Explain the operating principle of power and energy measurement
4	Outline the principles of operation of Magnetic measurement systems
5	Describe the operating principle of DC and AC bridges, transducers based systems.
6	Understand the operating principles of basic building blocks of digital systems, recording and display units

Semester : 3 -Course Code : EET205 - Course Name : ANALOG ELECTRONICS



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Design biasing scheme for transistor circuits.
1	Design biasing scheme for transistor circuits.
2	Model BJT and FET amplifier circuits.
2	Model BJT and FET amplifier circuits.
3	Identify a power amplifier with appropriate specifications for electronic circuit applications.
3	Identify a power amplifier with appropriate specifications for electronic circuit applications.
4	Describe the operation of oscillator circuits using BJT.
4	Describe the operation of oscillator circuits using BJT.
5	Explain the basic concepts of Operational amplifier(OPAMP)
5	Explain the basic concepts of Operational amplifier(OPAMP)
6	Design and develop various OPAMP application circuits.
6	Design and develop various OPAMP application circuits.

Semester : 3 -Course Code : EST200 - Course Name : DESIGN AND ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the different concepts and principles involved in design engineering
2	Apply design thinking while learning and practicing engineering
3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Semester : 3 -Course Code : MAT201 - Course Name : PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS

Course Outcome Number	Course Outcome
1	Understand the concept and the solution of partial differential equation
2	Analyse and solve one dimensional wave equation and heat equation.
3	Understand complex functions, its continuity differentiability with the use of Cauchy Riemann equations.
4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.

Semester : 3 -Course Code : MCN201 - Course Name : SUSTAINABLE ENGINEERING

Course Outcome Number	Course Outcome
1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
2	Explain the different types of environmental pollution problems and their sustainable solutions
3	Discuss the environmental regulations and standards
4	Outline the concepts related to conventional and non-conventional energy
5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 4 -Course Code : EEL202 - Course Name : ELECTRICAL MACHINES LAB 1

Course Outcome Number	Course Outcome
1	Analyse the performance of DC motors and DC generators by performing load test
2	Sketch the Open Circuit Characteristics of a self excited DC shunt generator and check conditions of voltage build up by performing suitable experiment
3	Develop equivalent circuit and predetermine their regulation and efficiency by performing OC & SC tests on transformer
4	Analyse the efficiency and regulation of the transformer by performing load test
5	Analyse the efficiency of a DC machine when working as motor and generator by conducting suitable test
6	Examine the efficiency by performing Sumpner's test on two similar transformers

Semester : 4 -Course Code : EEL204 - Course Name : DIGITAL ELECTRONICS LAB

Course Outcome Number	Course Outcome
1	Formulate digital functions using Boolean Algebra and verify experimentally
2	Design and implement combinational logic circuits
3	Design and implement sequential logic circuits
4	Design and fabricate a digital circuit using the knowledge acquired from the laboratory

Semester : 4 -Course Code : EET202 - Course Name : DC MACHINES AND TRANSFORMERS

Course Outcome Number	Course Outcome
1	Acquire knowledge about constructional details of DC machines
2	Describe the performance characteristics of DC generators
3	Describe the principle of operation of DC motors and select appropriate motor types for different applications
4	Acquire knowledge in testing of DC machines to assess its performance
5	Describe the constructional details and modes of operation of single phase and three phase transformers
6	Analyse the performance of transformers under various conditions

Semester : 4 -Course Code : EET204 - Course Name : ELECTROMAGNETIC THEORY

Course Outcome Number	Course Outcome
1	Apply vector analysis and coordinate systems to solve static electric and magnetic field problems
2	Apply Gauss Law, Coulomb's law and Poisson's equation to determine electrostatic field parameters
3	Determine magnetic fields from current distributions by applying Biot-Savart's law and Amperes Circuital law
4	Apply Maxwell Equations for the solution of timevarying fields
5	Analyse electromagnetic wave propagation in different media

Semester : 4 -Course Code : EET206 - Course Name : DIGITAL ELECTRONICS



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Identify various number systems, binary codes and formulate digital functions using Boolean algebra
2	Design and implement combinational logic circuits
3	Design and implement sequential logic circuits
4	Compare the operation of various analog to digital and digital to analog conversion circuits
5	Explain the basic concepts of programmable logic devices and VHDL

Semester : 4 -Course Code : HUT200 - Course Name : PROFESSIONAL ETHICS

Course Outcome Number	Course Outcome
1	Understand the core values that shape the ethical behaviour of a professional.
2	Adopt a good character and follow an ethical life
3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
4	Solve moral and ethical problems through exploration and assessment by established experiments
5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Semester : 4 -Course Code : MAT204 - Course Name : PROBABILITY, RANDOM PROCESSES AND NUMERICAL METHODS

Course Outcome Number	Course Outcome
1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena
2	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena
3	Analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate
4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations

Semester : 4 -Course Code : MCN202 - Course Name : CONSTITUTION OF INDIA

Course Outcome Number	Course Outcome
1	Explain the background of the present constitution of India and features
2	Utilize the fundamental rights and duties
3	Understand the working of the union executive, parliament and judiciary
4	Understand the working of the state executive, legislature and judiciary
5	Utilize the special provisions and statutory institutions
6	Show national and patriotic spirit as responsible citizens of the country

Semester : 5 -Course Code : EEL331 - Course Name : MICROPROCESSORS AND MICROCONTROLLERS LAB



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Develop and execute assembly language programs for solving arithmetic and logical problems using microprocessor/microcontroller
2	Design and Implement systems with interfacing circuits for various applications.
3	Execute projects as a team using microprocessor/microcontroller for real life applications.

