PRINCETON INSTITUTE OF ENGINEERING & TECHNOLOGY FOR WOMEN

(Approved by AICTE, New Delhi & Affiliated to JNTU, Hyderabad)

Chowdariguda (V), Narapally, Ghatkesar (M), Medchal (D), Telangana – 500 088

Academic Year 2022-23

2.6.1: Course Outcomes offered by the institution are stated and displayed on website and communicated to teachers and students

R18 REGULATION

DEPARTMENT OF CIVIL ENGINEERING

II YEAR- I Semester

Course:SURVEYING & GEOMATICS (CE301PC)
Upon completion of the course, the students will be able to:
CO1: Calculate angles, distances and levels
CO2: Identify data collection methods and prepare field notes
CO3: Understand the working principles of survey instruments
CO4: Estimate measurement errors and apply corrections
CO5: Intrepret survey data and compute areas and volumes
Course:ENGINEERING GEOLOGY (CE302PC)
Upon completion of the course, the students will be able to:
CO1: Understanding weathering process and mass movement.
CO2: Distinguish geological formations.
CO3: Identify geological structures and processes for rock mass quality.
CO4: Identify subsurface information and groundwater potential sites through geophysical investigations.
CO5: Apply geological principles fr mitigration of natural hazards and select sites for dams and tunnels.
Course:STRENGTH OF MATERIALS-I (CE303PC)
Upon completion of the course, the students will be able to:
CO1: Describe the theory of stress, strain, forces, moment, torsion, deflection, principal stresses and principal plane.

CO2:	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
CO3:	Compute elastic constants, deflection, bending and torsional behavior of shaft and springs.
CO4:	Analyze the beams, trusses, shaft and springs using alternate methods.
CO5:	Draw shear force and bending moment diagram for beams and Mohr's circle for principal plane.

Course:PROBABILITY AND STATISTICS (MA304BS)

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

CO1:	Understand the concepts of discrete probability, conditional probability, independence and be able to apply these concepts to engineering applications
CO2:	Be able to use statistical concepts to analyze and interpret engineering data.
CO3:	Equipping students with essential tools for statistical anayses at the graduate level.
CO4:	Providing students with a formal treatment of probability theory.
CO5:	Formulate and solve problems involving random cariables and apply statistical methods for analyzing experimental data.

Course:FLUID MECHANICS (CE305PC)

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

CO1:	Apply conseervation laws to derive governing equation of fluid flows.
CO2:	Compute hydrostatic and hydrodynamic forces.
CO3:	Analyze and design simple pipe systems.
CO4:	Apply principles of dimensioinal analysis to design experiments.
CO5:	Compute drag and lift coefficients.

Course:SURVEYING LAB (CE306PC)

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

CO1:	Able to perform chains survey & plotting of closed traverse and also obstacles.
CO2:	Determine distance between two inaccessible points with compass.
CO3:	Perform reduced level & distances using techometric survey.
CO4:	Able to perform trignometric leveling using theodelite for heights and distances problems.
CO5:	Determines Radiation method, intersection methods by plane table survey.

Course:STRENGTH OF MATERIALS LAB (CE307PC)

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

CO1:	Conduct tension test on Materials like steel etc.

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CO2: Conduct compresion tests on spring, wood & Concrete.
CO3: Conduct flexural and torsion test to determine elastic constants.
CO4: Detremine hardness of metals.
CO5: Write a technical laboratory report.
Course:ENGINEERING GEOLOGY LAB (CE308PC)
Upon completion of the course, the students will be able to:
CO1: Understanding weathering process and mass movement.
CO2: Distinguish geological formations.
CO3: Identify geological structures and processes for rock mass quality.
CO4: Identify subsurface information and groundwater potential sites through geophysical investigations.
CO5: Apply geological principles fr mitigration of natural hazards and select sites for dams and tunnels.
Course:CONSTITUTION OF INDIA (MC309)
Upon completion of the course, the students will be able to:
CO1: Understand the emergence and evaluation of Indian Constitution.
CO2: Understand the structure and composition of Indian Constitution
CO3: Understand and analyses federalism in the indian context.
CO4: Analyse panchayathi Raj institutions as a medium of decentralization.
CO5: Understand and analyses the three organs of the state in the contemporary scenario.

II YEAR- II Semester

Course: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (EE401ES)
Upon completion of the course, the students will be able to:
CO1: To analyse and solve electrical circuits using network laws and theorems.
CO2: To understand and analyse basic Electric and Magnetic circuits.
CO3: To study the working principles of Electrical Machines.
CO4: To introduce components of Low Voltage Electrical Installations.
CO5: To identify and charcterize diodes and various types of transistors.

Course: BASIC MECHANICAL ENGINEERING FOR CIVIL ENGINEERS (CE402ES)	
Upon completion of the course, the students will be able to:	
CO1:	To understand the mechanical equipment for the usage at civil engineering systems.
CO2:	To familiarize with the general principles and requirement for refrigeration, manufacturing.
CO3:	To realize the techniques employed to construct civil engineering sytems.
CO4:	To understand the manufacturing process for the usage at civil engineering constructions.
CO5:	Learning the design and working process of machine tools for the usage of construction field.
Course: BUILDING MATERIALS, CONSTRUCTION AND PLANNING (CE403PC)	
Upon completion of the course, the students will be able to:	
CO1:	Define the basic terminology that is used in the Industry.
CO2:	Categorize different building materials, properties and ther uses.
CO3:	Understand the Prevention of damage measures and good workmanship.
CO4:	Explain diferent building survices.
CO5:	Explain diferent building plan survices.
Course: STRENGHT OF MATERIALS-II (CE404PC)	
Upon completion of the course, the students will be able to:	
CO1:	Describe the concepts and principles, understand the theory of elasticity and perform caculations, relative to the strength of structures and mechanical components in particular to torsion and direct compression.
CO2:	To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.
CO3:	Analyze strength and stability of structural members subjected to Direct and Indirect Bending Stresses.
CO4:	Understans the evaluate the shear center and unsymmetrical bending.
CO5:	Frame an idea to design a system, component, or process.
Course: HYDRAULIC AND HYDRAULIC MACHINERY (CE405PC)	
Upon completion of the course, the students will be able to:	
CO1:	Apply their knowledge of fluid mechanics in addrressing problems in open channels and hydraulic machinery.
CO2:	Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
CO3:	Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.
CO4:	Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages.
CO5:	Students able to know the performance of single stage and multistage pumps.

Course: STRUCTURAL ANALYSIS-I (CE406PC)
Upon completion of the course, the students will be able to:
CO1: An ability to apply knowledge of mathematics, science and engineering.
CO2: Analyze the statically indeterminate bars and continuous beams.
CO3: Draw strength behaviour of members for static and dynamic loading.
CO4: Calculate the stiffness parameters in beams and pin jointed trusses.
CO5: Understand the indeterminacy aspects to consider for a total structural system.
Course: COMPUTER AIDED CIVIL ENGINEERING DRAWING (CE407PC)
Upon completion of the course, the students will be able to:
CO1: Use the Autocad commands for drawing 2D building drawings required for different civil engineering applications.
CO2: Plan and draw Civil Engineering Buildings as per aspect and orientation.
CO3: Presenting drawinngs as per user requirements and preperation of technical report.
CO4: Use the Autocad commands for drawing 3D building drawings required for different civil engineering applications.
CO5: Plan and draw the views of Buildings as per aspect and orientation.
Course: HYDRAULIC AND HYDRAULIC MACHINERY LAB (CE409PC)
Upon completion of the course, the students will be able to:
CO1: Describe the basic measurement techniques fo fluid mechanics and it appropriate applications.
CO2: Interpret the results obtained in the laboratory for various experiments.
CO3: Discover the practical working of Hydraulic mavnines- different types of Turbines, Pumps and other miscellaneous hydraulic machines.
CO4: Compare the results of analytical models introduced in lecture to the actual behaviour of real fluid flows and draw correct and sustainable conclusions.
CO5: Write a technical laboratory report.
Course: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB (EE409ES)
Upon completion of the course, the students will be able to:
CO1: To analyse and solve electrical circuits using network laws and theorems.
CO2: To understand and analyse basic Electric and Magnetic circuits.
CO3: To study the working principles of Electrical Machines.
CO4: To introduce components of Low Voltage Electrical Installations.
CO5: To identify and charcterize diodes and various types of transistors.

Course: GENDER SENSITIZATION LAB (MC409)
Upon completion of the course, the students will be able to:
CO1: Students will have developed a better understanding of important issues related to gender in contemporary India.
CO2: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
CO3: Students will acquire insight into the gendered division of labour and its relation to politics and economics.
CO4: Men and women students and professionals will be better equipped to work and live together as equals.
CO5: Students will develop a sense of appreciation of women in all walks of life.

III YEAR- I Semester

Course: STRUCTURAL ANALYSIS-II (CE501)
Upon completion of the course, the students will be able to:
CO1: Analyze the two hinged arches.
CO2: Solve statically indeterminate beams and portal frames using classical methods
CO3: Sketch the shear force and bending moment diagrams for indeterminate structures.
CO4: Formula the stiffness matrix and analyze the beams by matrix methods.
CO5: Analyze to know the influence lined for indeterminate structures.
Course: GEOTECHNICAL ENGINEERING (CE502PC)
Upon completion of the course, the students will be able to:
CO1: Characterize and classify the soils
CO2: Able to estimate seepage, stresses under various loading conditions and compaction charatcteristics.
CO3: Able to analyse the compressibility of the soils.
CO4: Able to understand the streng th of soils under various drainage conditions.
CO5: Able to know the failure mechanism and the shear strength of soils.
Course: STRUCTURAL ENGINEERING-I (RCC) (CE503PC)
Upon completion of the course, the students will be able to:
CO1: Compare and design the singly reinforced, doubly reinforced and flanged sections.
CO2: Design the axially loaded, uniaxial and biaxial bending columns.

CO3: Student able to know the design of footings for different foundations.

CO4: Classify the footings and design the isolated square, rectangular and circular footings.

CO5: Distinguish and design the one-way and two-way slabs.

Course: TRANSPORTATION ENGINEERING (CE504PC)

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

CO1: An ability to apply the knowledge of mathematics, science and

CO2: Design the axially loaded, uniaxial and biaxial bending columns.

CO3: Student able to know the design of footings for different foundations.

CO4: Classify the footings and design the isolated square, rectangular and circular footings.

CO5: Distinguish and design the one-way and two-way slabs.

Course: CONCRETE TECHNOLOGY (Professional Elective – I) (CE511PE)

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

CO1: Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the rheology and early age properties of concrete on its long-term behavior.

CO2: Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties.

CO3: Use advanced laboratory techniques to characterize cement-based materials.

CO4: Classify the footings and design the isolated square, rectangular and circular footings.

CO5: concrete, and fibre reinforced concrete.

Course: ENGINEERING ECONOMICS AND ACCOUNTANCY (SM505MS)

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

CO1: To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF Methods.

CO2: To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.

CO3: Evaluate the present and future worth of the alternate projects and to appraise projects by using traditional and DCF Methods.

CO4: Analysis of projects and to calculate BEP of different alternative projects.

CO5: Design and analysis of projects and to calculate BEP of different alternative projects.

Course: HIGHWAY ENGINEERING & CONCRETE TECHNOLOGY LAB (CE506PC)

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

CO1: Categorize the test on materials used Civil Engineering Building & Pavement constructions

CO2: To perform the tests on concrete for it characterization.

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CO3:	To Design Concrete Mix Proportioning by Using Indian Standard Method.
CO4:	Examine the tests performed for Bitumen mixes
CO5:	To prepare a laboratory report

Course: GEOTECHNICAL ENGINEERING LAB (CE507PC)

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

CO1:	Student will be able to Classify and evaluate the behavior of the soils subjected to various loads.
CO2:	Determination of Specific gravity of soil Grain size distribution by sieve analysis
CO3:	Determination of Coefficient of consolidation (square root time fitting method)
CO4:	Permeability of soil by constant and variable head test methods
CO5:	To prepare a laboratory report

Course: ADVANCE COMMUNICATION SKILLS LAB (EN508HS)

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

CO1:	To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and
CO2:	Further, they would be required to communicate their ideas relevantly and coherently in writing.
CO3:	Activities on Fundamentals of Inter-personal Communication and Building Vocabulary.
CO4:	To improve the performance of students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers
CO5:	To prepare all the students for their placements.

Course:INTELLECTUAL PROPERTY RIGHTS (MC509)

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

CO1:	Intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.
CO2:	Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.
CO3:	Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.
CO4:	Trade mark law, copy right law, international patent law, and international development in trade secrets law.
CO5:	Unfair competition: Misappropriation right of publicity, false advertising.

III YEAR- II Semester

Course: HYDROLOGY AND WATER RESOURCES ENGINEERING (CE601PC)

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

CO1: Understand the different concepts and terms used in engineering hydrology.

CO2: To identify and explain various formulae used in estimation of surface and Ground water hydrology components.

CO3: Demonstrate their knowledge to connect hydrology to the field requirement.

CO4: Steady radial flow into well for confined and unconfined aquifers, Recuperation tests.

CO5: Design & explaination of various formulae used in estimation of surface and Ground water hydrology components.

Course: ENVIRONMENTAL ENGINEERING (CE602PC)

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

CO1: Assess characteristics of water and wastewater and their impacts.

CO2: To identify and explain various formulae used in estimation of surface and Ground water hydrology components.

CO3: Estimate quantities of water and waste water and plan conveyance components.

CO4: Design components of water and waste water treatment plants.

CO5: Be conversant with issues of air pollution and control.

Course: FOUNDATION ENGINEERING (CE603PC)

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

CO1: understand the principles and methods of Geotechnical Exploration.

CO2: decide the suitability of soils and check the stability of slopes.

CO3: calculate lateral earth pressures and check the stability of retaining walls.

CO4: analyse and design the shallow and deep foundations.

CO5: Knowing the methods and principles of Exploration of Geotechnic.

Course: STRUCTURAL ENGINEERING – II (STEEL) (CE604PC)

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

CO1: Analyze the tension members, compression members.

CO2: Analyze and Design the beams including built-up sections and beam and connections.

CO3: Design the tension members, compression members and column bases and joints and connections.

CO4: Identify and Design the various components of welded plate girder including stiffeners.

CO5: Design & Analyze the tension & compression members.

Course: PRESTRESSED CONCRETE (Professional Elective – II) (CE611PE)

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

CO1: Acquire the knowledge of evolution of process of prestressing.

CO2: Analyze and Design the beams including built-up sections and beam and connections.

CO3: Develop skills in analysis design of prestressed structural elements as per the IS codal provisions.

CO4: Knowing the knowledge of evolution of process of prestressing.

CO5: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams

Course: FUNDAMENTALS OF INTERNET OF THINGS (Open Elective – I) (EC600OE)

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

CO1: Known basic protocols in sensor networks

CO2: Program and configure Arduino boards for various designs.

CO3: Python programming and interfacing for Raspberry Pi

CO4: Design IoT applications in different domains.

CO5: Learn the programming and use of Arduino and Raspberry Pi boardsstress diagrams.

Course: ENVIRONMENTAL ENGINEERING LAB (CE605PC)

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

CO1: Understand about the equipment used to conduct the test procedures.

CO2: Perform the experiments in the lab.

CO3: Examine and Estimate water, waste water, air and soil Quality.

CO4: Compare the water, air quality standards with prescribed standards set by the local governments.

CO5: Develop a report on the quality aspect of the environment.

Course: COMPUTER AIDED DESIGN LAB (CE606PC)

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

CO1: Model the geometry of real-world structure Represent the physical model of structural element/structure.

CO2: Perform analysis.

CO3: Interpret from the Post processing results.

CO4: Design the structural elements and a system as per IS Codes.

CO5: Analysis & Design of residential building subjected to all loads (DL,LL,WL,EQL).

Course: ENVIRONMENTAL SCIENCE (MC609)

Upon completion of the course, the students will be able to:	
CO1:	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2:	growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
CO3:	Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity.
CO4:	Environmental Pollution and Control Technologies.
CO5:	Environmental Protection act, Legal aspects Air Act- 1981.

IV YEAR- I Semester

Course: ESTIMATION, COSTING AND PROJECT MANAGEMENT (CE701PC)	
Upon completion of the course, the students will be able to:	
CO1:	understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure
CO2:	quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure
CO3:	understandings to others with effective communication processes.
CO4:	An idea how construction projects are administered with respect to contract structures and issues.
CO5:	Design & explaination of various formulae used in estimation of surface and Ground water hydrology components.
Course: GROUND IMPROVEMENT TECHNIQUES (PE – III) (CE712PE)	
Upon completion of the course, the students will be able to:	
CO1:	Know the necessity of ground improvement.
CO2:	Understand the various ground improvement techniques available.
CO3:	Select & design suitable ground improvement technique for existing soil conditions in the field.
CO4:	soils.
CO5:	Geosynthetics, Preloading and vertical drains.
Course: IRRIGATION AND HYDRAULIC STRUCTURES (PE – IV) (CE721PE)	
Upon completion of the course, the students will be able to:	
CO1:	Know types of water retaining structures for multiple purposes and its key parameters considered for planning and designing.
CO2:	Understand details in any Irrigation System and its requirements.
CO3:	Know, Analyze and Design of a irrigation system components.

CO4:	various types of storage works and, diversion headwork, their components and design principles for their construction.
CO5:	modules, proportionality, sensitivity, setting and flexibility.

Course: PYTHON PROGRAMMING (Open Elective - II) (CS702OE)

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

CO1:	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
CO2:	Demonstrate proficiency in handling Strings and File Systems.
CO3:	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO4:	Interpret the concepts of Object-Oriented Programming as used in Python.
CO5:	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

Course: PROFESSIONAL PRACTICE LAW & ETHICS (SM702MS)

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

CO1:	The students will understand the importance of professional practice, Law and Ethics in their personal lives and professional careers
CO2:	The students will learn the rights and responsibilities as an employee, team member and a global citizen.
CO3:	To develop some ideas of the legal and practical aspects of their profession.
CO4:	engineering profession
CO5:	Role of information security professionals.