Semester : 5 -Course Code : EEL333 - Course Name : ELECTRICAL MACHINES LAB II

Course Outcome Number	Course Outcome
1	Analyse the performance of single phase and three phase induction motors by conducting suitable tests.
2	Analyse the performance of three phase synchronous machine from V and inverted V curves.
3	Analyse the performance of a three phase alternator by conducting suitable tests

Semester : 5 -Course Code : EET301 - Course Name : POWER SYSTEMS I

Course Outcome Number	Course Outcome
1	Identify the power generating system appropriate for a given area
2	Evaluate the electrical performance of any transmission line
3	Compute various physical characteristics of underground and overhead transmission systems
4	Select appropriate switchgear for protection schemes
5	Design a simple electrical distribution system as per the standards

Semester : 5 -Course Code : EET303 - Course Name : MICROPROCESSORS AND MICROCONTROLLERS

Course Outcome Number	Course Outcome
1	Describe the architecture and timing diagram of 8085 microprocessor.
2	Develop assembly language programs in 8085 microprocessor.
3	Identify the different ways of interfacing memory and I/O with 8085 microprocessor.
4	Understand the architecture of 8051 microcontroller and embedded systems.
5	Develop assembly level and embedded C programs in 8051 microcontroller.

Semester : 5 -Course Code : EET305 - Course Name : SIGNALS AND SYSTEMS

Course Outcome Number	Course Outcome
1	Explain the basic operations on signals and systems
2	Apply Fourier Series and Fourier Transform concepts for continuous time signals
3	Analyse the continuous time systems with Laplace Transform
4	Analyse the discrete time system using Z Transform
5	Apply Fourier Series and Fourier Transform concepts for Discrete time domain
6	Describe the concept of stability of continuous time systems and sampled data systems

Semester : 5 -Course Code : EET307 - Course Name : SYNCHRONOUS AND INDUCTION MACHINE



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Analyse the performance of different types of alternators.
2	Analyse the performance of a synchronous motor.
3	Analyse the performance of different types of induction motors.
4	Describe operating principle of induction machine as generator.
5	Explain the types of single phase induction motors and their working principle

Semester : 5 -Course Code : HUT310 - Course Name : MANAGEMENT FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Explain the characteristics of management in the contemporary context
2	Describe the functions of management
3	Demonstrate ability in decision making process and productivity analysis
4	Illustrate project management technique and develop a project schedule
5	Summarize the functional areas of management
6	Comprehend the concept of entrepreneurship and create business plans

Semester : 5 -Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community
5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level

Semester : 6 -Course Code : EEL332 - Course Name : POWER SYSTEMS LAB

Course Outcome Number	Course Outcome
1	Develop mathematical models and conduct steady state and transient analysis of power system networks using standard software
2	Develop a frequency domain model of power system networks and conduct the stability analysis
3	Conduct appropriate tests for any power system component as per standards.
4	Conduct site inspection and evaluate performance ratio of solar power plant.

Semester : 6 -Course Code : EEL334 - Course Name : POWER ELECTRONICS LAB

Course Outcome Number	Course Outcome
1	Determine the characteristics of SCR and design triggering circuits for SCR based circuits



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NAAC Cycle 2

Criterion: 2.6.1

2	Design, set up and analyse single phase AC voltage controllers.
3	Design, set up and test suitable gate drives for MOSFET/IGBT
4	Design, set up and test basic inverter topologies
5	Design and set up dc-dc converters
6	Develop simulation models of dc-dc converters, rectifiers and inverters using modern simulation tools

Semester : 6 -Course Code : EET302 - Course Name : LINEAR CONTROL SYSTEMS

Course Outcome Number	Course Outcome
1	Describe the role of various control blocks and components in feedback systems
2	Analyse the time domain responses of the linear systems
3	Apply Root locus technique to assess the performance of linear systems
4	Analyse the stability of the given LTI systems
5	Analyse the frequency domain response of the given LTI systems
6	Design compensators using time domain and frequency domain techniques

Semester : 6 -Course Code : EET304 - Course Name : POWER SYSTEMS II

Course Outcome Number	Course Outcome
1	Apply the per unit scheme for any power system network and compute the fault levels.
2	Analyse the voltage profile of any given power system network using iterative methods.
3	Analyse the steady state and transient stability of power system networks.
4	Model the control scheme of power systems.
5	Schedule optimal generation scheme.

Semester : 6 -Course Code : EET306 - Course Name : POWER ELECTRONICS

Course Outcome Number	Course Outcome
1	Explain the operation of modern power semiconductor devices and its characteristics
2	Analyse the working of controlled rectifiers.
3	Explain the working of AC voltage controllers, inverters and PWM techniques.
4	Compare the performance of different dc-dc converters
5	Describe basic drive schemes for ac and dc motors

Semester : 6 -Course Code : EET308 - Course Name : COMPREHENSIVE COURSE WORK

Course Outcome Number	Course Outcome
1	Apply the knowledge of circuit theorems to solve the problems in electrical networks
2	Evaluate the performance of DC machines and Transformers under different loading conditions
3	Identify appropriate digital components to realise any combinational or sequential logic.
4	Apply the knowledge of Power generation, transmission and distribution to select appropriate components for power system operation.
5	Apply appropriate mathematical concepts to analyse continuous time and discrete time signals and systems

Semester : 6 -Course Code : EET322 - Course Name : RENEWABLE ENERGY SYSTEMS



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Describe the environmental aspects of renewable energy resources.
2	Explain the operation of various renewable energy systems
3	Design solar PV systems
4	Explain different emerging energy conversion technologies and storage

Semester : 6 -Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
3	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)

Semester : 7 -Course Code : AET425 - Course Name : BIOMEDICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the basic idea about the biomedical engineering technology
2	Explain the principle and working of different types of bio medical electronic equipment/device
3	Understand the electrical muscle activities and to measure it
4	Analyze the brain wave activities and abnormalities
5	Illustrate the principles of modern medical diagnosing machines

Semester : 7 -Course Code : CET415 - Course Name : ENVIRONMENTAL IMPACT ASSESSMENT

Course Outcome Number	Course Outcome
1	Explain the need for minimizing the environmental impacts of developmental activities
2	Outline environmental legislation & clearance procedure in the country
3	Apply various methodologies for assessing the environmental impacts of any developmental activity
4	Prepare an environmental impact assessment report
5	Conduct an environmental audit

Semester : 7 -Course Code : CSE445 - Course Name : PYTHON FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs (Cognitive Knowledge level: Apply)
2	Illustrate uses of conditional (if, if-else, if-elif-else and switch-case) and iterative (while and for) statements in Python programs (Cognitive Knowledge level: Apply)



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NAAC Cycle 2

Criterion: 2.6.1

3	Develop programs by utilizing the modules Lists, Tuples, Sets and Dictionaries in Python (Cognitive Knowledge level: Apply)
4	Implement Object Oriented programs with exception handling (Cognitive Knowledge level: Apply)
5	Analyze, Interpret, and Visualize data according to the target application (Cognitive Knowledge level: Apply)
6	Develop programs in Python to process data stored in files by utilizing the modules Numpy, Matplotlib, and Pandas (Cognitive Knowledge level: Apply)

Semester : 7 -Course Code : EED415 - Course Name : PROJECT PHASE I

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply)
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).

Semester : 7 -Course Code : EEL411 - Course Name : CONTROL SYSTEMS LAB

Course Outcome Number	Course Outcome
1	Demonstrate the knowledge of simulation tools for control system design.
2	Develop the mathematical model of a given physical system by conducting appropriate experiments.
3	Analyse the performance and stability of physical systems using classical and advanced control approaches.
4	Design controllers for physical systems to meet the desired specifications.

Semester : 7 -Course Code : EEQ413 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
3	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
4	Give a presentation about an academic document (Cognitive knowledge level: Apply).
5	Prepare a technical report (Cognitive knowledge level: Create)

Semester : 7 -Course Code : EET401 - Course Name : ADVANCED CONTROL SYSTEMS



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Develop the state variable representation of physical systems
2	Analyse the performance of linear and nonlinear systems using state variable approach
3	Design state feedback controller for a given system
4	Explain the characteristics of nonlinear systems
5	Apply the tools like describing function approach or phase plane approach for assessing the performance of nonlinear systems
6	Apply Lyapunov method for the stability analysis of physical systems.

Semester : 7 -Course Code : EET413 - Course Name : ELECTRIC DRIVES

Course Outcome Number	Course Outcome
1	Describe the transient and steady state aspects electric drives
2	Apply the appropriate configuration of controlled rectifiers for the speed control of DC motors
3	Analyse the operation of chopper-fed DC motor drive in various quadrants
4	Illustrate the various speed control techniques of induction motors
5	Examine the vector control of induction motor drives
6	Distinguish different speed control methods of synchronous motor drives

Semester : 7 -Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the theories of accident causation and preventive measures of industrial accidents.
2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)
4	Describe various hazards associated with different machines and mechanical material handling.
5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)

Semester : 7 -Course Code : MET445 - Course Name : RENEWABLE ENERGY ENGINEERING

Course Outcome Number	Course Outcome
1	Explain renewable energy sources and evaluate the implication of renewable energy. To predict solar radiation at a location
2	Explain solar energy collectors, storages, solar cell characteristics and applications
3	Explain the different types of wind power machines and control strategies of wind turbines
4	Explain the ocean energy and conversion devices and different Geothermal sources
5	Explain biomass energy conversion devices. Calculate the Net Present value and payback period

Semester : 8 -Course Code : EED416 - Course Name : PROJECT PHASE II



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 8 -Course Code : EET402 - Course Name : ELECTRICAL SYSTEM DESIGN AND ESTIMATION

Course Outcome Number	Course Outcome
1	Explain the rules and regulations in the design of components for medium and high voltage installations
2	Design lighting schemes for indoor and outdoor applications
3	Design low/medium voltage domestic and industrial electrical installations
4	Design, testing and commissioning of 11 kV transformer substation
5	Design electrical installations in high rise buildings

Semester : 8 -Course Code : EET424 - Course Name : ENERGY MANAGEMENT

Course Outcome Number	Course Outcome
1	Analyse the significance of energy management and auditing
2	Discuss the energy efficiency and management of electrical loads
3	Apply demand side management techniques
4	Explain the energy management opportunities in industries
5	Compute the economic feasibility of the energy conservation measures

Semester : 8 -Course Code : EET426 - Course Name : SPECIAL ELECTRIC MACHINES

Course Outcome Number	Course Outcome
1	Analyse the performance of different types of permanent magnet motors
2	Analyse the performance of a stepper motor
3	Analyse the performance of different types of reluctance motors
4	Explain the construction and principle of operation of servo motors, single phase motors and linear motors
5	Analyse the performance of linear induction motors

Semester : 8 -Course Code : EET438 - Course Name : ENERGY STORAGE SYSTEMS

Course Outcome Number	Course Outcome
1	Identify the role of energy storage in power systems
2	Classify thermal, kinetic and potential storage technologies and their applications
3	Compare Electrochemical, Electrostatic and Electromagnetic storage technologies



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NAAC Cycle 2

Criterion: 2.6.1

4	Illustrate energy storage technology in renewable energy integration
5	Summarise energy storage technology applications for smart grids)

DEPARTMENT OF MECHANICAL ENGINEERING

Semester : 1 - Course Code : ESL130 - Course Name : ELECTRICAL & ELECTRONICS WORKSHOP

Course Outcome Number	Course Outcome
1	Demonstrate safety measures against electric shocks
2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
4	Identify and test various electronic components
5	Draw circuit schematics with EDA tools
6	Assemble and test electronic circuits on boards
7	Work in a team with good interpersonal skills

Semester : 1 - Course Code : EST110 - Course Name : ENGINEERING GRAPHICS

Course Outcome Number	Course Outcome
1	Draw the projection of points and lines located in different quadrants
2	Prepare multiview orthographic projections of objects by visualizing them in different positions
3	Draw sectional views and develop surfaces of a given object
4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions
5	Convert 3D views to orthographic views and vice versa
6	Obtain multiview projections and solid models of objects using CAD tools

Semester : 1 - Course Code : EST130 - Course Name : BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcome Number	Course Outcome
1	Apply fundamental concepts and circuit laws to solve simple DC electric and magnetic circuits
2	Develop and solve models of magnetic circuits
3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
4	Describe working of a voltage amplifier
5	Outline the principle of an electronic instrumentation system
6	Explain the principle of radio and cellular communication

Semester : 1 - Course Code : HUN101 - Course Name : LIFE SKILLS

Course Outcome Number	Course Outcome
1	Define and Identify different life skills required in personal and professional life
2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.