Course: INDUSTRIAL ORIENTED MINI PROJECT/SUMMER INTERNSHIP (CE703PC)

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

CO1:	Formulate a real world problem and develop its requirements.
CO2:	Ability to plan and execute well defined objective.
CO3:	Ability to work in team at component level.
CO4:	Ability to solve problems on analysis & design.
CO5:	Self learn new software's and/ or techniques that contribute to the software solution of the project.

Course: SEMINAR (CE704PC)

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

CO1:	The students will be able to recall existing technologies in the area of designing
CO2:	The students will be able to describe, compare and evaluate different technologies
CO3:	The students will be able to decide the area of interest

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CO4:	The students will be able to develop their communication skills
CO5:	The students will be able to write technical reports

Course: PROJECT STAGE-I (CE705PC)	
Upon completion of the course, the students will be able to:	
CO1:	Identify the problem statement through literature survey for project work.
CO2:	Develop design strategy for the project work.
CO3:	Apply appropriate modern tools to execute the project work.
CO4:	Evaluate the outcome of the project work.
CO5:	Develop presentation and interpersonal communication skills through project work.

IV YEAR- II Semester

Course: ENVIRONMENTAL IMPACT ASSESSMENT (PE – V) (CE812PE)	
Upon completion of the course, the students will be able to:	
CO1:	Identify the environmental attributes to be considered for the EIA study.
CO2:	Formulate objectives of the EIA studies.
CO3:	Identify the methodology to prepare rapid EIA.
CO4:	Prepare EIA reports and environmental management plans.
CO5:	Understands the environmental Impact assessment procedure.

Course: AIRPORT, RAILWAYS, AND WATERWAYS (PE – VI) (CE821PE)	
Upon completion of the course, the students will be able to:	
CO1:	An ability to design of runways and taxiways.
CO2:	An ability to design the infrastructure for large and small airports.
CO3:	An ability to design various crossings and signals in Railway Projects.
CO4:	An ability plan the harbors and ports projects including the infrastructure required for new ports and harbors.
CO5:	Deal with the characteristics of aircrafts related to airport design; runway and taxiway design, runway orientation, length, grading and drainage

Course: DATABASE MANAGEMENT SYSTEMS (Open Elective - III) (CS803OE)
Upon completion of the course, the students will be able to:

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CO1:	Gain knowledge of fundamentals of DBMS, database design and normal forms.
CO2:	Master the basics of SQL for retrieval and management of data.
CO3:	Be acquainted with the basics of transaction processing and concurrency control.
CO4:	Familiarity with database storage structures and access techniques.
CO5:	To master the basics of SQL and construct queries using SQL.

Course: PROJECT STAGE-II (CE801PC)

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

CO1:	Communication Engineering field.
CO2:	Apply the various methodologies and technologies for solving the problem.
CO3:	Analyze project management skills for solving the problem.
CO4:	Design and develop hardware and/or software for their project specific problem.
CO5:	Formulate the project reports and validate the presentation and demonstration.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

III YEAR- I Semester

Course:POWER ELECTRONICS (EE501PE)

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

CO1:	Understand The Differences Between Signal Level And Power Level Devices. Analyze Controlled Rectifier Circuits.
CO2:	Analyze Controlled Rectifier Circuits.
CO3:	CO3 Analyze The Operation Of DC-DC Choppers.
CO4:	Analyze The Operation Of Voltage Source Inverters.
CO5:	Phase Controller (AC Voltage Regulator)-Introduction.

Course: POWER SYSTEM-II (EE502PE)

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

CO1:	Analyze transmission line performance.

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CO2: Apply load compensation techniques to control reactive power.
CO3: Design over voltage protection and insulation coordination.
CO4: Determine the fault currents for symmetrical and unbalanced faults.
CO5: Sequence networks, fault calculations, sequence network equations.
Course: MEASUREMENTS AND INSTRUMENTATION (EE503PE)
Upon completion of the course, the students will be able to:
CO1: Understand Different Types Of Measuring Instruments, Their Construction, Operation And Characteristics.
CO2: Identify The Instruments Suitable For Typical Measurements.
CO3: Apply The Knowledge About Transducers And Instrument Transformers To Use Them Effectively.
CO4: Apply The Knowledge Of Smart And Digital Metering For Industrial Applications.
CO5: Electrical Transducers, Characteristics And Choice Of Transducers.
Course: HIGH VOLTAGE ENGINEERING (Professional Elective-I) (EE512PE)
Upon completion of the course, the students will be able to:
CO1: Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials.
CO2: Knowledge of generation and measurement of D. C., A.C., & Impulse voltages.
CO3: Knowledge of tests on H. V. equipment and on insulating materials, as per the standards.
CO4: Knowledge of how over-voltages arise in a power system, and protection against these overvoltages.
CO5: High voltage laboratory layout, indoor and outdoor laboratories.
Course: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (SM504MS)
Upon completion of the course, the students will be able to:
CO1: The Students Will Understand The Various Forms Of Business And The Impact Of Economic Variables On The Business.
CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing Aspects Are Learnt.
CO3: The Students Can Study The Firm's Financial Position By Analysing The Financial Statements Of A Company.
CO4: Financial Analysis Through Ratios.
CO5: Short Run And Long Run Cost Functions
Course: POWER SYSTEM SIMULATION LAB (EE505PC)
Upon completion of the course, the students will be able to:
CO1: Perform various transmission line calculations

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CO2: Understand Different circuits time constants
CO3: Analyze the experimental data and draw the conclusions
CO4: To perform resonance circuit simulation
CO5: To perform parameter estimation and fault analysis on Transmission lines
Course: POWER ELECTRONICS LAB (EE506PC)
Upon completion of the course, the students will be able to:
CO1: Understand the operating principles of various power electronic converters
CO2: Use power electronic simulation packages& hardware to develop the power converters
CO3: Analyze and choose the appropriate converters for various applications
CO4: Design the power converter with suitable switches meeting a specific load requirement.
CO5: The concepts of power electronic converters for efficient conversion/control of power from source to load.
Course: MEASUREMENTS AND INSTRUMENTATION LAB (EE507PC)
Upon completion of the course, the students will be able to:
CO1: to choose instruments
CO2: test any instrument
CO3: find the accuracy of any instrument by performing experiment
CO4: calibrate PMMC instrument using D.C potentiometer
CO5: To calibrate LPF Watt Meter, energy meter, P. F Meter using electro dynamo meter type instrument as the standard instrument
Course: ADVANCED COMMUNICATION SKILLS LAB (EN508HS)
Upon completion of the course, the students will be able to:
CO1: To Improve The Students' Fluency In English, Through A Well-Developed
CO2: Further, they would be required to communicate their ideas relevantly and coherently in writing.
CO3: To prepare all the students for their placements.
CO4: Transferring information from non-verbal to verbal texts and vice-versa.
CO5: Gathering ideas and information to organize ideas relevantly and coherently.
Course: INTELLECTUAL PROPERTY RIGHTS (MC510)
Upon completion of the course, the students will be able to:
CO1: Intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

CO2:	Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.
CO3:	Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation
CO4:	Trade mark law, copy right law, international patent law, and international development in trade secrets law.
CO5:	Unfair competition: Misappropriation right of publicity, false advertising.

III YEAR- II Semester

Course: DISASTER PREPAREDNESS & PLANNING MANAGEMENT (Open Elective - I) (CE600OE)	
Upon completion of the course, the students will be able to:	
CO1:	the application of Disaster Concepts to Management
CO2:	Analyzing Relationship between Development and Disasters
CO3:	Ability to understand Categories of Disasters.
CO4:	Realization of the responsibilities to society.
CO5:	To understand Impacts of Disasters Key Skills
Course: POWER SEMICONDUCTOR DRIVES (Professional Elective - II) (EE612PE)	
Upon completion of the course, the students will be able to:	
CO1:	Identify the drawbacks of speed control of motor by conventional methods
CO2:	Differentiate Phase controlled and chopper-controlled DC drives speed-torque characteristics merits and demerits
CO3:	Understand Ac motor drive speed–torque characteristics using different control strategies its merits and demerits
CO4:	Describe Slip power recovery schemes
CO5:	To differentiate DC and AC drives
Course: SIGNALS AND SYSTEMS (EE601PC)	
Upon completion of the course, the students will be able to:	
CO1:	Differentiate various signal functions
CO2:	Represent any arbitrary signal in time and frequency domain
CO3:	Understand the characteristics of linear time invariant systems.
CO4:	Analyze the signals with different transform technique
CO5:	To understand the characteristics of LTI systems.

Course: MICROPROCESSORS & MICROCONTROLLERS (EE602PC)
Upon completion of the course, the students will be able to:
CO1: Understands the internal architecture, organization and assembly language programming of 8086 processors.
CO2: Understands the internal architecture, organization and assembly language programming of 8051/controllers
CO3: Understands the interfacing techniques to 8086 and 8051 based systems.
CO4: Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors.
CO5: To provide the knowledge about interfacing techniques of bus & memory.
Course: POWER SYSTEM PROTECTION (EE603PC)
Upon completion of the course, the students will be able to:
CO1: Compare and contrast electromagnetic, static and microprocessor-based relays
CO2: Apply technology to protect power system components.
CO3: Select relay settings of over current and distance relays.
CO4: Analyze quenching mechanisms used in air, oil and vacuum circuit breakers
CO5: To describe neutral grounding for overall protection
Course: POWER SYSTEM OPERATION AND CONTROL (EE604PC)
Upon completion of the course, the students will be able to:
CO1: Understand operation and control of power systems.
CO2: Analyze various functions of Energy Management System (EMS) functions
CO3: Analyze whether the machine is in stable or unstable position.
CO4: Understand power system deregulation and restructuring .
CO5: To know the importance of frequency control
Course: POWER SYSTEM LAB (EE605PC)
Upon completion of the course, the students will be able to:
CO1: Perform various load flow techniques
CO2: Understand Different protection methods
CO3: Analyze the experimental data and draw the conclusions.
CO4: To find sequence impedances of 3-Φ synchronous machine and Transformer
CO5: perform testing of CT, PT's and Insulator strings

Course: MICROPROCESSORS & MICROCONTROLLERS LAB (EE606PC)
Upon completion of the course, the students will be able to:
CO1: Assembly Language Programs to 8086 to Perform Arithmetic, Logical, String Operations on 16 Bit and 32-Bit Data.
CO2: Assembly Language Programs to 8086 to Perform Bit level Logical Operations, Rotate, Shift, Swap and Branch Operations
CO3: Time delay Generation Using Timers of 8051.
CO4: Sequence Generator Using Serial Interface in 8051.
CO5: Triangular Wave Generator through DAC interfaces to 8051.
Course: SIGNALS AND SYSTEMS LAB (EE607PC)
Upon completion of the course, the students will be able to:
CO1: Understand the concepts of continuous time and discrete time systems.
CO2: Analyse systems in complex frequency domain.
CO3: Understand sampling theorem and its implications
CO4: To know the various transform techniques
CO5: To develop ability to analyze linear systems and signals
Course: ENVIRONMENTAL SCIENCE (MC609)
Upon completion of the course, the students will be able to:
CO1: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
CO3: Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity.
CO4: Environmental Pollution and Control Technologies.
CO5: Environmental Protection act, Legal aspects Air Act- 1981.

IV YEAR- I Semester

Course: REMOTE SENSING & GIS (Open Elective - II) (CE700OE)
Upon completion of the course, the students will be able to:
CO1: Describe different concepts and terms used in Remote Sensing and its data
CO2: Understand the Data conversion and Process in different coordinate systems of GIS interface

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CO3:	Evaluate the accuracy of Data and implementing a GIS
CO4:	Understand the applicability of RS and GIS for various applications
CO5:	know the concept of Geographical Information System (GIS), coordinate system GIS Data and its types
Course: DIGITAL SIGNAL PROCESSING (PE – III) (EE712PE)	
Upon completion of the course, the students will be able to:	
CO1:	Understand the LTI system characteristics and Multirate signal processing
CO2:	Design a digital filter for a given specification
CO3:	Understand the inter-relationship between DFT and various transforms
CO4:	Understand the applicability of RS and GIS for various applications
CO5:	Understand the significance of various filter structures and effects of round off errors
Course: HVDC TRANSMISSION (PE – IV) (EE721PE)	
Upon completion of the course, the students will be able to:	
CO1:	Compare EHV AC and HVDC system and to describe various types of DC links
CO2:	Analyze Graetz circuit for rectifier and inverter mode of operation
CO3:	Describe various methods for the control of HVDC systems and to perform power flow analysis in AC/DC systems
CO4:	Describe various protection methods for HVDC systems and classify Harmonics and design different types of filters
CO5:	To control HVDC systems with various methods and to perform power flow analysis in AC/DC systems
Course: FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS (SM701MS)	
Upon completion of the course, the students will be able to:	
CO1:	The students understand the significance of Management in their Profession
CO2:	Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course.
CO3:	To understand the Management Concepts, applications of Concepts in Practical aspects of business and development of Managerial Skills for Engineers
CO4:	Leadership, Power and Authority
CO5:	Characteristics of Effective Controls, Establishing control systems, Control frequency and Methods.
Course: ELECTRICAL & ELECTRONICS DESIGN LAB (EE701PC)	
Upon completion of the course, the students will be able to:	
CO1:	Get practical knowledge related to electrical
CO2:	Fabricate basic electrical circuit elements/networks

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CO3:	Trouble shoot the electrical circuits
CO4:	Design filter circuit for application
CO5:	Get hardware skills such as soldering, winding etc

IV YEAR- II Semester

Course: ENVIRONMENTAL IMPACT ASSESSMENT (Open Elective - III) (CE800OE)	
Upon completion of the course, the students will be able to:	
CO1:	Identify the environmental attributes to be considered for the EIA study
CO2:	Formulate objectives of the EIA studies.
CO3:	Identify the methodology to prepare rapid EIA.
CO4:	Prepare EIA reports and environmental management plans.
CO5:	Understands the environmental Impact assessment procedure.
Course: POWER QUALITY AND FACTS (PE - V) (EE811PE)	
Upon completion of the course, the students will be able to:	
CO1:	Know the severity of power quality problems in distribution system
CO2:	Understand the concept of voltage sag transformation from up-stream (higher voltages) to down-stream (lower voltage)
CO3:	Concept of improving the power quality to sensitive load by various mitigating custom power devices
CO4:	Choose proper controller for the specific application based on system requirements
CO5:	Understand various systems thoroughly and their requirements
Course: ELECTRICAL DISTRIBUTION SYSTEMS (PE - VI) (EE822PE)	
Upon completion of the course, the students will be able to:	
CO1:	distinguish between transmission, and distribution line and design the feeders
CO2:	compute power loss and voltage drop of the feeders
CO3:	design protection of distribution systems
CO4:	understand the importance of voltage control and power factor improvement
CO5:	To examine the power factor improvement and voltage control

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

II YEAR- I Semester

ELECTRONIC DEVICES AND CIRCUITS (EC301PC)
Upon completion of the course, the students will be able to:
CO1: Know the characteristics of various components.
CO2: Understand the utilization of components
CO3: Understand the biasing techniques
CO4: Understanding the usage of diodes and transistors
CO5: Design and analyze small signal amplifier circuits.
Course: NETWORK ANALYSIS AND TRANSMISSION LINES [EC302PC]
Upon completion of the course, the students will be able to:
CO1: Understand the concepts of Network Topology
CO2: Gain the knowledge on basic RLC circuits behavior.
CO3: Analyze the Steady state and transient analysis of RLC Circuits.
CO4: Know the characteristics of two port network parameters.
CO5: Analyze the transmission line parameters and configurations.
Course: DIGITAL SYSTEM DESIGN [EC303PC]
Upon completion of the course, the students will be able to:
CO1: Understand the numerical information in different forms and Boolean Algebra theorems
CO2: Postulates of Boolean algebra and to minimize combinational functions
CO3: Design and analyze combinational and sequential circuits
CO4: Known about the logic families and realization of logic gates.
CO5: Understand the Realization of Logic Gates Using Diodes & Transistors
Course: SIGNALS AND SYSTEMS [EC304PC]
Upon completion of the course, the students will be able to:
CO1: Differentiate various signal functions.