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Criterion: 2.6.1

3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
4	Take part in group discussions
5	Use appropriate thinking and problem solving techniques to solve new problems
6	Understand the basics of teamwork and leadership

Semester : 1 - Course Code : PHL120 - Course Name : ENGINEERING PHYSICS LAB

Course Outcome Number	Course Outcome
1	Apply modern instruments like CRO, strain gauge to measure the basic physical quantities viz. frequency and amplitude of a wave pattern, strain etc. Carryout measurement of wave pattern in a stretched string and the corresponding frequency values using a Melde's string apparatus
2	Determine the wavelength of monochromatic beam of light and thickness of micro-thin object etc. by forming Newton's rings pattern and an air wedge fringe pattern
3	Carryout the measurement of wavelength by diffraction of plane transmission grating and the spectra formed by a monochromatic beam of light and a laser
4	Determine the wavelength of a laser beam using the plane transmission grating. Measurement of numerical aperture of an optic fibre and evaluate the properties of a solar cell and LED through its I-V characteristics
5	Determine the velocity of ultrasonic waves in liquid using ultrasonic diffractometer. Compare the magnetic moment of various magnets and determine the magnetic flux density using deflection/vibration Magnetometer

Semester : 1 - Course Code : PHT110 - Course Name : ENGINEERING PHYSICS (FOR NON-CIRCUIT BRANCHES)

Course Outcome Number	Course Outcome
1	Compute the quantitative aspects of waves and oscillations in engineering systems
2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments
3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices
4	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment
5	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications

Semester : 2 - Course Code : CYL120 - Course Name : ENGINEERING CHEMISTRY LAB

Course Outcome Number	Course Outcome
1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds



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NAAC Cycle 2

Criterion: 2.6.1

4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

Semester : 2 - Course Code : CYT100 - Course Name : ENGINEERING CHEMISTRY

Course Outcome Number	Course Outcome
1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields
2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials
4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering
5	Study various types of water treatment methods to develop skills for treating wastewater

Semester : 2 - Course Code : ESL120 - Course Name : CIVIL & MECHANICAL WORKSHOP

Course Outcome Number	Course Outcome
1	Name different devices and tools used for civil engineering measurements
2	Explain the use of various tools and devices for various field measurements
3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work
4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing
5	Identify Basic Mechanical workshop operations in accordance with the material and objects
6	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
7	Apply appropriate safety measures with respect to the mechanical workshop trades

Semester : 2 - Course Code : EST100 - Course Name : ENGINEERING MECHANICS

Course Outcome Number	Course Outcome
1	Recall principles and theorems related to rigid body mechanics
2	Identify and describe the components of system of forces acting on the rigid body
3	Apply the conditions of equilibrium to various practical problems involving different force system
4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Semester : 2 - Course Code : EST102 - Course Name : PROGRAMMING IN C



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators
3	Write readable C programs with arrays, structure or union for storing the the data to be processed
4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
5	Write readable C programs which use pointers for array processing and parameter passing
6	Develop readable C programs with files for reading input and storing output

Semester : 2 - Course Code : EST120 - Course Name : BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering
2	Explain different types of buildings, building components, building materials and building construction
3	Describe the importance, objectives and principles of surveying
4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
5	Discuss the Materials, energy systems, water management and environment for green buildings
6	Analyse thermodynamic cycles and calculate its efficiency
7	Illustrate the working and features of IC Engines
8	Explain the basic principles of Refrigeration and Air Conditioning
9	Describe the working of hydraulic machines
10	Explain the working of power transmission elements
11	Describe the basic manufacturing, metal joining and machining processes

Semester : 2 - Course Code : HUN102 - Course Name : PROFESSIONAL COMMUNICATION

Course Outcome Number	Course Outcome
1	Develop vocabulary and language skills relevant to engineering as a profession
2	Analyze, interpret and effectively summarize a variety of textual content
3	Create effective technical presentations
4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
6	Create professional and technical documents that are clear and adhering to all the necessary conventions

Semester : 2 - Course Code : MAT102 - Course Name : VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Course Outcome Number	Course Outcome
1	Apply the concept of vector functions and learn to work with conservative vector field



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NAAC Cycle 2

Criterion: 2.6.1

2	Apply computing integrals of scalar and vector field over surfaces in three-dimensional space
3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
4	Apply Laplace transforms to solve physical problems arising in engineering
5	Apply Fourier transforms to solve physical problems arising in engineering

Semester : 3 - Course Code : HUT200 - Course Name : PROFESSIONAL ETHICS

Course Outcome Number	Course Outcome
1	Understand the core values that shape the ethical behaviour of a professional.
2	Adopt a good character and follow an ethical life
3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
4	Solve moral and ethical problems through exploration and assessment by established experiments
5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Semester : 3 - Course Code : MAT201 - Course Name : PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS

Course Outcome Number	Course Outcome
1	Understand the concept and the solution of partial differential equation
2	Analyse and solve one dimensional wave equation and heat equation.
3	Understand complex functions, its continuity differentiability with the use of CauchyRiemann equations.
4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.

Semester : 3 - Course Code : MCN201 - Course Name : SUSTAINABLE ENGINEERING

Course Outcome Number	Course Outcome
1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
2	Explain the different types of environmental pollution problems and their sustainable solutions
3	Discuss the environmental regulations and standards
4	Outline the concepts related to conventional and non-conventional energy
5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Semester : 3 - Course Code : MEL201 - Course Name : COMPUTER AIDED MACHINE DRAWING

Course Outcome Number	Course Outcome
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Criterion: 2.6.1

1	Apply the knowledge of engineering drawings and standards to prepare standard dimensioned drawings of machine parts and other engineering components.
2	Prepare standard assembly drawings of machine components and valves using part drawings and bill of materials
3	Apply limits and tolerances to components and choose appropriate fits for given assemblies
4	Interpret the symbols of welded, machining and surface roughness on the component drawings.
5	Prepare part and assembly drawings and Bill of Materials of machine components and valves using CAD software.