CO2: Represent any arbitrary signal in time and frequency domain.
CO3: Understand the characteristics of linear time invariant systems.
CO4: Analyze the signals with different transform technique
CO5: understand the characteristics of LTI systems

Course: PROBABILITY THEORY AND STOCHASTIC PROCESSES [EC305ES]

Upon completion of the course, the students will be able to:
CO1: Understand the concepts of Random Process and its Characteristics.
CO2: Understand the response of linear time Invariant system for a Random Processes.
CO3: Determine the Spectral and temporal characteristics of Random Signals.
CO4: Understand the concepts of Noise in Communication system
CO5: Apply the concept of probability, correlation and spectral densities in communication engineering

Course: ELECTRONIC DEVICES AND CIRCUITS LAB [EC306PC]

Upon completion of the course, the students will be able to:
CO1: Analyze the frequency response of BJT/JFET Amplifiers
CO2: Analyze amplifier circuit
CO3: Design BJT amplifier
CO4: Know different characteristics
CO5: Analyze different clamping circuits

Course: DIGITAL SYSTEM DESIGN LAB [EC307PC]

Upon completion of the course, the students will be able to:
CO1: Test digital logic gates
CO2: Design universal gates
CO3: Design different flipflops
CO4: Different converters
CO5: Design multiplexers

Course: BASIC SIMULATION LAB [EC308ES]

Upon completion of the course, the students will be able to:
CO1: Simulation of MATLAB

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CO2: Generate various signals
CO3: Synthesis various transforms
CO4: Removal of noise in different forms
CO5: Locating zeros and poles
Course: CONSTITUTION OF INDIA [MC309/MC409]
Upon completion of the course, the students will be able to:
CO1: Meaning of the constitution law and constitutionalism
CO2: Historical perspective of the Constitution of India
CO3: Salient features and characteristics of the Constitution of India
CO4: Scheme of the fundamental rights
CO5: The scheme of the Fundamental Duties and its legal status

II YEAR- II Semester

Course: LAPLACE TRANSFORMS, NUMERICAL METHODS AND COMPLEX VARIABLES [MA401BS]
Upon completion of the course, the students will be able to:
CO1: Use the Laplace transforms techniques for solving ODE's
CO2: Find the root of a given equation.
CO3: Estimate the value for the given data using interpolation
CO4: Find the numerical solutions for a given ODE's
CO5: Taylor's and Laurent's series expansions of complex Function
Course: ELECTROMAGNETIC FIELDS AND WAVES [EC402PC]
Upon completion of the course, the students will be able to:
CO1: Get the knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields and Magnetostatic Fields.
CO2: Distinguish between the static and time-varying fields
CO3: Establish the corresponding sets of Maxwell's Equations and Boundary Conditions.
CO4: Analyze the Wave Equations for good conductors, good dielectrics evaluate the UPW Characteristics for several practical media of interest
CO5: To analyze completely the rectangular waveguides, their mode characteristics, and Design waveguides for solving practical problems

Course: ANALOG AND DIGITAL COMMUNICATIONS [EC403PC]
Upon completion of the course, the students will be able to:
CO1: Analyze and design of various continuous wave and angle modulation and demodulation techniques
CO2: Understand the effect of noise present in continuous wave and angle modulation techniques.
CO3: Attain the knowledge about AM , FM Transmitters and Receivers
CO4: Analyze and design the various Pulse Modulation Techniques.
CO5: Understand the concepts of Digital Modulation Techniques and Baseband transmission.
Course: LINEAR IC APPLICATIONS [EC404PC]
Upon completion of the course, the students will be able to:
CO1: Design the multistage amplifiers and understand the concepts of High Frequency Analysis of Transistors.
CO2: Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations
CO3: Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.
CO4: Design Multivibrators and sweep circuits for various applications.
CO5: To introduce the concepts of waveform generation and introduce some special function ICs.
Course: ELECTRONIC CIRCUIT ANALYSIS [EC405PC]
Upon completion of the course, the students will be able to:
CO1: A thorough understanding of operational amplifiers with linear integrated circuits.
CO2: Attain the knowledge of functional diagrams and applications of IC 555 and IC 565
CO3: Acquire the knowledge about the Data converters.
CO4: A thorough understanding concepts of waveform generation and introduce some special function ICs.
CO5: understanding the concepts of converters
Course: ANALOG AND DIGITAL COMMUNICATIONS LAB [EC406PC]
Upon completion of the course, the students will be able to:
CO1: To analyze the modulation and demodulation techniques
CO2: Design of pulse modulation techniques
CO3: Spectrum analyzers of different modulators
CO4: Design of phase shift keying and frequency shift keying
CO5: Knowing the process of Delta modulation

Course: IC APPLICATIONS LAB [EC407PC]
Upon completion of the course, the students will be able to:
CO1: Analyze the working of PLL and describe its application as a frequency multiplier
CO2: Analyze the performance of filters, multivibrators, A/D converter and analog multiplier
CO3: Design amplifiers, oscillators, D-A converters using operational amplifiers
CO4: Design filters using op-amp and performs an experiment on frequency response
CO5: Design DC power supply using ICs
Course: ELECTRONIC CIRCUIT ANALYSIS LAB [EC408PC]
Upon completion of the course, the students will be able to:
CO1: Simulation software-Multisim
CO2: Design of various Oscillator Circuits
CO3: Design of different amplifiers
CO4: Design different multivibrators
CO5: Various circuits formation
Course: GENDER SENSITIZATION LAB [MC409/MC309]
Upon completion of the course, the students will be able to:
CO1: To develop students' sensibility with regard to issues of gender in contemporary India.
CO2: To provide a critical perspective on the socialization of men and women.
CO3: To introduce students to information about some key biological aspects of genders.
CO4: To expose the students to debates on the politics and economics of work.
CO5: To help students reflect critically on gender violence.

III YEAR- I Semester

Course: MICROPROCESSORS AND MICROCONTROLLERS [EC501PC]
Upon completion of the course, the students will be able to:
CO1: Understands the internal architecture, organization and assembly language programming of 8086 processors.
CO2: Understands the internal architecture, organization and assembly language programming of 8051/controllers

CO3:	Understands the interfacing techniques to 8086 and 8051 based systems.
CO4:	Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors.
CO5:	To provide the knowledge about interfacing techniques of bus & memory.

Course: DATA COMMUNICATIONS AND NETWORKS [EC502PC]

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

CO1:	Know the Categories and functions of various Data communication Networks
CO2:	Design and analyze various error detection techniques.
CO3:	Demonstrate the mechanism of routing the data in network layer
CO4:	Know the significance of various Flow control and Congestion control Mechanisms
CO5:	Know the Functioning of various Application layer Protocols.

Course: CONTROL SYSTEMS [EC503PC]

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

CO1:	Understand the modeling of linear-time-invariant systems using transfer function and state space representations.
CO2:	Understand the concept of stability and its assessment for linear-time invariant systems.
CO3:	Design simple feedback controllers
CO4:	Explain transfer functions of linear systems, block diagram reduction technique, time response of the control systems, and stability analysis in terms of root-locus technique and bode plots
CO5:	Prepare basic systems.

Course: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS [SM504MS]

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

CO1:	The various Forms of Business and the impact of economic variables on the Business.
CO2:	The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
CO3:	Can study the firm's financial position by analysing the Financial Statements of a Company.
CO4:	Utilize the tools and techniques for economic analysis of alternative opportunities, considering time value of money and risk associated with returns
CO5:	Appraise investment opportunities considering forthcoming changes in economy, including inflation and their effect.

Course: COMPUTER ORGANIZATION & OPERATING SYSTEMS [EC511PE]

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

CO1:	Able to visualize the organization of different blocks in a computer.
CO2:	Able to use micro-level operations to control different units in a computer.

CO3:	Able to use Operating systems in a computer.
CO4:	Understanding the concepts of I/O and memory organization and operating systems.
CO5:	To understand the RTL and Micro-level operations and control in a computer.

Course: MICROPROCESSORS AND MICROCONTROLLERS LAB [EC505PC]

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

CO1:	Write ALP Programmes
CO2:	Demonstrate Interfacing different I/Os with processor
CO3:	Stimulate Programs in 8051
CO4:	Compute waveforms using Microprocessors
CO5:	Explain the difference between simulator and Emulator

Course: DATA COMMUNICATIONS AND NETWORKS LAB [EC506PC]

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

CO1:	Demonstrate communication between two desktop computers
CO2:	Stimulate program using sockets
CO3:	Experiment the different protocols
CO4:	Identify and compare the various routing algorithms
CO5:	Employ simulation tools for networking concepts

Course: ADVANCED COMMUNICATION SKILLS LAB [EN508HS]

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

CO1:	To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers
CO2:	respond appropriately in different socio-cultural and professional contexts.
CO3:	Further, they would be required to communicate their ideas relevantly and coherently in writing.
CO4:	To prepare all the students for their placements.
CO5:	To follow different activities

Course: INTELLECTUAL PROPERTY RIGHTS [MC510]

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

CO1:	Explain the Basic concepts and need for Intellectual Property.
CO2:	Describe the registration processes of various types of IPR

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CO3:	Illustrate the agreements and legislations that frame the IPR
CO4:	Illustrate the laws that protect digital products
CO5:	Analyze the enforcement, infringement and issues related to IPR

III YEAR- II Semester

Course: ANTENNAS AND PROPAGATION [EC601PC]	
Upon completion of the course, the students will be able to:	
CO1:	relations.
CO2:	Characterize the antennas based on frequency, configure the geometry and establish the radiation patterns of VHF, UHF and Microwave antennas and also antenna arrays
CO3:	measurements in the laboratory.
CO4:	Classify the different wave propagation mechanisms, determine the characteristic features of different wave propagations, and estimate the parameters involved
CO5:	antenna measurements.
Course: DIGITAL SIGNAL PROCESSING [EC602PC]	
Upon completion of the course, the students will be able to:	
CO1:	Understand the LTI system characteristics and Multirate signal processing.
CO2:	Understand the inter-relationship between DFT and various transforms.
CO3:	Design a digital filter for a given specification.
CO4:	Understand the significance of various filter structures and effects of round off errors.
CO5:	Fundamental material for the analysis and processing of digital signals.
Course: VLSI DESIGN [EC603PC]	
Upon completion of the course, the students will be able to:	
CO1:	Acquire qualitative knowledge about the fabrication process of integrated circuits using MOS transistors.
CO2:	Draw the layout of any logic circuit which helps to understand and estimate parasitic effect of any logic circuit.
CO3:	Design building blocks of data path systems, memories and simple logic circuits using PLA,PAL, FPGA and CPLD.
CO4:	Understand different types of faults that can occur in a system.
CO5:	learn the concept of testing and adding extra hardware to improve testability of system.
Course: OBJECT ORIENTED PROGRAMMING THROUGH JAVA [EC611PE]	

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

CO1: Develop Applications for Range of Problems Using Object-Oriented Programming Techniques.

CO2: Design Simple Graphical User Interface Applications.

CO3: Implementation Of Packages And Interfaces.

CO4: Exception Handling, Event Handling and Multithreading.

CO5: The Design Of Graphical User Interface Using Applets And Swings.

Course: DISASTER PREPAREDNESS & PLANNING MANAGEMENT (Open Elective - I) [CE600OE]

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

CO1: The application of Disaster Concepts to Management.

CO2: Analyzing Relationship between Development and Disasters.

CO3: Ability to understand Categories of Disasters.

CO4: Realization of the responsibilities to society.

CO5: To Understand Definitions and Terminologies used in Disaster Management.

Course: DIGITAL SIGNAL PROCESSING LAB [EC604PC]

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

CO1: Describe basic signal processing operations.

CO2: Demonstrate MATLAB based implementation of various DSP systems.

CO3: Analyze the architecture of a DSP Processor.

CO4: Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals.

CO5: Design a DSP system for various applications of DSP.

Course: e - CAD LAB [EC605PC]

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

CO1: Explain HDL code for basic as well as advanced digital integrated circuit.

CO2: Import the logic modules into FPGA Boards.

CO3: Explain the fundamental principles of VLSI circuit design in digital and analog domain.

CO4: Simulate Digital & Analog IC Blocks using EDA tools.

CO5: Extract the layouts of Digital & Analog IC Blocks using EDA tools.

Course: : SCRIPTING LANGUAGES LAB [EC606PC]

Upon completion of the course, the students will be able to:
CO1: Ability to understand the differences between Scripting languages and programming languages.
CO2: Able to gain some fluency programming in Ruby.
CO3: Able to Understand the concepts of scripting languages for developing web-based projects.
CO4: Able to gain some fluency programming in Perl.
CO5: Able to gain some fluency programming in TCL.
Course: ENVIRONMENTAL SCIENCE [MC609]
Upon completion of the course, the students will be able to:
CO1: The basis of ecological principles and environmental regulations which in turn helps in sustainable development.
CO2: Understanding the importance of ecological balance for sustainable development.
CO3: Understanding the impacts of developmental activities and mitigation measures.
CO4: Understanding the environmental policies and regulations.
CO5: Understanding the concepts of resources.

IV YEAR- I Semester

Course: MICROWAVE AND OPTICAL COMMUNICATIONS (PC) [EC701PC]
Upon completion of the course, the students will be able to:
CO1: Known power generation at microwave frequencies and derive the performance characteristics.
CO2: realize the need for solid state microwave sources and understand the principles of solid state devices.
CO3: distinguish between the different types of waveguide and ferrite components, and select proper components for engineering applications.
CO4: understand the utility of S-parameters in microwave component design and learn the measurement procedure of various microwave parameters.
CO5: understand the mechanism of light propagation through Optical Fibres.
Course: DIGITAL IMAGE PROCESSING (PE – III) [EC713PE]
Upon completion of the course, the students will be able to:
CO1: Explore the fundamental relations between pixels and utility of 2-D transforms in image processer.
CO2: Understand the enhancement, segmentation and restoration processes on an image.
CO3: Implement the various Morphological operations on an image.

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CO4: Understand the need of compression and evaluation of basic compression algorithms.
CO5: To understand the Morphological operations on an image.
Course: DATABASE MANAGEMENT SYSTEMS (PE – IV) [EC722PE]
Upon completion of the course, the students will be able to:
CO1: Gain knowledge of fundamentals of DBMS, database design and normal forms.
CO2: Master the basics of SQL for retrieval and management of data.
CO3: Be acquainted with the basics of transaction processing and concurrency control.
CO4: Familiarity with database storage structures and access techniques.
CO5: Familiarity with data models, database design, relational model, relational algebra, transaction control, concurrency control.
Course: PYTHON PROGRAMMING (Open Elective - II) [CS702OE]
Upon completion of the course, the students will be able to:
CO1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
CO2: Demonstrate proficiency in handling Strings and File Systems.
CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO4: Interpret the concepts of Object-Oriented Programming as used in Python.
CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
Course: PROFESSIONAL PRACTICE LAW & ETHICS [SM702MS]
Upon completion of the course, the students will be able to:
CO1: the types of roles they are expected to play in the society as practitioners of the civil engineering profession.
CO2: To develop some ideas of the legal and practical aspects of their profession.
CO3: The importance of professional practice, Law and Ethics in their personal lives and professional careers.
CO4: the rights and responsibilities as an employee, team member and a global citizen.
CO5: The importance of professional rules and sections.
Course: MICROWAVE AND OPTICAL COMMUNICATIONS LAB [EC703PC]
Upon completion of the course, the students will be able to:
CO1: Explain basic elements in microwave devices and optical fibers, different modes and configurations.
CO2: Illustrate the transmission characteristics associated with dispersion and polarization techniques.
CO3: Apply optical sources and detectors with their use in optical communication system.

CO4: Construct fiber optic receiver systems, measurements and coupling techniques.
CO5: Analyze optical communication systems and its networks.
Course: PROJECT STAGE - I [EC705PC]
Upon completion of the course, the students will be able to:
CO1: Identify the problem statement through literature survey for project work.
CO2: Develop design strategy for the project work.
CO3: Apply appropriate modern tools to execute the project work.
CO4: Evaluate the outcome of the project work.
CO5: Develop presentation and interpersonal communication skills through project work.

IV YEAR- II Semester

Course: SATELLITE COMMUNICATIONS (PE – V) [EC811PE]
Upon completion of the course, the students will be able to:
CO1: Understand basic concepts and frequency allocations for satellite communication, orbital mechanics and launch vehicles.
CO2: Envision the satellite sub systems and design satellite links for specified C/N.
CO3: Understand the various multiple access techniques for satellite communication systems and earth station technologies.
CO4: Known the concepts of LEO, GEO Stationary Satellite Systems and satellite navigation.
CO5: To understand the concepts of satellite navigation and GPS.
Course: SYSTEM ON CHIP ARCHITECTURE (PE – VI) [EC821PE]
Upon completion of the course, the students will be able to:
CO1: To acquire the knowledge on processor selection criteria and limitations.
CO2: To acquires the knowledge of memory architectures on SOC.
CO3: To understands the interconnection strategies and their customization on SOC.
CO4: Expected to understand SOC Architectural features.
CO5: To undersdtand the Configuration OF SOC.
Course: ENVIRONMENTAL IMPACT ASSESSMENT (Open Elective - III) [SCE800OE]
Upon completion of the course, the students will be able to:

CO1: Environmental Impacts and the terminology.
CO2: Formulate objectives of the EIA studies.
CO3: Identify the environmental attributes to be considered for the EIA study.
CO4: Identify the methodology to prepare rapid EIA.
CO5: Prepare EIA reports and environmental management plans.
Course: PROJECT STAGE – II [EC801PC]
Upon completion of the course, the students will be able to:
CO1: Communication Engineering field.
CO2: Apply the various methodologies and technologies for solving the problem.
CO3: Analyze project management skills for solving the problem.
CO4: Design and develop hardware and/or software for their project specific problem.
CO5: Formulate the project reports and validate the presentation and demonstration.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II YEAR- I Semester

Course: ANALOG AND DIGITAL ELECTRONICS [CS301ES]
Upon completion of the course, the students will be able to:
CO1: Know the characteristics of various components.
CO2: Understand the utilization of components
CO3: Design and analyze small signal amplifier circuits.
CO4: Learn Postulates of Boolean algebra and to minimize combinational functions.
CO5: Design and analyze combinational and sequential circuits.
Course: DATA STRUCTURES [CS302PC]
Upon completion of the course, the students will be able to:
CO1: Ability to select the data structures that efficiently model the information in a problem.
CO2: Ability to assess efficiency trade-offs among different data structure implementations

CO3: Combinations. Implement and know the application of algorithms for sorting and pattern matching.
CO4: Design programs using a variety of data structures, including hash tables, binary and general
CO5: Tree structures, search trees, tries, heaps, graphs, and AVL-trees.

Course: COMPUTER ORIENTED STATISTICAL METHODS [MA303BS]

Upon completion of the course, the students will be able to:
CO1: After learning the contents of this paper the student must be able.
CO2: to apply the concepts of probability and distributions to some case studies.
CO3: Correlate the material of one unit to the material in other units.
CO4: Resolve the potential misconceptions and hazards in each topic of study.
CO5: Concepts of probability to some case studies.

Course: COMPUTER ORGANIZATION AND ARCHITECTURE [CS304PC]

Upon completion of the course, the students will be able to:
CO1: Understand the basics of instructions sets and their impact on processor design.
CO2: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
CO3: Demonstrate an understanding of the design of the functional units of a digital computer system.
CO4: Design a pipeline for consistent execution of instructions with minimum hazards.
CO5: Recognize and manipulate representations of numbers stored in digital computers.

Course: OBJECT ORIENTED PROGRAMMING USING C++ [CS305PC]

Upon completion of the course, the students will be able to:
CO1: Able to develop programs with reusability.
CO2: Handle exceptions in programming
CO3: Develop applications for a range of problems using object-oriented programming techniques
CO4: Develop programs for file handling
CO5: Analysis of a range of problems using object-oriented programming techniques

Upon completion of the course, the students will be able to:
CO1: Know the characteristics of various components.
CO2: Understand the utilization of components.