Semester : 3 - Course Code : MEL203 - Course Name : MATERIALS TESTING LAB

Course Outcome Number	Course Outcome
1	To understand the basic concepts of analysis of circular shafts subjected to torsion.
2	To understand the behaviour of engineering component subjected to cyclic loading and failure concepts
3	Evaluate the strength of ductile and brittle materials subjected to compressive, Tensile shear and bending forces
4	Evaluate the microstructural morphology of ductile or brittle materials and its fracture modes (ductile /brittle fracture) during tension test
5	To specify suitable material for applications in the field of design and manufacturing

Semester : 3 - Course Code : MET201 - Course Name : MECHANICS OF SOLIDS

Course Outcome Number	Course Outcome
1	Determine the stresses, strains and displacements of structures by tensorial and graphical (Mohr's circle) approaches
2	Analyse the strength of materials using stress-strain relationships for structural and thermal loading
3	Perform basic design of shafts subjected to torsional loading and analyse beams subjected to bending moments
4	Determine the deformation of structures subjected to various loading conditions using strain energy methods
5	Estimate the strength of thin cylinders, spherical vessels and columns, and appreciate the theories of failures and its relevance in mechanical design

Semester : 3 - Course Code : MET203 - Course Name : MECHANICS OF FLUIDS

Course Outcome Number	Course Outcome
1	Define Properties of Fluids and Solve hydrostatic problems
2	Explain fluid kinematics and Classify fluid flows
3	Interpret Euler and Navier-Stokes equations and Solve problems using Bernoulli's equation
4	Evaluate energy losses in pipes and sketch energy gradient lines
5	Explain the concept of boundary layer and its applications
6	Use dimensional Analysis for model studies

Semester : 3 - Course Code : MET205 - Course Name : METALLURGY & MATERIAL SCIENCE



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Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Understand the basic chemical bonds, crystal structures (BCC, FCC, and HCP), and their relationship with the properties
2	Analyze the microstructure of metallic materials using phase diagrams and modify the microstructure and properties using different heat treatments.
3	How to quantify mechanical integrity and failure in materials
4	Apply the basic principles of ferrous and non-ferrous metallurgy for selecting materials for specific applications.
5	Define and differentiate engineering materials on the basis of structure and properties for engineering applications.

Semester : 4 - Course Code : EST200 - Course Name : DESIGN AND ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the different concepts and principles involved in design engineering
2	Apply design thinking while learning and practicing engineering
3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Semester : 4 - Course Code : MAT202 - Course Name : PROBABILITY, STATISTICS AND NUMERICAL METHODS

Course Outcome Number	Course Outcome
1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena
2	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena
3	Perform statistical inferences concerning characteristics of a population based on attributes of samples drawn from the population
4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations

Semester : 4 - Course Code : MCN202 - Course Name : CONSTITUTION OF INDIA

Course Outcome Number	Course Outcome
1	Explain the background of the present constitution of India and features
2	Utilize the fundamental rights and duties
3	Understand the working of the union executive, parliament and judiciary
4	Understand the working of the state executive, legislature and judiciary
5	Utilize the special provisions and statutory institutions
6	Show national and patriotic spirit as responsible citizens of the country

Semester : 4 - Course Code : MEL202 - Course Name : FM & HM LAB



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Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Determine the coefficient of discharge of flow measuring devices (notches, orifice meter and Venturi meter)
2	Calibrate flow measuring devices (notches, orifice meter and Venturi meter)
3	Evaluate the losses in pipes
4	Determine the metacentric height and stability of floating bodies
5	Determine the efficiency and plot the characteristic curves of different types of pumps and turbines

Semester : 4 - Course Code : MEL204 - Course Name : MACHINE TOOLS LAB- I

Course Outcome Number	Course Outcome
1	The students can operate different machine tools with understanding of work holders and operating principles to produce different part features to the desired quality
2	Apply cutting mechanics to metal machining based on cutting force and power consumption
3	Select appropriate machining processes and process parameters for different metals
4	Fabricate and assemble various metal components by welding and students will be able to visually examine their work and that of others for discontinuities and defects
5	Infer the changes in properties of steel on annealing, normalizing, hardening and tempering

Semester : 4 - Course Code : MET202 - Course Name : ENGINEERING THERMODYNAMICS

Course Outcome Number	Course Outcome
1	Understand basic concepts and laws of thermodynamics
2	Conduct first law analysis of open and closed systems
3	Determine entropy and availability changes associated with different processes
4	Understand the application and limitations of different equations of state
5	Determine change in properties of pure substances during phase change processes
6	Evaluate properties of ideal gas mixtures

Semester : 4 - Course Code : MET204 - Course Name : MANUFACTURING PROCESS

Course Outcome Number	Course Outcome
1	Illustrate the basic principles of foundry practices and special casting processes, their advantages, limitations and applications
2	Categorize welding processes according to welding principle and material
3	Understand requirements to achieve sound welded joint while welding different similar and dissimilar engineering materials
4	Student will estimate the working loads for pressing, forging, wire drawing etc. processes
5	Recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints

Semester : 4 - Course Code : MET206 - Course Name : FLUID MACHINERY

Course Outcome Number	Course Outcome
1	Explain the characteristics of centrifugal and reciprocating pumps



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Criterion: 2.6.1

2	Calculate forces and work done by a jet on fixed or moving plate and curved plates
3	Explain the working of turbines and Select a turbine for specific application
4	Analyse the working of air compressors and Select the suitable one based on application
5	Analyse gas turbines and Identify the improvements in basic gas turbine cycles

Semester : 5 - Course Code : HUT300 - Course Name : INDUSTRIAL ECONOMICS & FOREIGN TRADE

Course Outcome Number	Course Outcome
1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level)
2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production
3	Determine the functional requirement of a firm under various competitive conditions
4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
5	Determine the impact of changes in global economic policies on the business opportunities of a firm

Semester : 5 - Course Code : MCN301 - Course Name : DISASTER MANAGEMENT

Course Outcome Number	Course Outcome
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level:
5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level

Semester : 5 - Course Code : MEL331 - Course Name : MACHINE TOOLS LAB II

Course Outcome Number	Course Outcome
1	Apply the procedures to measure length, angles, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments and by different indirect methods
2	Determine limits and fits and allocate tolerances for machine components
3	CNC programming and to use coordinate measuring machine to record measurements of complex profiles with high sensitivity
4	Use effective methods of measuring straightness, Squareness, flatness, roundness, profile, screw threads and gear teeth.