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CO3: Design and analyze small signal amplifier circuits.
CO4: Postulates of Boolean algebra and to minimize combinational functions.
CO5: Known about the logic families and realization of logic gates.

Upon completion of the course, the students will be able to:
CO1: Ability to develop C programs for computing and real-life applications using basic elements like control statements.
CO2: To develop C programs pointers and strings.
CO3: To develop C programs arrays, functions.
CO4: Data structures like stacks, queues and linked lists.
CO5: Ability to Implement searching and sorting algorithms.

Upon completion of the course, the students will be able to:
CO1: Identify various hardware components of a system.
CO2: Assemble the computer.
CO3: Use various Microsoft tools.
CO4: Software & Hardware Troubleshooting
CO5: Orientation & Connectivity Boot Camp.

Course: C++ PROGRAMMING LAB [CS309PC]

Upon completion of the course, the students will be able to:
CO1: Ability to develop applications for a range of problems using object-oriented programming techniques.
CO2: To describe the advantages of a high level language C++, the programming process, and the compilation process.
CO3: To describe and use software tools in the programming process.
CO4: To apply good programming principles to the design and implementation of C++ programs.
CO5: To demonstrate an understanding of primitive data types, values, operators and expressions in C++.

Course: GENDER SENSITIZATION LAB [MC309]

Upon completion of the course, the students will be able to:
CO1: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
CO2: Men and women students and professionals will be better equipped to work and live together as equals.

CO3: Students will develop a sense of appreciation of women in all walks of life.
CO4: Students will acquire insight into the gendered division of labour and its relation to politics and economics.
CO5: Students will have developed a better understanding of important issues related to gender in contemporary India.

II YEAR- II Semester

Course: DISCRETE MATHEMATICS [CS401PC]
Upon completion of the course, the students will be able to:
CO1: Ability to understand and construct precise mathematical proofs.
CO2: Ability to analyze and solve counting problems on finite and discrete structures.
CO3: Ability to use logic and set theory to formulate precise statements.
CO4: Ability to describe and manipulate sequences.
CO5: Ability to apply graph theory in solving computing problems.
Upon completion of the course, the students will be able to:
CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business.
CO2: The Demand, Supply, Production, Cost are learnt.
CO3: Market Structure, Pricing aspects are learnt.
CO4: The Students can study the firm's financial position.
CO5: analysing the Financial Statements of a Company.
Upon completion of the course, the students will be able to:
CO1: Will be able to control access to a computer and the files that may be shared.
CO2: Demonstrate the knowledge of the components of computer and their respective roles in computing.
CO3: Ability to recognize and resolve user problems with standard operating environments.
CO4: Gain practical knowledge of how programming languages, operating systems.
CO5: Architectures interact and how to use each effectively.

Upon completion of the course, the students will be able to: CO1: Gain knowledge of fundamentals of DBMS. CO2: fundamentals on database design Normal forms Master the basics of SQL for retrieval and management of data. CO3: Be acquainted with the basics of transaction processing and concurrency control. CO4: Familiarity with database storage structures and access techniques. CO5: Analysis of the DBMS
Upon completion of the course, the students will be able to: CO1: Able to solve real world problems using OOP techniques. CO2: Able to understand the use of abstract classes. CO3: Able to solve problems using java collection framework and I/o classes. CO4: Able to develop multithreaded applications with synchronization. CO5: Able to develop applets for web applications.
Upon completion of the course, the students will be able to: CO1: Work with UNIX commands and shell programming. CO2: Implement the various scheduling algorithms. CO3: Implement process creation and Inter process communication. CO4: Implement Deadlock avoidance and Deadlock Detection algorithms . CO5: Implement Page replacement algorithms, File organization and File allocation strategies.
Upon completion of the course, the students will be able to: CO1: Make use of typical data definitions and manipulation commands. CO2: Apply database queries to retrieve records. CO3: Applying PL/SQL for processing database. CO4: Apply front end tools to design forms, reports and menus. CO5: Develop solutions using database concepts for real time requirements.

Upon completion of the course, the students will be able to: CO1: Able to write programs using abstract classes. CO2: Able to write programs for solving real world problems using java collection frame work. CO3: Able to write multithreaded programs. CO4: Able to write GUI programs using swing controls in Java. CO5: Able to introduce java compiler and eclipse platform.
Upon completion of the course, the students will be able to: CO1: Understand and explain the significance of Indian Constitution as the fundamental law of the land. CO2: Exercise his fundamental rights in proper sense at the same time identifies his responsibilities in national building. CO3: Able to write multithreaded programs.Analyse the Indian political system, the powers and functions of the Union, State and Local Governments in detail. CO4: Understand Electoral Process, Emergency provisions. CO5: Understand about Amendment procedure.

III YEAR- I Semester

Course: FORMAL LANGUAGES & AUTOMATA THEORY [CS501PC]
Upon completion of the course, the students will be able to: CO1: Able to understand the concept of abstract machines and their power to recognize the languages. CO2: Able to employ finite state machines for modeling and solving computing problems. CO3: Able to design context free grammars for formal languages. CO4: Able to distinguish between decidability and undecidability. CO5: Able to gain proficiency with mathematical tools and formal methods
Course: SOFTWARE ENGINEERING [CS502PC]
Upon completion of the course, the students will be able to: CO1: Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD). CO2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices. CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.

CO4: Analyze and contrast the various testing and maintenance.

CO5: Analyze project Schedule, Estimate project cost and Effort Required.

Course: COMPUTER NETWORKS [CS503PC]

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

CO1: Gain the knowledge of the basic computer network technology.

CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.

CO3: Obtain the skills of subnetting and routing mechanisms.

CO4: Familiarity with the essential protocols of computer networks.

CO5: how they can be applied in network design and implementation.

Course: WEB TECHNOLOGY [CS504PC]

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

CO1: Gain knowledge of client-side scripting, validation of forms and AJAX programming.

CO2: Understand server-side scripting with PHP language.

CO3: Understand what is XML and how to parse.

CO4: Use XML Data with Java

CO5: To introduce Server-side programming with Java Servlets and JSP.

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

CO1: Learn measurement of information and errors.

CO2: Obtain knowledge in designing various source codes and channel codes.

CO3: Design encoders and decoders for block and cyclic codes.

CO4: Understand the significance of codes in various applications.

CO5: Understand the importance of various codes for communication systems.

Course: COMPUTER GRAPHICS (Professional Elective - II) [CS521PE]

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

CO1: Acquire familiarity with the relevant mathematics of computer graphics.

CO2: Be able to design basic graphics application programs, including animation.

CO3: Be able to design applications that display graphic images to given specifications.

CO4: Be able to design applications that 2D/3D transformations.

CO5: To provide an introduction of fundamental concepts and theory.

Course: SOFTWARE ENGINEERING LAB [CS505PC]

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

CO1: Ability to translate end-user requirements into system and software requirements.

CO2: Ability to generate a high-level design of the system from the software requirements.

CO3: Will have experience and/or awareness of testing problems.

CO4: Able to develop a simple testing report.

CO5: developing a software project by using various software engineering principles and methods in each of the phases of software development.

Course: COMPUTER NETWORKS & WEB TECHNOLOGIES LAB [CS506PC]

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

CO1: Implement data link layer farming methods.

CO2: Analyze error detection and error correction codes.

CO3: Implement and analyze routing and congestion issues in network design.

CO4: Implement Encoding and Decoding techniques used in presentation layer.

CO5: To be able to work with different network tools.

Course: ADVANCE COMMUNICATION SKILLS LAB [EN508HS]

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

CO1: Respond appropriately to the listening skill.

CO2: Speak clearly with proper stress and intonation.

CO3: Make effective presentations.

CO4: Participate in group discussions.

CO5: Participate confidently and appropriately in conversations both formal, informal.

Course: INTELLECTUAL PROPERTY RIGHTS [MC510]

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

CO1: Distinguish and Explain various forms of IPRs.

CO2: Identify criteria's to fit one's own intellectual work in particular form of IPRs.

CO3: Apply statutory provisions to protect particular form of IPRs.

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CO4:	Analyse rights and responsibilities of holder of Patent, Copyright, Trademark, Industrial Designetc.
CO5:	Identify procedure to protect different forms of IPRs national and international level.

III YEAR- II Semester

Course: MACHINE LEARNING [CS601PC]	
Upon completion of the course, the students will be able to:	
CO1:	Understand the concepts of computational intelligence like machine learning.
CO2:	Ability to get the skill to apply machine learning.
CO3:	techniques to address the real time problems in different areas.
CO4:	Understand the Neural Networks and its usage in machine learning application.
CO5:	To study the pattern comparison techniques.
Course: COMPILER DESIGN [CS602PC]	
Upon completion of the course, the students will be able to:	
CO1:	Demonstrate the ability to design a compiler given a set of language features.
CO2:	Demonstrate the the knowledge of patterns, tokens & regular expressions for lexical analysis.
CO3:	Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
CO4:	Design and implement LL and LR parsers.
CO5:	Design algorithms to generate machine code.
Course: DESIGN AND ANALYSIS OF ALGORITHMS [CS603PC]	
Upon completion of the course, the students will be able to:	
CO1:	Ability to analyze the performance of algorithms.
CO2:	Ability to choose appropriate data structures and algorithm design methods for a specified application.
CO3:	Ability to understand how the choice of data structures.
CO4:	The algorithm design methods impact the performance of programs.
CO5:	Describes how to evaluate and compare different algorithms using worst-, average-, and bestcase analysis.
Course: NETWORK PROGRAMMING (Professional Elective - III) [CS612PE]	
Upon completion of the course, the students will be able to:	

CO1: To write socket API based program.
CO2: To design and implement client-server applications using TCP and UDP sockets.
CO3: To analyze network programs.
CO4: To understand usage of TCP/UDP / Raw sockets.
CO5: To understand socket programming in its entirety

Course: SOFTWARE TESTING METHODOLOGIES (Professional Elective - III) [CS615PE]

Upon completion of the course, the students will be able to:
CO1: To design best test strategies in accordance to the development model.
CO2: To develop the best test strategies in accordance to the development model.
CO3: To learn software test automation.
CO4: To learn management using latest tools.
CO5: Paths, Path products and Regular expressions

Course: FUNDAMENTALS OF INTERNET OF THINGS (Open Elective – I) [EC600OE]

Upon completion of the course, the students will be able to:
CO1: Known basic protocols in sensor networks.
CO2: Program and configure Arduino boards for various designs..
CO3: Python programming and interfacing for Raspberry Pi.
CO4: Design IoT applications in different domains
CO5: Known about data handling and analytics in SDN

Course: MACHINE LEARNING LAB [CS604PC]

Upon completion of the course, the students will be able to:
CO1: understand complexity of Machine Learning algorithms and their limitations
CO2: understand modern notions in data analysis-oriented computing
CO3: be capable of confidently applying common Machine Learning algorithms in practice and implementing their own
CO4: Be capable of performing experiments in Machine Learning using real-world data.
CO5: Implement linear regression using python.

Course: COMPILER DESIGN LAB [CS605PC]

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

CO1: Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML.
CO2: Apply client-server principles to develop scalable and enterprise web applications.
CO3: Ability to design, develop, and implement a compiler for any language.
CO4: Able to use lex and yacc tools for developing a scanner and a parser.
CO5: Able to design and implement LL and LR parsers.

Course: NETWORK PROGRAMMING LAB (Professional Elective - III) [CS622PE]

Upon completion of the course, the students will be able to:
CO1: To write socket API based programs.
CO2: To design and implement client-server applications using TCP and UDP sockets.
CO3: To analyze network programs.
CO4: To understand how to build network applications.
CO5: To understand inter process and inter-system communication.

Course: SOFTWARE TESTING METHODOLOGIES LAB (Professional Elective - III) [CS623PE]

Upon completion of the course, the students will be able to:
CO1: Design and develop the best test strategies in accordance to the development model.
CO2: To develop skills in software test automation and management using latest tools
CO3: To provide knowledge of Software Testing Methods.
CO4: Recording in context sensitive mode and analog mode.
CO5: Bitmap checkpoint for object/window.

Course: ENVIRONMENTAL SCIENCE [MC609]

Upon completion of the course, the students will be able to:
CO1: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2: Understanding the importance of ecological balance for sustainable development.
CO3: Understanding the impacts of developmental activities and mitigation measures.
CO4: Understanding the environmental policies and regulations.
CO5: Environmental Pollution and Control Technologies.

IV YEAR- I Semester

Course: CRYPTOGRAPHY AND NETWORK SECURITY (PC) [CS701PC]
Upon completion of the course, the students will be able to:
CO1: Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
CO2: Ability to identify information system requirements for both of them such as client and server.
CO3: Describe the enhancements made to IPv4 by IPSec.
CO4: Ability to understand the current legal issues towards information security.
CO5: Understand various cryptographic algorithms.
Course: DATA MINING (PC) [CS702PC]
Upon completion of the course, the students will be able to:
CO1: Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system
CO2: Apply preprocessing methods for any given raw data.
CO3: Extract interesting patterns from large amounts of data.
CO4: Discover and Choose employ suitable data mining algorithms to build analytical applications in various fields.
CO5: Evaluate the accuracy of supervised and unsupervised models and algorithms.
Course: INTRODUCTION TO EMBEDDED SYSTEMS (Professional Elective - IV) [CS712PE]
Upon completion of the course, the students will be able to:
CO1: To provide an overview of principles of Embedded System.
CO2: Expected to understand the selection procedure of processors in the embedded domain.
CO3: Design procedure of embedded firm ware.
CO4: Expected to visualize the role of realtime operating systems in embedded systems.
CO5: Expected to evaluate the correlation between task synchronization and latency issues.
Course: INTERNET OF THINGS (Professional Elective - V) [CS724PE]
Upon completion of the course, the students will be able to:
CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.
CO3: Appraise the role of IoT protocols for efficient network communication.
CO4: Elaborate the need for Data Analytics and Security in IoT.

CO5: Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.
Course: ELECTRONIC SENSORS (Open Elective - II) [EC700OE]
Upon completion of the course, the students will be able to: CO1: Learn about sensor Principle, Classification and Characterization. CO2: Explore the working of Electromechanical, Thermal, Magnetic, radiation and Electro analytic sensors. CO3: Understand the basic concepts of Smart Sensors. CO4: Design a system with sensors. CO5: Able to use sensors in different applications.
Course: CRYPTOGRAPHY AND NETWORK SECURITY LAB (PC) [CS703PC]
Upon completion of the course, the students will be able to: CO1: Provide security of the data over the network. CO2: Do research in the emerging areas of cryptography and network security. CO3: Implement various networking protocols. CO4: Protect any network from the threats in the world. CO5: Design a system with NS
Course: INDUSTRIAL ORIENTED MINI PROJECT [CS704PC]
Upon completion of the course, the students will be able to: CO1: Identify and Finalize problem statement by surveying variety of domains. CO2: Perform requirement analysis and identify design methodologies. CO3: Apply advanced programming techniques to develop solutions to the problem. CO4: Test the quality of the proposed method by evaluation metrics. CO5: Present technical report by applying different visualization tools.
Course: SEMINAR [CS705PC]
Upon completion of the course, the students will be able to: CO1: Establish motivation for any topic of interest and develop a thought process for technical presentation. CO2: Organize a detailed literature survey and build a document with respect to technical publications. CO3: Analysis and comprehension of proof-of-concept and related data. CO4: Effective presentation and improve soft skills.

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CO5: Make use of new and recent technology (e.g. Latex) for creating technical reports.
Course: PROJECT STAGE -I [CS706PC]
Upon completion of the course, the students will be able to:
CO1: Identify and Finalize problem statement by surveying variety of domains.
CO2: Perform requirement analysis and identify design methodologies.
CO3: Apply advanced programming techniques to develop solutions to the problem.
CO4: Test the quality of the proposed method by evaluation metrics.
CO5: Present technical report by applying different visualization tools.

IV YEAR- II Semester

Course: ORGANIZATIONAL BEHAVIOUR (PC) [SM801MS]
Upon completion of the course, the students will be able to:
CO1: to provide the students with the conceptual framework and the theories underlying Organizational Behaviour.
CO2: May describe the basic subjects for improving the performance of employees and organizations.
CO3: Evaluate the developments of basic conflict resolutions.
CO4: Discuss the main problems about stress,power and politics and ethics.
CO5: İmprove and develop statajies about organizational change and development.
Course: HUMAN COMPUTER INTERACTION (Professional Elective - VI) [CS814PE]
Upon completion of the course, the students will be able to:
CO1: Design effective dialog for HCI.
CO2: Design effective HCI for individuals and persons with disabilities.
CO3: Assess the importance of user feedback.
CO4: Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
CO5: Develop meaningful user interface.
Course: MEASURING INSTRUMENTS (Open Elective - III) [EC800OE]
Upon completion of the course, the students will be able to:
CO1: Able to identify suitable sensors for real time applications.

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CO2:	Able to transducers for real time applications.
CO3:	Able to translate theoretical concepts into working models.
CO4:	Able to understand the basic of measuring device and use them in relevant situation.
CO5:	To provide better familiarity with the concepts of Sensors and Measurements.

Course: PROJECT STAGE -II [CS802PC]	
Upon completion of the course, the students will be able to:	
CO1:	Identify and Finalize problem statement by surveying variety of domains.
CO2:	Perform requirement analysis and identify design methodologies.
CO3:	Apply advanced programming techniques to develop solutions to the problem.
CO4:	Test the quality of the proposed method by evaluation metrics.
CO5:	Present technical report by applying different visualization tools.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI & ML)

II YEAR- I Semester

Course: DISCRETE MATHEMATICS [CS310PC]	
Upon completion of the course, the students will be able to:	
CO1:	Ability to understand and construct precise mathematical proofs.
CO2:	Ability to use logic and set theory to formulate precise statements.
CO3:	Ability to analyze and solve counting problems on finite and discrete structures.
CO4:	Ability to describe and manipulate sequences.
CO5:	Ability to apply graph theory in solving computing problems.

Course: DATA STRUCTURES [CS302PC]	
Upon completion of the course, the students will be able to:	
CO1:	Ability to select the data structures that efficiently model the information in a problem.
CO2:	Ability to assess efficiency trade-offs among different data structure implementations or combinations.
CO3:	Implement and know the application of algorithms for sorting and pattern matching.

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CO4:	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
CO5:	Introduces sorting and pattern matching algorithms.

Course: MATHEMATICAL AND STATISTICAL FOUNDATIONS [MA313BS]

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

CO1:	Apply the number theory concepts to cryptography domain.
CO2:	Apply the concepts of probability and distributions to some case studies.
CO3:	Correlate the material of one unit to the material in other units.
CO4:	Resolve the potential misconceptions and hazards in each topic of study.
CO5:	Stochastic process and Markov chains.

Course: COMPUTER ORGANIZATION AND ARCHITECTURE [CS304PC]

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

CO1:	Understand the basics of instructions sets and their impact on processor design.
CO2:	Demonstrate an understanding of the design of the functional units of a digital computer system.
CO3:	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
CO4:	Design a pipeline for consistent execution of instructions with minimum hazards.
CO5:	Recognize and manipulate representations of numbers stored in digital computers.

Course: PYTHON PROGRAMMING [CS311PC]

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

CO1:	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions
CO2:	Demonstrate proficiency in handling Strings and File Systems.
CO3:	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO4:	Interpret the concepts of Object-Oriented Programming as used in Python.
CO5:	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

Course: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS [SM306MS]

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

CO1:	The students will understand the various Forms of Business and the impact of economic variables on the Business.
CO2:	The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
CO3:	The Students can study the firm's financial position by analysing the Financial Statements of a Company.

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CO4:	The study of the firm's financial, market-related, environmental, and organizational issues.
CO5:	cost and production analysis, pricing decisions and strategies, profit management, and wealth management. Databases in Python

Course: DATA STRUCTURES LAB [CS307PC]

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

CO1:	Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks
CO2:	Ability to Implement searching and sorting algorithms.
CO3:	Ability to Implement searching and sorting algorithms.
CO4:	Ability to Implement stacks and queues.
CO5:	Ability to Implement Trees.

Course: PYTHON PROGRAMMING LAB [CS312PC]

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

CO1:	Student should be able to understand the basic concepts scripting and the contributions of scripting language.
CO2:	Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
CO3:	Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations
CO4:	To understand the high-performance programs designed to strengthen the practical expertise.
CO5:	To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques

Course: GENDER SENSITIZATION LAB [MC309]

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

CO1:	Students will have developed a better understanding of important issues related to gender in contemporary India.
CO2:	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film
CO3:	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
CO4:	Students will acquire insight into the gendered division of labour and its relation to politics and economics
CO5:	Men and women students and professionals will be better equipped to work and live together as equals.

II YEAR- II Semester

Course: FORMAL LANGUAGES AND AUTOMATA THEORY [CS416PC]

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

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CO1:	Able to understand the concept of abstract machines and their power to recognize the languages.
CO2:	Able to employ finite state machines for modeling and solving computing problems.
CO3:	Able to design context free grammars for formal languages.
CO4:	Able to distinguish between decidability and undecidability.
CO5:	Able to gain proficiency with mathematical tools and formal methods.

Course: SOFTWARE ENGINEERING [CS417PC]

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

CO1:	Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD)
CO2:	Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices
CO3:	Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.
CO4:	Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality manage
CO5:	Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project

Course: OPERATING SYSTEMS [CS403PC]

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

CO1:	Will be able to control access to a computer and the files that may be shared.
CO2:	Demonstrate the knowledge of the components of computer and their respective roles in computing.
CO3:	Ability to recognize and resolve user problems with standard operating environments.
CO4:	effectively.
CO5:	Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc

Course: DATABASE MANAGEMENT SYSTEMS [CS404PC]

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

CO1:	Gain knowledge of fundamentals of DBMS, database design and normal forms.
CO2:	Master the basics of SQL for retrieval and management of data.
CO3:	Be acquainted with the basics of transaction processing and concurrency control.
CO4:	Familiarity with database storage structures and access techniques
CO5:	To master the basics of SQL and construct queries using SQL.

Course: OBJECT ORIENTED PROGRAMMING USING JAVA [CS412PC]

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

CO1: Able to solve real world problems using OOP techniques.
CO2: Able to understand the use of abstract classes.
CO3: Able to solve problems using java collection framework and I/o classes.
CO4: Able to develop multithreaded applications with synchronization.
CO5: Able to develop applets for web applications.

Course: OPERATING SYSTEMS LAB (Using UNIX/LINUX) [CS406PC]

Upon completion of the course, the students will be able to:
CO1: Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management
CO2: Able to implement C programs using Unix system calls.
CO3: Ensure the development of students applied skills in operating systems related areas.
CO4: Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.
CO5: memory management techniques.

Course: DATABASE MANAGEMENT SYSTEMS LAB [CS407PC]

Upon completion of the course, the students will be able to:
CO1: Design database schema for a given application and apply normalization.
CO2: Acquire skills in using SQL commands for data definition and data manipulation.
CO3: Develop solutions for database applications using procedures, cursors and triggers.
CO4: Describe different transaction processing concepts and use different concurrency control techniques.
CO5: Discuss advanced database technologies and products used in enterprise.

Course: JAVA PROGRAMMING LAB [CS408PC]

Upon completion of the course, the students will be able to:
CO1: Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
CO2: The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.
CO3: Ability to write programs using abstract classes.
CO4: Ability to write multithreaded programs.
CO5: Ability to write GUI programs using swing controls in Java.

Course: CONSTITUTION OF INDIA [MC409]

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

CO1:	Meaning of the constitution law and constitutionalism.
CO2:	Historical perspective of the Constitution of India.
CO3:	Salient features and characteristics of the Constitution of India.
CO4:	Scheme of the fundamental rights.
CO5:	Scheme of the Fundamental Right to Equality.

III YEAR- I Semester

Course: DESIGN AND ANALYSIS OF ALGORITHMS	
Upon completion of the course, the students will be able to:	
CO1:	Ability to analyze the performance of algorithms.
CO2:	Introduces the data structure of disjoint sets.
CO3:	Ability to choose appropriate data structures and algorithm design methods for a specified application.
CO4:	Evaluate and compare different algorithms using worst-, average-, and best case analysis.
CO5:	Ability to understand how the choice of data structures and the algorithm design methods Impact the performance of programs.
Course: MACHINE LEARNING	
Upon completion of the course, the students will be able to:	
CO1:	Understand the concepts of computational intelligence like machine learning.
CO2:	machine learning techniques such as decision tree learning, Bayesian learning etc.
CO3:	Ability to get the skill to apply machine learning techniques to address the real time problems in different areas.
CO4:	pattern comparison techniques.
CO5:	Understand the Neural Networks and its usage in machine learning application.
Course: COMPUTER NETWORKS	
Upon completion of the course, the students will be able to:	
CO1:	Gain the knowledge of the basic computer network technology.
CO2:	The students with a general overview of the concepts and fundamentals of computer networks.
CO3:	Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
CO4:	Obtain the skills of subnetting and routing mechanisms.

CO5: Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
Course: COMPILER DESIGN
Upon completion of the course, the students will be able to: CO1: Demonstrate the ability to design a compiler given a set of language features. CO2: Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis. CO3: Acquire skills in using lex tool & yacc tool for devleoping a scanner and parser. CO4: Design and implement LL and LR parsers. CO5: Design algorithms to generate machine code.
Course: COMPUTER GRAPHICS (Professional Elective – I)
Upon completion of the course, the students will be able to: CO1: Acquire familiarity with the relevant mathematics of computer graphics. CO2: Be able to design basic graphics application programs, including animation. CO3: Theory of computer graphics. CO4: Illumination and color models; animation; rendering and implementation; visible surface detection. CO5: Be able to design applications that display graphic images to given specifications.
Course: INFORMATION RETRIEVAL SYSTEMS (Professional Elective – II)
Upon completion of the course, the students will be able to: CO1: Ability to apply IR principles to locate relevant information large collections of data. CO2: Important concepts and algorithms in IRS. CO3: Ability to design different document clustering algorithms. CO4: Implement retrieval systems for web search tasks. CO5: Design an Information Retrieval System for web search tasks.
Course: MACHINE LEARNING LAB
Upon completion of the course, the students will be able to: CO1: An overview of the various machine learning techniques. CO2: Understand complexity of Machine Learning algorithms and their limitations. CO3: Understand modern notions in data analysis-oriented computing. CO4: be capable of confidently applying common Machine Learning algorithms in practice and implementing their own.

CO5: Be capable of performing experiments in Machine Learning using real-world data.
Course: COMPUTER NETWORKS LAB
Upon completion of the course, the students will be able to:
CO1: Implement data link layer farming methods.
CO2: Analyze error detection and error correction codes.
CO3: Implement and analyze routing and congestion issues in network design.
CO4: Implement Encoding and Decoding techniques used in presentation layer.
CO5: To be able to work with different network tools.
Course: ADVANCED COMMUNICATION SKILLS LAB
Upon completion of the course, the students will be able to:
CO1: To Improve The Students' Fluency In English, Through A Well-Developed
CO2: Further, they would be required to communicate their ideas relevantly and coherently in writing.
CO3: To prepare all the students for their placements.
CO4: Transferring information from non-verbal to verbal texts and vice-versa.
CO5: Gathering ideas and information to organize ideas relevantly and coherently.
Course: INTELLECTUAL PROPERTY RIGHTS
Upon completion of the course, the students will be able to:
CO1: Ability to apply IR principles to locate relevant information large collections of data.
CO2: Ability to design different document clustering algorithms.
CO3: Implement retrieval systems for web search tasks.
CO4: Design an Information Retrieval System for web search tasks.
CO5: Introduction to Text Search Techniques.

III YEAR- II Semester

Course: ARTIFICIAL INTELLIGENCE
Upon completion of the course, the students will be able to:
CO1: To learn the distinction between optimal reasoning Vs. human like reasoning

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CO2: Ability to formulate an efficient problem space for a problem expressed in natural language.

CO3: Select a search algorithm for a problem and estimate its time and space complexities.

CO4: Possess the skill for representing knowledge using the appropriate technique for a given problem.

CO5: Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.

Course: DEVOPS

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

CO1: Identify components of Devops environment.

CO2: Describe Software development models and architectures of DevOps.

CO3: Apply different project management, integration, testing and code deployment tool.

CO4: Investigate different DevOps Software development models.

CO5: Assess various Devops practices.

Course: NATURAL LANGUAGE PROCESSING

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

CO1: Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.

CO2: Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.

CO3: Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.

CO4: Able to design, implement, and analyze NLP algorithms.

CO5: Able to design different language modeling Techniques.

Course: INTERNET OF THINGS (Professional Elective – III)

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

CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.

CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.

CO3: Appraise the role of IoT protocols for efficient network communication.

CO4: Elaborate the need for Data Analytics and Security in IoT.

CO5: Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

Course: FUNDAMENTALS OF INTERNET OF THINGS (Open Elective – I)

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

CO1: Known basic protocols in sensor networks

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CO2: Program and configure Arduino boards for various designs.
CO3: Python programming and interfacing for Raspberry Pi
CO4: Design IoT applications in different domains.
CO5: Learn the programming and use of Arduino and Raspberry Pi boardsstress diagrams.
Course: ARTIFICIAL INTELLIGENCE AND NATURAL LANGUAGE PROCESSING LAB
Upon completion of the course, the students will be able to:
CO1: Apply basic principles of AI in solutions that require problem solving, knowledge representation, and learning.
CO2: Show sensitivity to linguistic phenomena and an ability to model them with formal grammars
CO3: Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
CO4: Able to design, implement, and analyze NLP algorithms.
CO5: Knowledge on basic Language processing features, design an innovative application using NLP components.
Course: DEVOPS LAB
Upon completion of the course, the students will be able to:
CO1: Apply different project management, integration, testing and code deployment tool
CO2: Identify components of Devops environment
CO3: Investigate different DevOps Software development, models
CO4: Demonstrate continuous integration and development using Jenkins
CO5: Implement automated system update and DevOps lifecycle
Course: INTERNET OF THINGS LAB (PE – III LAB)
Upon completion of the course, the students will be able to:
CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.
CO3: Appraise the role of IoT protocols for efficient network communication.
CO4: Elaborate the need for Data Analytics and Security in IoT.
CO5: Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.
Course: ENVIRONMENTAL SCIENCE
Upon completion of the course, the students will be able to:
CO1: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

CO2:	growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
CO3:	Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity.
CO4:	Environmental Pollution and Control Technologies.
CO5:	Environmental Protection act, Legal aspects Air Act- 1981.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

II YEAR- I Semester

Course: DISCRETE MATHEMATICS [CS310PC]	
Upon completion of the course, the students will be able to:	
CO1:	Ability to understand and construct precise mathematical proofs.
CO2:	Ability to use logic and set theory to formulate precise statements.
CO3:	Ability to analyze and solve counting problems on finite and discrete structures.
CO4:	Ability to describe and manipulate sequences.
CO5:	Ability to apply graph theory in solving computing problems.
Course: DATA STRUCTURES [CS302PC]	
Upon completion of the course, the students will be able to:	
CO1:	Ability to select the data structures that efficiently model the information in a problem.
CO2:	Ability to assess efficiency trade-offs among different data structure implementations or combinations.
CO3:	Implement and know the application of algorithms for sorting and pattern matching.
CO4:	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
CO5:	Introduces sorting and pattern matching algorithms.
Course: MATHEMATICAL AND STATISTICAL FOUNDATIONS [MA313BS]	
Upon completion of the course, the students will be able to:	
CO1:	Apply the number theory concepts to cryptography domain.
CO2:	Apply the concepts of probability and distributions to some case studies.
CO3:	Correlate the material of one unit to the material in other units.

CO4:	Resolve the potential misconceptions and hazards in each topic of study.
CO5:	Stochastic process and Markov chains.

Course: COMPUTER ORGANIZATION AND ARCHITECTURE [CS304PC]

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

CO1:	Understand the basics of instructions sets and their impact on processor design.
CO2:	Demonstrate an understanding of the design of the functional units of a digital computer system.
CO3:	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
CO4:	Design a pipeline for consistent execution of instructions with minimum hazards.
CO5:	Recognize and manipulate representations of numbers stored in digital computers.

Course: PYTHON PROGRAMMING [CS311PC]

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

CO1:	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions
CO2:	Demonstrate proficiency in handling Strings and File Systems.
CO3:	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO4:	Interpret the concepts of Object-Oriented Programming as used in Python.
CO5:	Implement exemplary applications related to Network Programming, Web Services and Databases in Python

Course: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS [SM306MS]

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

CO1:	The students will understand the various Forms of Business and the impact of economic variables on the Business.
CO2:	The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
CO3:	The Students can study the firm's financial position by analysing the Financial Statements of a Company.
CO4:	The study of the firm's financial, market-related, environmental, and organizational issues.
CO5:	cost and production analysis, pricing decisions and strategies, profit management, and wealth management. Databases in Python

Course: DATA STRUCTURES LAB [CS307PC]

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

CO1:	Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks
CO2:	Ability to Implement searching and sorting algorithms.
CO3:	Ability to Implement searching and sorting algorithms.

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CO4:	Ability to Implement stacks and queues.
CO5:	Ability to Implement Trees.

Course: PYTHON PROGRAMMING LAB [CS312PC]	
Upon completion of the course, the students will be able to:	
CO1:	Student should be able to understand the basic concepts scripting and the contributions of scripting language.
CO2:	Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
CO3:	Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations
CO4:	To understand the high-performance programs designed to strengthen the practical expertise.
CO5:	To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques

Course: GENDER SENSITIZATION LAB [MC309]	
Upon completion of the course, the students will be able to:	
CO1:	Students will have developed a better understanding of important issues related to gender in contemporary India.
CO2:	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film
CO3:	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
CO4:	Students will acquire insight into the gendered division of labour and its relation to politics and economics
CO5:	Men and women students and professionals will be better equipped to work and live together as equals.

II YEAR- II Semester

Course: FORMAL LANGUAGES AND AUTOMATA THEORY [CS416PC]	
Upon completion of the course, the students will be able to:	
CO1:	Able to understand the concept of abstract machines and their power to recognize the languages.
CO2:	Able to employ finite state machines for modeling and solving computing problems.
CO3:	Able to design context free grammars for formal languages.
CO4:	Able to distinguish between decidability and undecidability.
CO5:	Able to gain proficiency with mathematical tools and formal methods.

Course: SOFTWARE ENGINEERING [CS417PC]
Upon completion of the course, the students will be able to:

CO1:	Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
CO2:	Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
CO3:	Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.
CO4:	Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality manage
CO5:	Able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project.

Course: OPERATING SYSTEMS [CS403PC]

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

CO1:	Will be able to control access to a computer and the files that may be shared.
CO2:	Demonstrate the knowledge of the components of computer and their respective roles in computing.
CO3:	Ability to recognize and resolve user problems with standard operating environments.
CO4:	effectively.
CO5:	Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.

Course: DATABASE MANAGEMENT SYSTEMS [CS404PC]

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

CO1:	Gain knowledge of fundamentals of DBMS, database design and normal forms.
CO2:	Master the basics of SQL for retrieval and management of data.
CO3:	Be acquainted with the basics of transaction processing and concurrency control.
CO4:	Familiarity with database storage structures and access techniques
CO5:	To master the basics of SQL and construct queries using SQL.

Course: OBJECT ORIENTED PROGRAMMING USING JAVA [CS412PC]

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

CO1:	Able to solve real world problems using OOP techniques.
CO2:	Able to understand the use of abstract classes.
CO3:	Able to solve problems using java collection framework and I/o classes.
CO4:	Able to develop multithreaded applications with synchronization.
CO5:	Able to develop applets for web applications.

Course: OPERATING SYSTEMS LAB (Using UNIX/LINUX) [CS406PC]

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

CO1:	Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management
CO2:	Able to implement C programs using Unix system calls.
CO3:	Ensure the development of students applied skills in operating systems related areas.
CO4:	Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.
CO5:	memory management techniques.