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NAAC Cycle 2

Criterion: 2.6.1

5	Securing knowledge of manufacturing components within the tolerance limit and surface roughness according to given drawings using various machine tools
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Semester : 5 - Course Code : MEL333 - Course Name : THERMAL ENGINEERING LAB 1

Course Outcome Number	Course Outcome
1	Measure thermo-physical properties of solid, liquid and gaseous fuels
2	Identify various systems and subsystems of Diesel and petrol engines
3	Analyse the performance characteristics of internal combustion engines
4	Investigate the emission characteristics of exhaust gases from IC Engines
5	Interpret the performance characteristics of air compressors / blowers

Semester : 5 - Course Code : MET301 - Course Name : MECHANICS OF MACHINERY

Course Outcome Number	Course Outcome
1	Explain the fundamentals of kinematics, various planar mechanisms and interpret the basic principles of mechanisms and machines
2	Perform analysis and synthesis of mechanisms
3	Solve the problem on cams and gear drives, including selection depending on requirement
4	Calculate the gyroscopic effect in various situations
5	Analyse rotating and reciprocating masses for its unbalance

Semester : 5 - Course Code : MET303 - Course Name : THERMAL ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the working of steam power cycle and related components
2	Discuss the working of steam turbines and methods for evaluating the performance
3	Illustrate the performance testing and evaluation of IC engines
4	Explain the combustion phenomenon and pollution in IC engines
5	Discuss the principles of refrigeration and air-conditioning and basic design considerations

Semester : 5 - Course Code : MET305 - Course Name : INDUSTRIAL & SYSTEMS ENGINEERING

Course Outcome Number	Course Outcome
1	Implement various tools and techniques in industrial engineering
2	Calculate the inventory system for a given requirement
3	Explain the importance of industrial relations
4	Select the lean manufacturing tools to find and eliminate wastes
5	Identify the framework of agile manufacturing
6	Identify core and extended modules of enterprise resource planning

Semester : 5 - Course Code : MET307 - Course Name : MACHINE TOOLS AND METROLOGY

Course Outcome Number	Course Outcome
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Criterion: 2.6.1

1	Analyze various machining process and calculate relevant quantities such as velocities, forces and powers.
2	Analyze of the tool nomenclature with surface roughness obtainable in each machining processes.
3	Understand the limitations of various machining process with regard to shape formation and surface texture.
4	Demonstrate knowledge of the underlying principles of measurement, as they relate to mechanical measurement, electronic instrumentation, and thermal effects.
5	Get an exposure to advanced measuring devices and machine tool metrology

Semester : 6 - Course Code : HUT310 - Course Name : MANAGEMENT FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Explain the characteristics of management in the contemporary context
2	Describe the functions of management
3	Demonstrate ability in decision making process and productivity analysis
4	Illustrate project management technique and develop a project schedule
5	Summarize the functional areas of management
6	Comprehend the concept of entrepreneurship and create business plans

Semester : 6 - Course Code : MEL332 - Course Name : COMPUTER AIDED DESIGN & ANALYSIS LAB

Course Outcome Number	Course Outcome
1	Gain working knowledge in Computer Aided Design and modelling procedures
2	Gain knowledge in creating solid machinery parts.
3	Gain knowledge in assembling machine elements.
4	Gain working knowledge in Finite Element Analysis.
5	Solve simple structural, heat and fluid flow problems using standard software

Semester : 6 - Course Code : MEL334 - Course Name : THERMAL ENGINEERING LAB-II

Course Outcome Number	Course Outcome
1	Evaluate thermal properties of materials in conduction, convection and radiation
2	Analyse the performance of heat exchangers
3	Illustrate the operational performances of refrigeration and air conditioning systems
4	Perform calibration of thermocouples and pressure gauges

Semester : 6 - Course Code : MET302 - Course Name : HEAT & MASS TRANSFER

Course Outcome Number	Course Outcome
1	Apply principles of heat and mass transfer to engineering problems
2	Analyse and obtain solutions to problems involving various modes of heat transfer
3	Design heat transfer systems such as heat exchangers, fins, radiation shields etc.



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NAAC Cycle 2

Criterion: 2.6.1

4

Define laminar and turbulent boundary layers and ability to formulate energy equation in flow systems.

Semester : 6 - Course Code : MET304 - Course Name : DYNAMICS AND DESIGN OF MACHINERY

Course Outcome Number	Course Outcome
1	Do engine force analysis and to draw turning moment diagrams
2	Analyse free and forced vibrations of single degree of freedom systems
3	Determine the natural frequencies of a two degree of freedom vibrating system and to
4	calculate the stresses in a structural member due to combined loading
5	Design machine elements subjected to fatigue loading and riveted joints
6	Design welded joint and close coiled helical compression spring

Semester : 6 - Course Code : MET306 - Course Name : ADVANCED MANUFACTURING ENGINEERING

Course Outcome Number	Course Outcome
1	To be conversant with the advanced machining process and to appreciate the effect of process parameters on the surface integrity aspects during the advanced machining process.
2	To understand interpolation, NC and CNC programming and apply it for simple problem and select appropriate tooling and fixtures.
3	To categorize the various nontraditional material removal process based on energy sources and mechanism employed.
4	Analyze the processes and evaluate the role of each process parameter during micro machining of various advanced material removal processes and to understand non-traditional forming processes, high velocity forming, explosive forming and electrohydraulic forming.
5	Explain the processes used in additive manufacturing for a range of materials and applications.