Course: DATABASE MANAGEMENT SYSTEMS LAB [CS407PC]

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

CO1:	Design database schema for a given application and apply normalization.
CO2:	Acquire skills in using SQL commands for data definition and data manipulation.
CO3:	Develop solutions for database applications using procedures, cursors and triggers.
CO4:	Describe different transaction processing concepts and use different concurrency control techniques.
CO5:	Discuss advanced database technologies and products used in enterprise.

Course: JAVA PROGRAMMING LAB [CS408PC]

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

CO1:	Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
CO2:	The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.
CO3:	Ability to write programs using abstract classes.
CO4:	Ability to write multithreaded programs.
CO5:	Ability to write GUI programs using swing controls in Java.

Course: CONSTITUTION OF INDIA [MC409]

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

CO1:	Meaning of the constitution law and constitutionalism.
CO2:	Historical perspective of the Constitution of India.
CO3:	Salient features and characteristics of the Constitution of India.
CO4:	Scheme of the fundamental rights.
CO5:	Scheme of the Fundamental Right to Equality.

Course: DESIGN AND ANALYSIS OF ALGORITHMS
Upon completion of the course, the students will be able to:
CO1: Ability to analyze the performance of algorithms.
CO2: Introduces the data structure of disjoint sets.
CO3: Ability to choose appropriate data structures and algorithm design methods for a specified application.
CO4: Evaluate and compare different algorithms using worst-, average-, and best case analysis.
CO5: Ability to understand how the choice of data structures and the algorithm design methods Impact the performance of programs.
Course: INTRODUCTION TO DATA SCIENCE
Upon completion of the course, the students will be able to:
CO1: Understand basic terms what Statistical Inference means.
CO2: Identify probability distributions commonly used as foundations for statistical modelling. Fit a model to data.
CO3: describe the data using various statistical measures.
CO4: utilize R elements for data handling.
CO5: perform data reduction and apply visualization techniques.
Course: COMPUTER NETWORKS
Upon completion of the course, the students will be able to:
CO1: Gain the knowledge of the basic computer network technology.
CO2: The students with a general overview of the concepts and fundamentals of computer networks.
CO3: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
CO4: Obtain the skills of subnetting and routing mechanisms.
CO5: Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
Course: DATA MINING
Upon completion of the course, the students will be able to:
CO1: Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
CO2: Apply preprocessing methods for any given raw data.
CO3: Extract interesting patterns from large amounts of data.
CO4: Discover the role played by data mining in various fields.

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CO5: Choose and employ suitable data mining algorithms to build analytical applications.
Course: COMPUTER GRAPHICS (Professional Elective – I)
Upon completion of the course, the students will be able to:
CO1: Acquire familiarity with the relevant mathematics of computer graphics.
CO2: Be able to design basic graphics application programs, including animation.
CO3: Theory of computer graphics.
CO4: Illumination and color models; animation; rendering and implementation; visible surface detection.
CO5: Be able to design applications that display graphic images to given specifications.
Course: INFORMATION RETRIEVAL SYSTEMS (Professional Elective – II)
Upon completion of the course, the students will be able to:
CO1: Ability to apply IR principles to locate relevant information large collections of data.
CO2: Important concepts and algorithms in IRS.
CO3: Ability to design different document clustering algorithms.
CO4: Implement retrieval systems for web search tasks.
CO5: Design an Information Retrieval System for web search tasks.
Course: DATA MINING LAB
Upon completion of the course, the students will be able to:
CO1: Apply preprocessing statistical methods for any given raw data.
CO2: Gain practical experience of constructing a data warehouse.
CO3: Implement various algorithms for data mining in order to discover interesting patterns from large amounts of data.
CO4: Apply OLAP operations on data cube construction.
CO5: Intended to provide practical exposure of the concepts in data mining algorithms.
Course: COMPUTER NETWORKS LAB
Upon completion of the course, the students will be able to:
CO1: Implement data link layer farming methods.
CO2: Analyze error detection and error correction codes.
CO3: Implement and analyze routing and congestion issues in network design.
CO4: Implement Encoding and Decoding techniques used in presentation layer.

CO5:	To be able to work with different network tools.

Course: ADVANCED COMMUNICATION SKILLS LAB	
Upon completion of the course, the students will be able to:	
CO1:	To Improve The Students' Fluency In English, Through A Well-Developed
CO2:	Further, they would be required to communicate their ideas relevantly and coherently in writing.
CO3:	To prepare all the students for their placements.
CO4:	Transferring information from non-verbal to verbal texts and vice-versa.
CO5:	Gathering ideas and information to organize ideas relevantly and coherently.

Course: INTELLECTUAL PROPERTY RIGHTS	
Upon completion of the course, the students will be able to:	
CO1:	Ability to apply IR principles to locate relevant information large collections of data.
CO2:	Ability to design different document clustering algorithms.
CO3:	Implement retrieval systems for web search tasks.
CO4:	Design an Information Retrieval System for web search tasks.
CO5:	Introduction to Text Search Techniques.

III YEAR- II Semester

Course: COMPILER DESIGN	
Upon completion of the course, the students will be able to:	
CO1:	Demonstrate the ability to design a compiler given a set of language features.
CO2:	Demonstrate the the knowledge of patterns, tokens & regular expressions for lexical analysis.
CO3:	Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
CO4:	Design and implement LL and LR parsers.
CO5:	Design algorithms to generate machine code.

Course: MACHINE LEARNING	
Upon completion of the course, the students will be able to:	
CO1:	Understand the concepts of computational intelligence like machine learning.

CO2: Ability to get the skill to apply machine learning.
CO3: techniques to address the real time problems in different areas.
CO4: Understand the Neural Networks and its usage in machine learning application.
CO5: To study the pattern comparison techniques.

Course: BIG DATA ANALYTICS

Upon completion of the course, the students will be able to:
CO1: Ability to explain the foundations, definitions, and challenges of Big Data and various Analytical tools.
CO2: Ability to program using HADOOP and Map reduce, NOSQL.
CO3: Ability to understand the importance of Big Data in Social Media and Mining.
CO4: Ability to Understand Hadoop Architecture.
CO5: Ability to understand Data Analytics with R Machine Learning.

Course: SOFTWARE TESTING METHODOLOGIES (Professional Elective - III)

Upon completion of the course, the students will be able to:
CO1: To design best test strategies in accordance to the development model.
CO2: To develop the best test strategies in accordance to the development model.
CO3: To learn software test automation.
CO4: To learn management using latest tools.
CO5: Paths, Path products and Regular expressions

Course: FUNDAMENTALS OF INTERNET OF THINGS (Open Elective – I)

Upon completion of the course, the students will be able to:
CO1: Known basic protocols in sensor networks.
CO2: Program and configure Arduino boards for various designs..
CO3: Python programming and interfacing for Raspberry Pi.
CO4: Design IoT applications in different domains
CO5: Known about data handling and analytics in SDN

Course: MACHINE LEARNING LAB

Upon completion of the course, the students will be able to:
CO1: understand complexity of Machine Learning algorithms and their limitations

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CO2:	understand modern notions in data analysis-oriented computing
CO3:	be capable of confidently applying common Machine Learning algorithms in practice and implementing their own
CO4:	Be capable of performing experiments in Machine Learning using real-world data.
CO5:	Implement linear regression using python.

Course: BIG DATA ANALYTICS LAB

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

CO1:	Use Excel as an Analytical tool and visualization tool.
CO2:	Ability to program using HADOOP and Map reduce.
CO3:	Ability to perform data analytics using ML in R.
CO4:	Use cassandra to perform social media analytics.
CO5:	Able to program R-Project for data visualization of social media data.

Course: SOFTWARE TESTING METHODOLOGIES LAB (Professional Elective - III)

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

CO1:	Design and develop the best test strategies in accordance to the development model.
CO2:	To develop skills in software test automation and management using latest tools
CO3:	To provide knowledge of Software Testing Methods.
CO4:	Recording in context sensitive mode and analog mode.
CO5:	Bitmap checkpoint for object/window.

Course: ENVIRONMENTAL SCIENCE

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

CO1:	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2:	Understanding the importance of ecological balance for sustainable development.
CO3:	Understanding the impacts of developmental activities and mitigation measures.
CO4:	Understanding the environmental policies and regulations.
CO5:	Environmental Pollution and Control Technologies.

II YEAR- I Semester

Course: ANALOG AND DIGITAL ELECTRONICS [CS301ES]
Upon completion of the course, the students will be able to:
CO1: Know the characteristics of various components.
CO2: Understand the utilization of components
CO3: Design and analyze small signal amplifier circuits.
CO4: Learn Postulates of Boolean algebra and to minimize combinational functions.
CO5: Design and analyze combinational and sequential circuits.
Course: DATA STRUCTURES [CS302PC]
Upon completion of the course, the students will be able to:
CO1: Ability to select the data structures that efficiently model the information in a problem.
CO2: Ability to assess efficiency trade-offs among different data structure implementations
CO3: Combinations. Implement and know the application of algorithms for sorting and pattern matching.
CO4: Design programs using a variety of data structures, including hash tables, binary and general
CO5: Tree structures, search trees, tries, heaps, graphs, and AVL-trees.
Course: MATHEMATICAL AND STATISTICAL FOUNDATIONS [MA313BS]
Upon completion of the course, the students will be able to:
CO1: Apply the number theory concepts to cryptography domain.
CO2: Apply the concepts of probability and distributions to some case studies.
CO3: Correlate the material of one unit to the material in other units.
CO4: Resolve the potential misconceptions and hazards in each topic of study.
CO5: Stochastic process and Markov chains.
Course: COMPUTER ORGANIZATION AND ARCHITECTURE [CS304PC]
Upon completion of the course, the students will be able to:
CO1: Understand the basics of instructions sets and their impact on processor design.
CO2: Demonstrate an understanding of the design of the functional units of a digital computer system.
CO3: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.

CO4: Design a pipeline for consistent execution of instructions with minimum hazards.

CO5: Recognize and manipulate representations of numbers stored in digital computers.

Course: PYTHON PROGRAMMING [CS311PC]

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

CO1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions

CO2: Demonstrate proficiency in handling Strings and File Systems.

CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.

CO4: Interpret the concepts of Object-Oriented Programming as used in Python.

CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python

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

CO1: Know the characteristics of various components.

CO2: Understand the utilization of components.

CO3: Design and analyze small signal amplifier circuits.

CO4: Postulates of Boolean algebra and to minimize combinational functions.

CO5: Known about the logic families and realization of logic gates.

Course: DATA STRUCTURES LAB [CS307PC]

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

CO1: Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks

CO2: Ability to Implement searching and sorting algorithms.

CO3: Ability to Implement searching and sorting algorithms.

CO4: Ability to Implement stacks and queues.

CO5: Ability to Implement Trees.

Course: IT WORKSHOP LAB [CS308PC]

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

CO1: Identify various hardware components of a system.

CO2: Assemble the computer.

CO3: Use various Microsoft tools.

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CO4:	To impact the knowledge of various hardware components of a computer.
CO5:	To provide the skill of assembling the computer.

Course: PYTHON PROGRAMMING LAB [CS312PC]	
Upon completion of the course, the students will be able to:	
CO1:	Student should be able to understand the basic concepts scripting and the contributions of scripting language.
CO2:	Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
CO3:	Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations
CO4:	To understand the high-performance programs designed to strengthen the practical expertise.
CO5:	To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques

Course: GENDER SENSITIZATION LAB [MC309]	
Upon completion of the course, the students will be able to:	
CO1:	Students will have developed a better understanding of important issues related to gender in contemporary India.
CO2:	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film
CO3:	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
CO4:	Students will acquire insight into the gendered division of labour and its relation to politics and economics
CO5:	Men and women students and professionals will be better equipped to work and live together as equals.

II YEAR- II Semester

Course: DISCRETE MATHEMATICS [CS401PC]	
Upon completion of the course, the students will be able to:	
CO1:	Ability to understand and construct precise mathematical proofs.
CO2:	Ability to analyze and solve counting problems on finite and discrete structures.
CO3:	Ability to use logic and set theory to formulate precise statements.
CO4:	Ability to describe and manipulate sequences.
CO5:	Ability to apply graph theory in solving computing problems.
Upon completion of the course, the students will be able to:	

CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business.
CO2: The Demand, Supply, Production, Cost are learnt.
CO3: Market Structure, Pricing aspects are learnt.
CO4: The Students can study the firm's financial position.
CO5: analysing the Financial Statements of a Company.

Upon completion of the course, the students will be able to:
CO1: Will be able to control access to a computer and the files that may be shared.
CO2: Demonstrate the knowledge of the components of computer and their respective roles in computing.
CO3: Ability to recognize and resolve user problems with standard operating environments.
CO4: Gain practical knowledge of how programming languages, operating systems.
CO5: Architectures interact and how to use each effectively.

Course: COMPUTER NETWORKS [CS414PC]

Upon completion of the course, the students will be able to:
CO1: Gain the knowledge of the basic computer network technology.
CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
CO3: Obtain the skills of subnetting and routing mechanisms.
CO4: Familiarity with the essential protocols of computer networks.
CO5: how they can be applied in network design and implementation.

Course: OBJECT ORIENTED PROGRAMMING USING JAVA [CS412PC]

Upon completion of the course, the students will be able to:
CO1: Able to solve real world problems using OOP techniques.
CO2: Able to understand the use of abstract classes.
CO3: Able to solve problems using java collection framework and I/o classes.
CO4: Able to develop multithreaded applications with synchronization.
CO5: Able to develop applets for web applications.

Course: OPERATING SYSTEMS LAB (Using UNIX/LINUX) [CS406PC]

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

CO1:	Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management
CO2:	Able to implement C programs using Unix system calls.
CO3:	Ensure the development of students applied skills in operating systems related areas.
CO4:	Students will gain knowledge in writing software routines modules or implementing various concepts of operating system.
CO5:	memory management techniques.

Course: COMPUTER NETWORKS LAB [CS415PC]

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

CO1:	Implement data link layer farming methods.
CO2:	Analyze error detection and error correction codes.
CO3:	Implement and analyze routing and congestion issues in network design.
CO4:	Implement Encoding and Decoding techniques used in presentation layer.
CO5:	To be able to work with different network tools.

Course: JAVA PROGRAMMING LAB [CS408PC]

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

CO1:	Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
CO2:	The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.
CO3:	Ability to write programs using abstract classes.
CO4:	Ability to write multithreaded programs.
CO5:	Ability to write GUI programs using swing controls in Java.

Course: CONSTITUTION OF INDIA [MC409]

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

CO1:	Meaning of the constitution law and constitutionalism.
CO2:	Historical perspective of the Constitution of India.
CO3:	Salient features and characteristics of the Constitution of India.
CO4:	Scheme of the fundamental rights.
CO5:	Scheme of the Fundamental Right to Equality.

Course: DESIGN AND ANALYSIS OF ALGORITHMS
Upon completion of the course, the students will be able to:
CO1: Ability to analyze the performance of algorithms.
CO2: Introduces the data structure of disjoint sets.
CO3: Ability to choose appropriate data structures and algorithm design methods for a specified application.
CO4: Evaluate and compare different algorithms using worst-, average-, and best case analysis.
CO5: Ability to understand how the choice of data structures and the algorithm design methods Impact the performance of programs.
Course: CRYPTOGRAPHY AND NETWORK SECURITY
Upon completion of the course, the students will be able to:
CO1: Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
CO2: Ability to identify information system requirements for both of them such as client and server.
CO3: Describe the enhancements made to IPv4 by IPSec.
CO4: Ability to understand the current legal issues towards information security.
CO5: Understand various cryptographic algorithms.
Upon completion of the course, the students will be able to:
CO1: Gain knowledge of fundamentals of DBMS.
CO2: fundamentals on database design Normal forms Master the basics of SQL for retrieval and management of data.
CO3: Be acquainted with the basics of transaction processing and concurrency control.
CO4: Familiarity with database storage structures and access techniques.
CO5: Analysis of the DBMS
Course: FORMAL LANGUAGES & AUTOMATA THEORY
Upon completion of the course, the students will be able to:
CO1: Able to understand the concept of abstract machines and their power to recognize the languages.
CO2: Able to employ finite state machines for modeling and solving computing problems.
CO3: Able to design context free grammars for formal languages.
CO4: Able to distinguish between decidability and undecidability.

CO5: Able to gain proficiency with mathematical tools and formal methods
Course: COMPILER DESIGN (Professional Elective - I)
Upon completion of the course, the students will be able to:
CO1: Demonstrate the ability to design a compiler given a set of language features.
CO2: Demonstrate the the knowledge of patterns, tokens & regular expressions for lexical analysis.
CO3: Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
CO4: Design and implement LL and LR parsers.
CO5: Design algorithms to generate machine code.
Course: DISTRIBUTED SYSTEMS (Professional Elective – II)
Upon completion of the course, the students will be able to:
CO1: Ability to understand Transactions and Concurrency control.
CO2: Ability to understand Security issues.
CO3: Understanding Distributed shared memory.
CO4: Ability to design distributed systems for basic level applications.
CO5: Peer to Peer Systems, Transactions and Concurrency control
Course: CRYPTOGRAPHY AND NETWORK SECURITY LAB
Upon completion of the course, the students will be able to:
CO1: Provide security of the data over the network.
CO2: Do research in the emerging areas of cryptography and network security.
CO3: Implement various networking protocols.
CO4: Protect any network from the threats in the world.
CO5: Design a system with NS
Upon completion of the course, the students will be able to:
CO1: Make use of typical data definitions and manipulation commands.
CO2: Apply database queries to retrieve records.
CO3: Applying PL/SQL for processing database.
CO4: Apply front end tools to design forms, reports and menus.