Semester : 6 - Course Code : MET308 - Course Name : COMPREHENSIVE COURSE WORK

Course Outcome Number	Course Outcome
1	Learn to prepare for a competitive examination
2	Comprehend the questions in Mechanical Engineering field and answer them with confidence
3	Communicate effectively with faculty in scholarly environments
4	Analyze the comprehensive knowledge gained in basic courses in the field of Mechanical Engineering

Semester : 6 - Course Code : MET352 - Course Name : AUTOMOBILE ENGINEERING

Course Outcome Number	Course Outcome
1	Explain different automotive systems and subsystems
2	Illustrate the principles of transmission, suspension, steering and braking systems of an automobile.
3	Build a basic knowledge about the technology in electric vehicles.
4	Summarize the concept of aerodynamics in automobiles.



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NAAC Cycle 2

Criterion: 2.6.1

Semester : 7 - Course Code : AET425 - Course Name : BIOMEDICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the basic idea about the biomedical engineering technology
2	Explain the principle and working of different types of bio medical electronic equipment/device
3	Understand the electrical muscle activities and to measure it
4	Analyze the brain wave activities and abnormalities
5	Illustrate the principles of modern medical diagnosing machines

Semester : 7 - Course Code : CET415 - Course Name : ENVIRONMENTAL IMPACT ASSESSMENT

Course Outcome Number	Course Outcome
1	Explain the need for minimizing the environmental impacts of developmental activities
2	Outline environmental legislation & clearance procedure in the country
3	Apply various methodologies for assessing the environmental impacts of any developmental activity
4	Prepare an environmental impact assessment report
5	Conduct an environmental audit

Semester : 7 - Course Code : CSE445 - Course Name : PYTHON FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs (Cognitive Knowledge level: Apply)
2	Illustrate uses of conditional (if, if-else, if-elif-else and switch-case) and iterative (while and for) statements in Python programs (Cognitive Knowledge level: Apply)
3	Develop programs by utilizing the modules Lists, Tuples, Sets and Dictionaries in Python (Cognitive Knowledge level: Apply)
4	Implement Object Oriented programs with exception handling (Cognitive Knowledge level: Apply)
5	Analyze, Interpret, and Visualize data according to the target application (Cognitive Knowledge level: Apply)
6	Develop programs in Python to process data stored in files by utilizing the modules Numpy, Matplotlib, and Pandas (Cognitive Knowledge level: Apply)

Semester : 7 - Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the theories of accident causation and preventive measures of industrial accidents.
2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)
4	Describe various hazards associated with different machines and mechanical material handling.



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NAAC Cycle 2

Criterion: 2.6.1

5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)
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Semester : 7 - Course Code : MED415 - Course Name : PROJECT PHASE I

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 7 - Course Code : MEL411 - Course Name : MECHANICAL ENGINEERING LAB

Course Outcome Number	Course Outcome
1	Get practical knowledge on design and analysis of mechanisms in the machines.
2	Measure the cutting forces associated with milling machining operations.
3	Apply the basic concepts of hydraulic and pneumatic actuators and their applications in product and processes
4	Use appropriate systems for data acquisition and control of product and processes

Semester : 7 - Course Code : MEQ413 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
3	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
4	Give a presentation about an academic document (Cognitive knowledge level: Apply).
5	Prepare a technical report (Cognitive knowledge level: Create).

Semester : 7 - Course Code : MET401 - Course Name : DESIGN OF MACHINE ELEMENTS

Course Outcome Number	Course Outcome
1	Design shafts based on strength, rigidity and design for static and fatigue loads, design flat belts and connecting rod of IC engines
2	Design clutches and brakes
3	Analyse sliding contact bearings and understand design procedure of journal, ball and roller bearings.



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NAAC Cycle 2

Criterion: 2.6.1

4	Design Spur gear and helical gear
5	Design Bevel gears and worm gears

Semester : 7 - Course Code : MET473 - Course Name : AIR CONDITIONING AND REFRIGERATION

Course Outcome Number	Course Outcome
1	Explain the basics of refrigeration process.
2	Analyse the vapour compression refrigeration system and to improve the performance.
3	Describe vapour absorption and steam refrigeration system.
4	Design refrigeration system by selecting suitable components and environmentally refrigerant.
5	Evaluate the cooling load and capacity requirement of ac machine

Semester : 7 - Course Code : AET425 - Course Name : BIOMEDICAL ENGINEERING

Course Outcome Number	Course Outcome
1	Describe the basic idea about the biomedical engineering technology
2	Explain the principle and working of different types of bio medical electronic equipment/device
3	Understand the electrical muscle activities and to measure it
4	Analyze the brain wave activities and abnormalities
5	Illustrate the principles of modern medical diagnosing machines

Semester : 7 - Course Code : CET415 - Course Name : ENVIRONMENTAL IMPACT ASSESSMENT

Course Outcome Number	Course Outcome
1	Explain the need for minimizing the environmental impacts of developmental activities
2	Outline environmental legislation & clearance procedure in the country
3	Apply various methodologies for assessing the environmental impacts of any developmental activity
4	Prepare an environmental impact assessment report
5	Conduct an environmental audit

Semester : 7 - Course Code : CSE445 - Course Name : PYTHON FOR ENGINEERS

Course Outcome Number	Course Outcome
1	Write, test and debug Python programs (Cognitive Knowledge level: Apply)
2	Illustrate uses of conditional (if, if-else, if-elif-else and switch-case) and iterative (while and for) statements in Python programs (Cognitive Knowledge level: Apply)
3	Develop programs by utilizing the modules Lists, Tuples, Sets and Dictionaries in Python (Cognitive Knowledge level: Apply)
4	Implement Object Oriented programs with exception handling (Cognitive Knowledge level: Apply)
5	Analyze, Interpret, and Visualize data according to the target application (Cognitive Knowledge level: Apply)
6	Develop programs in Python to process data stored in files by utilizing the modules Numpy, Matplotlib, and Pandas (Cognitive Knowledge level: Apply)

Semester : 7 - Course Code : MCN401 - Course Name : INDUSTRIAL SAFETY ENGINEERING



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Describe the theories of accident causation and preventive measures of industrial accidents.
2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)
4	Describe various hazards associated with different machines and mechanical material handling.
5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)

Semester : 7 - Course Code : MED415 - Course Name : PROJECT PHASE I

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).