CO5:	Develop solutions using database concepts for real time requirements.
Course: ADVANCED COMMUNICATION SKILLS LAB	
Upon completion of the course, the students will be able to:	
CO1:	To Improve The Students' Fluency In English, Through A Well-Developed
CO2:	Further, they would be required to communicate their ideas relevantly and coherently in writing.
CO3:	To prepare all the students for their placements.
CO4:	Transferring information from non-verbal to verbal texts and vice-versa.
CO5:	Gathering ideas and information to organize ideas relevantly and coherently.
Course:INTELLECTUAL PROPERTY RIGHTS	
Upon completion of the course, the students will be able to:	
CO1:	Intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.
CO2:	Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law
CO3:	Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation
CO4:	Trade mark law, copy right law, international patent law, and international development in trade secrets law.
CO5:	Unfair competition: Misappropriation right of publicity, false advertising.

III YEAR- II Semester

Course: CYBER SECURITY	
Upon completion of the course, the students will be able to:	
CO1:	Analyze and evaluate the cyber security needs of an organization.
CO2:	Understand Cyber Security Regulations and Roles of International Law.
CO3:	Design and develop a security architecture for an organization.
CO4:	Understand fundamental concepts of data privacy attacks
CO5:	To study the defensive techniques against these attacks.
Course: CYBER CRIME INVESTIGATIONS AND DIGITAL FORENSICS	
Upon completion of the course, the students will be able to:	
CO1:	Understand the fundamentals of cybercrime and issues.

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CO2: Understand different investigation tools for cybercrime.

CO3: Understand basics of Forensic Technology and Practices.

CO4: Analyze different laws, ethics and evidence handling procedures

CO5: To analyze how to conduct a digital forensics investigation and validate forensics data.

Course: SOFTWARE ENGINEERING

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

CO1: Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).

CO2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.

CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

CO4: of large software development projects.

CO5: capability maturity model integration (CMMI)

Course: MACHINE LEARNING (Professional Elective – III)

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

CO1: Understand the concepts of computational intelligence like machine learning.

CO2: Ability to get the skill to apply machine learning.

CO3: techniques to address the real time problems in different areas.

CO4: Understand the Neural Networks and its usage in machine learning application.

CO5: To study the pattern comparison techniques.

Course: FUNDAMENTALS OF INTERNET OF THINGS (Open Elective – I)

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

CO1: Known basic protocols in sensor networks

CO2: Program and configure Arduino boards for various designs.

CO3: Python programming and interfacing for Raspberry Pi

CO4: Design IoT applications in different domains.

CO5: Learn the programming and use of Arduino and Raspberry Pi boardsstress diagrams.

Course: CYBER SECURITY LAB

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

CO1: Get the skill to identify cyber threats/attacks.

CO2:	Get the knowledge to solve security issues in day to day life.
CO3:	Able to use Autopsy tools.
CO4:	Perform Memory capture and analysis.
CO5:	Demonstrate Network analysis using Network miner tools.
Course: CYBER CRIME INVESTIGATION & DIGITAL FORENSICS LAB	
Upon completion of the course, the students will be able to:	
CO1:	Learn the importance of a systematic procedure for investigation of data found on digital storage media that might provide evidence of wrong-doing
CO2:	To Learn the file system storage mechanisms and retrieve files in hidden format.
CO3:	Learn the use of computer forensics tools used in data analysis.
CO4:	Learn how to find data that may be clear or hidden on a computer disk, find out the open ports for the attackers through network analysis. Registry analysis
CO5:	To understand the network analysis, Registry analysis and analyze attacks using different forensics tools.
Course: MACHINE LEARNING LAB	
Upon completion of the course, the students will be able to:	
CO1:	understand complexity of Machine Learning algorithms and their limitations
CO2:	understand modern notions in data analysis-oriented computing
CO3:	be capable of confidently applying common Machine Learning algorithms in practice and implementing their own
CO4:	Be capable of performing experiments in Machine Learning using real-world data.
CO5:	Implement linear regression using python.
Course: ENVIRONMENTAL SCIENCE	
Upon completion of the course, the students will be able to:	
CO1:	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2:	growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
CO3:	Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity.
CO4:	Environmental Pollution and Control Technologies.
CO5:	Environmental Protection act, Legal aspects Air Act- 1981.

DEPARTMENT OF CIVIL ENGINEERING

I YEAR- I Semester

Course: MATRICES AND CALCULUS [MA101BS]
Upon completion of the course, the students will be able to:
CO1: Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
CO2: Find the Eigenvalues and Eigen vectors.
CO3: Reduce the quadratic form to canonical form using orthogonal transformations.
CO4: Solve the applications on the mean value theorems.
CO5: Evaluate the improper integrals using Beta and Gamma functions.
Course: APPLIED PHYSICS [PH102BS]
Upon completion of the course, the students will be able to:
CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids
CO2: Identify the role of semiconductor devices in science and engineering Applications.
CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
CO4: Appreciate the features and applications of Nanomaterials.
CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
Course: C PROGRAMMING AND DATA STRUCTURES [ME103ES]
Upon completion of the course, the students will be able to:
CO1: Understand the various steps in Program development.
CO2: Explore the basic concepts in C Programming Language.
CO3: Develop modular and readable C Programs.
CO4: Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures.
CO5: Apply data structures such as stacks, queues in problem solving.
Course: ENGINEERING WORKSHOP [ME104ES]
Upon completion of the course, the students will be able to:
CO1: Study and practice on machine tools and their operations

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CO2:	Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
CO3:	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
CO4:	Apply basic electrical engineering knowledge for house wiring practice.
CO5:	Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances

Course: ENGLISH FOR SKILL ENHANCEMENT [EN105HS]

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

CO1:	Understand the importance of vocabulary and sentence structures.
CO2:	Choose appropriate vocabulary and sentence structures for their oral and written communication.
CO3:	Demonstrate their understanding of the rules of functional grammar.
CO4:	Develop comprehension skills from the known and unknown passages.
CO5:	Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.

Course: ELEMENTS OF CIVIL ENGINEERING [CE106ES]

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

CO1:	Understands the method and ways of investigations required for Civil Engineering projects
CO2:	Identify the various rocks, minerals depending on geological classifications
CO3:	Evaluate the properties of cement, fine and coarse aggregates and determine its suitability for construction.
CO4:	To provide practical knowledge about physical properties of minerals and rocks.
CO5:	To determine the characteristics of cement, Coarse & Fine aggregates.

Course: APPLIED PHYSICS LABORATORY [PH107BS]

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

CO1:	Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
CO2:	Appreciate quantum physics in semiconductor devices and optoelectronics.
CO3:	Gain the knowledge of applications of dielectric constant.
CO4:	Understand the variation of magnetic field and behavior of hysteresis curve.
CO5:	Carried out data analysis.

Course: C PROGRAMMING AND DATA STRUCTURES LABORATORY [ME108ES]

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

CO1:	Develop modular and readable C Programs

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CO2:	Solve problems using strings, functions
CO3:	Handle data in files
CO4:	Implement stacks, queues using arrays, linked lists.
CO5:	To understand and analyze various searching and sorting algorithms.

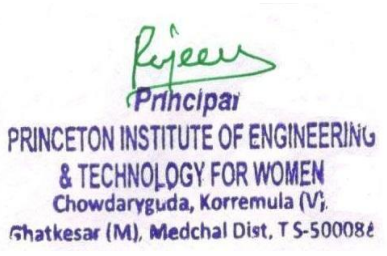
Course: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY [EN109HS]	
Upon completion of the course, the students will be able to:	
CO1:	Understand the nuances of English language through audio- visual experience and group activities
CO2:	Neutralise their accent for intelligibility
CO3:	Speak with clarity and confidence which in turn enhances their employability skills
CO4:	To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
CO5:	To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm

Course: ENVIRONMENTAL SCIENCE [MC110]	
Upon completion of the course, the students will be able to:	
CO1:	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2:	growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
CO3:	Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity.
CO4:	Environmental Pollution and Control Technologies.
CO5:	Environmental Protection act, Legal aspects Air Act- 1981.

I YEAR- II Semester

Course: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS [MA201BS]	
Upon completion of the course, the students will be able to:	
CO1:	Identify whether the given differential equation of first order is exact or not
CO2:	Solve higher differential equation and apply the concept of differential equation to real world problems.
CO3:	Use the Laplace transforms techniques for solving ODE's
CO4:	Evaluate the line, surface and volume integrals and converting them from one to another
CO5:	The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course: ENGINEERING CHEMISTRY [CH202BS]
Upon completion of the course, the students will be able to:
CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.
CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.
Course: COMPUTER AIDED ENGINEERING GRAPHICS [ME203ES]
Upon completion of the course, the students will be able to:
CO1: Apply computer aided drafting tools to create 2D and 3D objects
CO2: sketch conics and different types of solids
CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids
CO4: Read and interpret engineering drawings
CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
Course: APPLIED MECHANICS [CE204ES]
Upon completion of the course, the students will be able to:
CO1: Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
CO2: Solve problem of bodies subjected to friction
CO3: Find the location of centroid and calculate moment of inertia of a given section.
CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
CO5: Perform analysis of bodies lying on rough surfaces
Course: SURVEYING [CE205PC]
Upon completion of the course, the students will be able to:
CO1: Calculate angles, distances and levels
CO2: Identify data collection methods and prepare field notes
CO3: Understand the working principles of survey instruments
CO4: Estimate measurement errors and apply corrections
CO5: Interpret survey data and compute areas and volumes



Course: PYTHON PROGRAMMING LABORATORY [CE206ES]
Upon completion of the course, the students will be able to:
CO1: Develop the application specific codes using python.
CO2: Understand Strings, Lists, Tuples and Dictionaries in Python
CO3: Verify programs using modular approach, file I/O, Python standard library
CO4: Implement Digital Systems using Python
CO5: To Understand Lists, Dictionaries in python
Course: ENGINEERING CHEMISTRY LABORATORY [CH207BS]
Upon completion of the course, the students will be able to:
CO1: Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions
CO2: Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations of equivalence points of acids and bases
CO3: Students are able to prepare polymers like bakelite and nylon-6.
CO4: Estimations saponification value, surface tension and viscosity of lubricant oils.
CO5: Estimation of hardness of water to check its suitability for drinking purpose.
Course: SURVEYING LABORATORY - I [CE208PC]
Upon completion of the course, the students will be able to:
CO1: Student will be able to prepare Map and Plan for required site with suitable scale.
CO2: Student will be able to prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment
CO3: Student will be able to judge which type of instrument to be used for carrying out survey for a Particular Area and estimate the area
CO4: Student will be able to judge the profile of ground by observing the available existing contour map.
CO5: Student will learn and understand about Horizontal Angle, Vertical Angle, Horizontal distance and Vertical distance to study the ground profile

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

I YEAR- I Semester

Course: MATRICES AND CALCULUS [MA101BS]
Upon completion of the course, the students will be able to:

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CO1:	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
CO2:	Find the Eigenvalues and Eigen vectors.
CO3:	Reduce the quadratic form to canonical form using orthogonal transformations.
CO4:	Solve the applications on the mean value theorems.
CO5:	Evaluate the improper integrals using Beta and Gamma functions.

Course: APPLIED PHYSICS [PH102BS]

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

CO1:	Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids
CO2:	Identify the role of semiconductor devices in science and engineering Applications.
CO3:	Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
CO4:	Appreciate the features and applications of Nanomaterials.
CO5:	Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

Course: C PROGRAMMING FOR ENGINEERS [EC103ES]

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

CO1:	Draw flowcharts for solving arithmetic and logical problems
CO2:	Develop modular reusable code by understanding concepts of functions
CO3:	Formulate algorithms and programs using arrays, pointers, strings and structures
CO4:	Write a programs using Searching and sorting algorithms
CO5:	To understand the various steps in Program development.

Course: ENGINEERING WORKSHOP [ME104ES]

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

CO1:	Study and practice on machine tools and their operations
CO2:	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding
CO3:	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling
CO4:	Apply basic electrical engineering knowledge for house wiring practice.
CO5:	Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances

Course: ENGLISH FOR SKILL ENHANCEMENT [EN105HS]

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

CO1: Understand the importance of vocabulary and sentence structures.

CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication.

CO3: Demonstrate their understanding of the rules of functional grammar.

CO4: Develop comprehension skills from the known and unknown passages.

CO5: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.

Course: ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING [EC106ES]

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

CO1: Identify the different components used for electronics applications

CO2: Measure different parameters using various measuring instruments

CO3: Distinguish various signal used for analog and digital communications

CO4: Understand the significance of Electronics and communications subjects

CO5: Identify the different passive and active components

Course: APPLIED PHYSICS LABORATORY [PH107BS]

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

CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment

CO2: Appreciate quantum physics in semiconductor devices and optoelectronics.

CO3: Gain the knowledge of applications of dielectric constant.

CO4: Understand the variation of magnetic field and behavior of hysteresis curve.

CO5: Carried out data analysis.

Course: C PROGRAMMING FOR ENGINEERS LABORATOR [EC108ES]

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

CO1: Write algorithms and to draw flowcharts for solving problems and translate the algorithms/flowcharts to programs (in C language)

CO2: Use functions to develop modular reusable code

CO3: Use arrays, pointers, strings and structures to formulate algorithms and programs.

CO4: Understand Searching and sorting algorithms

CO5: To understand and analyze various searching and sorting algorithms.

Course: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY [EN109HS]

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

CO1:	Understand the nuances of English language through audio- visual experience and group activities
CO2:	Neutralise their accent for intelligibility
CO3:	Speak with clarity and confidence which in turn enhances their employability skills
CO4:	To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
CO5:	To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm

Course: ENVIRONMENTAL SCIENCE [MC110]	
Upon completion of the course, the students will be able to:	
CO1:	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2:	growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
CO3:	Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity.
CO4:	Environmental Pollution and Control Technologies.
CO5:	Environmental Protection act, Legal aspects Air Act- 1981.

I YEAR- II Semester

Course: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS [MA201BS]	
Upon completion of the course, the students will be able to:	
CO1:	Identify whether the given differential equation of first order is exact or not
CO2:	Solve higher differential equation and apply the concept of differential equation to real world problems.
CO3:	Use the Laplace transforms techniques for solving ODE's
CO4:	Evaluate the line, surface and volume integrals and converting them from one to another
CO5:	The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course: ENGINEERING CHEMISTRY [CH202BS]	
Upon completion of the course, the students will be able to:	
CO1:	Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
CO2:	The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
CO3:	They can learn the fundamentals and general properties of polymers and other engineering materials.
CO4:	They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course: COMPUTER AIDED ENGINEERING GRAPHICS [ME203ES]

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

CO1: Apply computer aided drafting tools to create 2D and 3D objects

CO2: sketch conics and different types of solids

CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids

CO4: Read and interpret engineering drawings

CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

Course: BASIC ELECTRICAL ENGINEERING [EE204ES]

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

CO1: Understand and analyze basic Electrical circuits

CO2: Study the working principles of Electrical Machines and Transformers

CO3: Introduce components of Low Voltage Electrical Installations.

CO4: To understand DC and Single & Three phase AC circuits

CO5: To study and understand the different types of DC, AC machines and Transformers.

Course: ELECTRONIC DEVICES AND CIRCUITS [EC205ES]

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

CO1: Acquire the knowledge of various electronic devices and their use on real life

CO2: Know the applications of various devices.

CO3: Acquire the knowledge about the role of special purpose devices and their applications.

CO4: To know the applications of devices

CO5: To know the switching characteristics of devices.

Course: APPLIED PYTHON PROGRAMMING LABORATORY [EC206ES]

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

CO1: Build basic programs using fundamental programming constructs

CO2: Write and execute python codes for different applications

CO3: Capable to implement on hardware boards

CO4: Implement Digital Systems using Python

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CO5:	To Understand Lists, Dictionaries in python
Course: ENGINEERING CHEMISTRY LABORATORY [CH207BS]	
Upon completion of the course, the students will be able to:	
CO1:	Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions
CO2:	Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases
CO3:	Students are able to prepare polymers like bakelite and nylon-6.
CO4:	Estimations saponification value, surface tension and viscosity of lubricant oils.
CO5:	Estimation of hardness of water to check its suitability for drinking purpose.
Course: BASIC ELECTRICAL ENGINEERING LABORATORY [EE208ES]	
Upon completion of the course, the students will be able to:	
CO1:	Verify the basic Electrical circuits through different experiments.
CO2:	Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods
CO3:	Analyze the transient responses of R, L and C circuits for different input conditions.
CO4:	To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
CO5:	To study the transient response of various R, L and C circuits using different excitations.
Course: ELECTRONIC DEVICES AND CIRCUITS LABORATORY [EEC209ES]	
Upon completion of the course, the students will be able to:	
CO1:	Acquire the knowledge of various semiconductor devices and their use in real life.
CO2:	Design aspects of biasing and keep them in active region of the device for functional circuits
CO3:	Acquire the knowledge about the role of special purpose devices and their applications.
CO4:	Switching characteristics of a transistor
CO5:	Regulated Power Suppliers

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I YEAR- I Semester

Course: MATRICES AND CALCULUS [MA101BS]

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

CO1: Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.

CO2: Find the Eigenvalues and Eigen vectors.

CO3: Reduce the quadratic form to canonical form using orthogonal transformations.

CO4: Solve the applications on the mean value theorems.

CO5: Evaluate the improper integrals using Beta and Gamma functions.

Course: ENGINEERING CHEMISTRY [CH102BS]

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

CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.

CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.

CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.

CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course: PROGRAMMING FOR PROBLEM SOLVING (CS103ES)

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

CO1: To write algorithms and to draw flowcharts for solving problems

CO2: To convert the algorithms/flowcharts to C programs

CO3: To code and test a given logic in the C programming language.

CO4: To decompose a problem into functions and to develop modular reusable code.

CO5: To use arrays, pointers, strings and structures to write C programs.

Course: BASIC ELECTRICAL ENGINEERING [EE104ES]

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

CO1: Understand and analyze basic Electrical circuits

CO2: Study the working principles of Electrical Machines and Transformers

CO3: Introduce components of Low Voltage Electrical Installations.

CO4: To understand DC and Single & Three phase AC circuits

CO5: To study and understand the different types of DC, AC machines and Transformers.