Semester : 7 - Course Code : MEL411 - Course Name : MECHANICAL ENGINEERING LAB

Course Outcome Number	Course Outcome
1	Get practical knowledge on design and analysis of mechanisms in the machines.
2	Measure the cutting forces associated with milling machining operations.
3	Apply the basic concepts of hydraulic and pneumatic actuators and their applications in product and processes
4	Use appropriate systems for data acquisition and control of product and processes

Semester : 7 - Course Code : MEQ413 - Course Name : SEMINAR

Course Outcome Number	Course Outcome
1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
3	Prepare a presentation about an academic document (Cognitive knowledge level: Create).



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NAAC Cycle 2

Criterion: 2.6.1

4	Give a presentation about an academic document (Cognitive knowledge level:Apply).
5	Prepare a technical report (Cognitive knowledge level: Create).

Semester : 7 - Course Code : MET401 - Course Name : DESIGN OF MACHINE ELEMENTS

Course Outcome Number	Course Outcome
1	Design shafts based on strength, rigidity and design for static and fatigue loads, design flat belts and connecting rod of IC engines
2	Design clutches and brakes
3	Analyse sliding contact bearings and understand design procedure of journal, ball and roller bearings.
4	Design Spur gear and helical gear
5	Design Bevel gears and worm gears

Semester : 7 - Course Code : MET473 - Course Name : AIR CONDITIONING AND REFRIGERATION

Course Outcome Number	Course Outcome
1	Explain the basics of refrigeration process.
2	Analyse the vapour compression refrigeration system and to improve the performance.
3	Describe vapour absorption and steam refrigeration system.
4	Design refrigeration system by selecting suitable components and environmentally refrigerant.
5	Evaluate the cooling load and capacity requirement of ac machine

Semester : 8 - Course Code : MED416 - Course Name : PROJECT PHASE II

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 8 - Course Code : MET402 - Course Name : MECHATRONICS

Course Outcome Number	Course Outcome
1	Explain the sensors and actuators used in mechatronics
2	Design hydraulic and pneumatic circuits for automation.
3	Explain the manufacturing processes used in MEMS
4	Demonstrate the various components of a CNC machine
5	Create a PLC program
6	Explain the robotic sensors and vision system

Semester : 8 - Course Code : MET416 - Course Name : COMPOSITE MATERIALS



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	To understand history about composites, various matrices and reinforcements used in composites
2	To understand types of fibers/ whiskers used in composites, structure, properties and applications, manufacturing process
3	To know about polymer matrix composites, classification, properties, characteristics and applications, manufacturing methods.
4	To know about metal matrix composites, classification, properties, characteristics and applications, manufacturing methods. Alloys and their potential role as matrices in composites. To understand about intermetallics
5	To know about ceramic matrix composites, classification, properties, characteristics and applications, manufacturing methods, micromechanics of composites

Semester : 8 - Course Code : MET458 - Course Name : ADVANCED ENERGY ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the concept of various types of power generation
2	Explain solar and wind power generation and its economics
3	Explain biomass energy sources and its economics
4	Explain various renewable energy sources
5	Explain environmental impacts of various energy generation

Semester : 8 - Course Code : MET464 - Course Name : MICRO AND NANO MANUFACTURING

Course Outcome Number	Course Outcome
1	Explain different techniques used in micro and nano manufacturing
2	Describe conventional techniques used in micro manufacturing.
3	Describe non-conventional micro-nano manufacturing approaches.
4	Outline the working principle and applications of micro and nano finishing processes
5	Explain the basics of micro and nano fabrication techniques.
6	Apply and select metrology systems in micro and nano manufacturing.

Semester : 8 - Course Code : MED416 - Course Name : PROJECT PHASE II

Course Outcome Number	Course Outcome
1	Model and solve real world problems by applying knowledge across domains
2	Develop products, processes or technologies for sustainable and socially relevant applications
3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
5	Identify technology/research gaps and propose innovative/creative solutions
6	Organize and communicate technical and scientific findings effectively in written and oral forms

Semester : 8 - Course Code : MET402 - Course Name : MECHATRONICS



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NAAC Cycle 2

Criterion: 2.6.1

Course Outcome Number	Course Outcome
1	Explain the sensors and actuators used in mechatronics
2	Design hydraulic and pneumatic circuits for automation.
3	Explain the manufacturing processes used in MEMS
4	Demonstrate the various components of a CNC machine
5	Create a PLC program
6	Explain the robotic sensors and vision system

Semester : 8 - Course Code : MET416 - Course Name : COMPOSITE MATERIALS

Course Outcome Number	Course Outcome
1	To understand history about composites, various matrices and reinforcements used in composites
2	To understand types of fibers/ whiskers used in composites, structure, properties and applications, manufacturing process
3	To know about polymer matrix composites, classification, properties, characteristics and applications, manufacturing methods.
4	To know about metal matrix composites, classification, properties, characteristics and applications, manufacturing methods. Alloys and their potential role as matrices in composites. To understand about intermetallics
5	To know about ceramic matrix composites, classification, properties, characteristics and applications, manufacturing methods, micromechanics of composites

Semester : 8 - Course Code : MET458 - Course Name : ADVANCED ENERGY ENGINEERING

Course Outcome Number	Course Outcome
1	Explain the concept of various types of power generation
2	Explain solar and wind power generation and its economics
3	Explain biomass energy sources and its economics
4	Explain various renewable energy sources
5	Explain environmental impacts of various energy generation

Semester : 8 - Course Code : MET464 - Course Name : MICRO AND NANO MANUFACTURING

Course Outcome Number	Course Outcome
1	Explain different techniques used in micro and nano manufacturing
2	Describe conventional techniques used in micro manufacturing.
3	Describe non-conventional micro-nano manufacturing approaches.
4	Outline the working principle and applications of micro and nano finishing processes
5	Explain the basics of micro and nano fabrication techniques.
6	Apply and select metrology systems in micro and nano manufacturing.