Course: COMPUTER AIDED ENGINEERING GRAPHICS [ME105ES]

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

CO1: Apply computer aided drafting tools to create 2D and 3D objects

CO2: sketch conics and different types of solids

CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids

CO4: Read and interpret engineering drawings

CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

Course: ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING (CS106ES)

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

CO1: Know the working principles of functional units of a basic Computer

CO2: Understand program development, the use of data structures and algorithms in problem solving.

CO3: Know the need and types of operating system, database systems.

CO4: Understand the significance of networks, internet, WWW and cyber security.

CO5: Understand Autonomous systems, the application of artificial intelligence.

Course: ENGINEERING CHEMISTRY LABORATORY [CH107BS]

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

CO1: Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions

CO2: Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases

CO3: Students are able to prepare polymers like bakelite and nylon-6.

CO4: Estimations saponification value, surface tension and viscosity of lubricant oils.

CO5: Estimation of hardness of water to check its suitability for drinking purpose.

Course: PROGRAMMING FOR PROBLEM SOLVING LABORATORY (CS108ES)

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

CO1: formulate the algorithms for simple problems

CO2: translate given algorithms to a working and correct program

CO3: correct syntax errors as reported by the compilers

CO4: identify and correct logical errors encountered during execution

CO5: represent and manipulate data with arrays, strings and structures

Course: BASIC ELECTRICAL ENGINEERING LABORATORY [EE109ES]

Upon completion of the course, the students will be able to:
CO1: Verify the basic Electrical circuits through different experiments.
CO2: Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods
CO3: Analyze the transient responses of R, L and C circuits for different input conditions.
CO4: To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
CO5: To study the transient response of various R, L and C circuits using different excitations.

I YEAR- II Semester

Course: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS [MA201BS]
Upon completion of the course, the students will be able to:
CO1: Identify whether the given differential equation of first order is exact or not
CO2: Solve higher differential equation and apply the concept of differential equation to real world problems.
CO3: Use the Laplace transforms techniques for solving ODE's
CO4: Evaluate the line, surface and volume integrals and converting them from one to another
CO5: The basic properties of vector valued functions and their applications to line, surface and volume integrals
Course: APPLIED PHYSICS [PH202BS]
Upon completion of the course, the students will be able to:
CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids
CO2: Identify the role of semiconductor devices in science and engineering Applications.
CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
CO4: Appreciate the features and applications of Nanomaterials.
CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
Course: ENGINEERING WORKSHOP [ME203ES]
Upon completion of the course, the students will be able to:
CO1: Study and practice on machine tools and their operations
CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding
CO3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling

CO4: Apply basic electrical engineering knowledge for house wiring practice.

CO5: Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances

Course: ENGLISH FOR SKILL ENHANCEMENT [EN204HS]

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

CO1: Understand the importance of vocabulary and sentence structures.

CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication.

CO3: Demonstrate their understanding of the rules of functional grammar.

CO4: Develop comprehension skills from the known and unknown passages.

CO5: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.

Course: ELECTRONIC DEVICES AND CIRCUITS [EC205ES]

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

CO1: Acquire the knowledge of various electronic devices and their use on real life.

CO2: Know the applications of various devices

CO3: Acquire the knowledge about the role of special purpose devices and their applications.

CO4: Understanding the usage of diodes and transistors

CO5: Design and analyze small signal amplifier circuits.

Course: PYTHON PROGRAMMING LABORATORY (CS206ES)

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

CO1: Develop the application specific codes using python

CO2: Understand Strings, Lists, Tuples and Dictionaries in Python

CO3: Verify programs using modular approach, file I/O, Python standard library

CO4: Implement Digital Systems using Python

CO5: To Understand Lists, Dictionaries in python

Course: APPLIED PHYSICS LABORATORY [PH207BS]

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

CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment

CO2: Appreciate quantum physics in semiconductor devices and optoelectronics.

CO3: Gain the knowledge of applications of dielectric constant.

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CO4:	Understand the variation of magnetic field and behavior of hysteresis curve.
CO5:	Carried out data analysis.

Course: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY [EN208HS]	
Upon completion of the course, the students will be able to:	
CO1:	Understand the nuances of English language through audio- visual experience and group activities
CO2:	Neutralise their accent for intelligibility
CO3:	Speak with clarity and confidence which in turn enhances their employability skills
CO4:	To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
CO5:	To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm

Course: IT WORKSHOP (CS209ES)	
Upon completion of the course, the students will be able to:	
CO1:	Perform Hardware troubleshooting
CO2:	Understand Hardware components and inter dependencies
CO3:	Safeguard computer systems from viruses/worms
CO4:	Document/ Presentation preparation
CO5:	Perform calculations using spreadsheets

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING ((AI & ML)

I YEAR- I Semester

Course: MATRICES AND CALCULUS [MA101BS]	
Upon completion of the course, the students will be able to:	
CO1:	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
CO2:	Find the Eigenvalues and Eigen vectors.
CO3:	Reduce the quadratic form to canonical form using orthogonal transformations.
CO4:	Solve the applications on the mean value theorems.
CO5:	Evaluate the improper integrals using Beta and Gamma functions.

Course: APPLIED PHYSICS [PH102BS]
Upon completion of the course, the students will be able to:
CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids
CO2: Identify the role of semiconductor devices in science and engineering Applications.
CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
CO4: Appreciate the features and applications of Nanomaterials.
CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
Course: PROGRAMMING FOR PROBLEM SOLVING (CS103ES)
Upon completion of the course, the students will be able to:
CO1: To write algorithms and to draw flowcharts for solving problems
CO2: To convert the algorithms/flowcharts to C programs
CO3: To code and test a given logic in the C programming language.
CO4: To decompose a problem into functions and to develop modular reusable code.
CO5: To use arrays, pointers, strings and structures to write C programs.
Course: ENGINEERING WORKSHOP [ME104ES]
Upon completion of the course, the students will be able to:
CO1: Study and practice on machine tools and their operations
CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding
CO3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling
CO4: Apply basic electrical engineering knowledge for house wiring practice.
CO5: Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances
Course: ENGLISH FOR SKILL ENHANCEMENT [EN105HS]
Upon completion of the course, the students will be able to:
CO1: Understand the importance of vocabulary and sentence structures.
CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication.
CO3: Demonstrate their understanding of the rules of functional grammar.
CO4: Develop comprehension skills from the known and unknown passages.
CO5: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.

Course: ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING (CS106ES)
Upon completion of the course, the students will be able to:
CO1: Know the working principles of functional units of a basic Computer
CO2: Understand program development, the use of data structures and algorithms in problem solving.
CO3: Know the need and types of operating system, database systems.
CO4: Understand the significance of networks, internet, WWW and cyber security.
CO5: Understand Autonomous systems, the application of artificial intelligence.
Course: APPLIED PHYSICS LABORATORY [PH107BS]
Upon completion of the course, the students will be able to:
CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment
CO2: Appreciate quantum physics in semiconductor devices and optoelectronics.
CO3: Gain the knowledge of applications of dielectric constant.
CO4: Understand the variation of magnetic field and behavior of hysteresis curve.
CO5: Carried out data analysis.
Course: PROGRAMMING FOR PROBLEM SOLVING LABORATORY (CS108ES)
Upon completion of the course, the students will be able to:
CO1: formulate the algorithms for simple problems
CO2: translate given algorithms to a working and correct program
CO3: correct syntax errors as reported by the compilers
CO4: identify and correct logical errors encountered during execution
CO5: represent and manipulate data with arrays, strings and structures
Course: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY [EN109HS]
Upon completion of the course, the students will be able to:
CO1: Understand the nuances of English language through audio- visual experience and group activities
CO2: Neutralise their accent for intelligibility
CO3: Speak with clarity and confidence which in turn enhances their employability skills
CO4: To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
CO5: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm

Course: ENVIRONMENTAL SCIENCE [MC110]	
Upon completion of the course, the students will be able to:	
CO1:	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2:	growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
CO3:	Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity.
CO4:	Environmental Pollution and Control Technologies.
CO5:	Environmental Protection act, Legal aspects Air Act- 1981.

I YEAR- II Semester

Course: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS [MA201BS]	
Upon completion of the course, the students will be able to:	
CO1:	Identify whether the given differential equation of first order is exact or not
CO2:	Solve higher differential equation and apply the concept of differential equation to real world problems.
CO3:	Use the Laplace transforms techniques for solving ODE's
CO4:	Evaluate the line, surface and volume integrals and converting them from one to another
CO5:	The basic properties of vector valued functions and their applications to line, surface and volume integrals
Course: ENGINEERING CHEMISTRY [CH202BS]	
Upon completion of the course, the students will be able to:	
CO1:	Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
CO2:	The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
CO3:	They can learn the fundamentals and general properties of polymers and other engineering materials.
CO4:	They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
CO5:	To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.
Course: COMPUTER AIDED ENGINEERING GRAPHICS [ME203ES]	
Upon completion of the course, the students will be able to:	
CO1:	Apply computer aided drafting tools to create 2D and 3D objects
CO2:	sketch conics and different types of solids

CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids
CO4: Read and interpret engineering drawings
CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
Course: BASIC ELECTRICAL ENGINEERING [EE204ES]
Upon completion of the course, the students will be able to:
CO1: Understand and analyze basic Electrical circuits
CO2: Study the working principles of Electrical Machines and Transformers
CO3: Introduce components of Low Voltage Electrical Installations.
CO4: To understand DC and Single & Three phase AC circuits
CO5: To study and understand the different types of DC, AC machines and Transformers.
Course: ELECTRONIC DEVICES AND CIRCUITS [EC205ES]
Upon completion of the course, the students will be able to:
CO1: Acquire the knowledge of various electronic devices and their use on real life.
CO2: Know the applications of various devices
CO3: Acquire the knowledge about the role of special purpose devices and their applications.
CO4: Understanding the usage of diodes and transistors
CO5: Design and analyze small signal amplifier circuits.
Course: PYTHON PROGRAMMING LABORATORY (CS206ES)
Upon completion of the course, the students will be able to:
CO1: Develop the application specific codes using python
CO2: Understand Strings, Lists, Tuples and Dictionaries in Python
CO3: Verify programs using modular approach, file I/O, Python standard library
CO4: Implement Digital Systems using Python
CO5: To Understand Lists, Dictionaries in python
Course: ENGINEERING CHEMISTRY LABORATORY [CH207BS]
Upon completion of the course, the students will be able to:
CO1: Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions
CO2: Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases

CO3:	Students are able to prepare polymers like bakelite and nylon-6.
CO4:	Estimations saponification value, surface tension and viscosity of lubricant oils.
CO5:	Estimation of hardness of water to check its suitability for drinking purpose.

Course: BASIC ELECTRICAL ENGINEERING LABORATORY [EE208ES]

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

CO1:	Verify the basic Electrical circuits through different experiments.
CO2:	Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods
CO3:	Analyze the transient responses of R, L and C circuits for different input conditions.
CO4:	To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
CO5:	To study the transient response of various R, L and C circuits using different excitations.

Course: IT WORKSHOP (CS209ES)

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

CO1:	Perform Hardware troubleshooting
CO2:	Understand Hardware components and inter dependencies
CO3:	Safeguard computer systems from viruses/worms
CO4:	Document/ Presentation preparation
CO5:	Perform calculations using spreadsheets

COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

I YEAR- I Semester

Course: MATRICES AND CALCULUS [MA101BS]

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

CO1:	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
CO2:	Find the Eigenvalues and Eigen vectors.
CO3:	Reduce the quadratic form to canonical form using orthogonal transformations.
CO4:	Solve the applications on the mean value theorems.

CO5: Evaluate the improper integrals using Beta and Gamma functions.

Course: ENGINEERING CHEMISTRY [CH102BS]

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

CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.

CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.

CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.

CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course: PROGRAMMING FOR PROBLEM SOLVING (CS103ES)

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

CO1: To write algorithms and to draw flowcharts for solving problems

CO2: To convert the algorithms/flowcharts to C programs

CO3: To code and test a given logic in the C programming language.

CO4: To decompose a problem into functions and to develop modular reusable code.

CO5: To use arrays, pointers, strings and structures to write C programs.

Course: BASIC ELECTRICAL ENGINEERING [EE104ES]

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

CO1: Understand and analyze basic Electrical circuits

CO2: Study the working principles of Electrical Machines and Transformers

CO3: Introduce components of Low Voltage Electrical Installations.

CO4: To understand DC and Single & Three phase AC circuits

CO5: To study and understand the different types of DC, AC machines and Transformers.

Course: COMPUTER AIDED ENGINEERING GRAPHICS [ME105ES]

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

CO1: Apply computer aided drafting tools to create 2D and 3D objects

CO2: sketch conics and different types of solids

CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids

CO4: Read and interpret engineering drawings

CO5:	Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
Course: ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING (CS106ES)	
Upon completion of the course, the students will be able to:	
CO1:	Know the working principles of functional units of a basic Computer
CO2:	Understand program development, the use of data structures and algorithms in problem solving.
CO3:	Know the need and types of operating system, database systems.
CO4:	Understand the significance of networks, internet, WWW and cyber security.
CO5:	Understand Autonomous systems, the application of artificial intelligence.
Course: ENGINEERING CHEMISTRY LABORATORY [CH107BS]	
Upon completion of the course, the students will be able to:	
CO1:	Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions
CO2:	Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases
CO3:	Students are able to prepare polymers like bakelite and nylon-6.
CO4:	Estimations saponification value, surface tension and viscosity of lubricant oils.
CO5:	Estimation of hardness of water to check its suitability for drinking purpose.
Course: PROGRAMMING FOR PROBLEM SOLVING LABORATORY (CS108ES)	
Upon completion of the course, the students will be able to:	
CO1:	formulate the algorithms for simple problems
CO2:	translate given algorithms to a working and correct program
CO3:	correct syntax errors as reported by the compilers
CO4:	identify and correct logical errors encountered during execution
CO5:	represent and manipulate data with arrays, strings and structures
Course: BASIC ELECTRICAL ENGINEERING LABORATORY [EE109ES]	
Upon completion of the course, the students will be able to:	
CO1:	Verify the basic Electrical circuits through different experiments.
CO2:	Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods
CO3:	Analyze the transient responses of R, L and C circuits for different input conditions.
CO4:	To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.

CO5:	To study the transient response of various R, L and C circuits using different excitations.

I YEAR- II Semester

Course: ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS [MA201BS]	
Upon completion of the course, the students will be able to:	
CO1:	Identify whether the given differential equation of first order is exact or not
CO2:	Solve higher differential equation and apply the concept of differential equation to real world problems.
CO3:	Use the Laplace transforms techniques for solving ODE's
CO4:	Evaluate the line, surface and volume integrals and converting them from one to another
CO5:	The basic properties of vector valued functions and their applications to line, surface and volume integrals
Course: APPLIED PHYSICS [PH202BS]	
Upon completion of the course, the students will be able to:	
CO1:	Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids
CO2:	Identify the role of semiconductor devices in science and engineering Applications.
CO3:	Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
CO4:	Appreciate the features and applications of Nanomaterials.
CO5:	Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
Course: ENGINEERING WORKSHOP [ME203ES]	
Upon completion of the course, the students will be able to:	
CO1:	Study and practice on machine tools and their operations
CO2:	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding
CO3:	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling
CO4:	Apply basic electrical engineering knowledge for house wiring practice.
CO5:	Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances
Course: ENGLISH FOR SKILL ENHANCEMENT [EN204HS]	
Upon completion of the course, the students will be able to:	
CO1:	Understand the importance of vocabulary and sentence structures.

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CO2:	Choose appropriate vocabulary and sentence structures for their oral and written communication.
CO3:	Demonstrate their understanding of the rules of functional grammar.
CO4:	Develop comprehension skills from the known and unknown passages.
CO5:	Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.

Course: ELECTRONIC DEVICES AND CIRCUITS [EC205ES]

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

CO1:	Acquire the knowledge of various electronic devices and their use on real life.
CO2:	Know the applications of various devices
CO3:	Acquire the knowledge about the role of special purpose devices and their applications.
CO4:	Understanding the usage of diodes and transistors
CO5:	Design and analyze small signal amplifier circuits.

Course: PYTHON PROGRAMMING LABORATORY (CS206ES)

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

CO1:	Develop the application specific codes using python
CO2:	Understand Strings, Lists, Tuples and Dictionaries in Python
CO3:	Verify programs using modular approach, file I/O, Python standard library
CO4:	Implement Digital Systems using Python
CO5:	To Understand Lists, Dictionaries in python

Course: APPLIED PHYSICS LABORATORY [PH207BS]

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

CO1:	Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment
CO2:	Appreciate quantum physics in semiconductor devices and optoelectronics.
CO3:	Gain the knowledge of applications of dielectric constant.
CO4:	Understand the variation of magnetic field and behavior of hysteresis curve.
CO5:	Carried out data analysis.

Course: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY [EN208HS]

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

CO1:	Understand the nuances of English language through audio- visual experience and group activities

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CO2:	Neutralise their accent for intelligibility
CO3:	Speak with clarity and confidence which in turn enhances their employability skills
CO4:	To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
CO5:	To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm

Course: IT WORKSHOP (CS209ES)

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

CO1:	Perform Hardware troubleshooting
CO2:	Understand Hardware components and inter dependencies
CO3:	Safeguard computer systems from viruses/worms
CO4:	Document/ Presentation preparation
CO5:	Perform calculations using spreadsheets

Course: ENVIRONMENTAL SCIENCE [MC210]

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

CO1:	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development
CO2:	growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
CO3:	Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity.
CO4:	Environmental Pollution and Control Technologies.
CO5:	Environmental Protection act, Legal aspects Air Act- 1981.

COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

I YEAR- I Semester

Course: MATRICES AND CALCULUS [MA101BS]

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

CO1:	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
CO2:	Find the Eigenvalues and Eigen vectors.
CO3:	Reduce the quadratic form to canonical form using orthogonal transformations.

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CO4: Solve the applications on the mean value theorems.

CO5: Evaluate the improper integrals using Beta and Gamma functions.

Course: ENGINEERING CHEMISTRY [CH102BS]

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

CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.

CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.

CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.

CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

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CO5:	Environmental Protection act, Legal aspects Air Act- 1981.

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