



Jyothi Engineering College

NAAC Accredited College with NBA Accredited Programmes*

Approved by AICTE & affiliated to APJ Abdul Kalam Technological University

A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR

JYOTHI HILLS, VETTIKATTIRI P.O, CHERUTHURUTHY, THRISSUR. PIN-679531 PH : +91- 4884-259000, 274423 FAX : 04884-274777



NBA accredited B.Tech Programmes in Computer Science & Engineering, Electronics & Communication Engineering, Electrical & Electronics Engineering and Mechanical Engineering valid for the academic years 2016-2022. NBA accredited B.Tech Programme in Civil Engineering valid for the academic years 2019-2022.

Course Outcomes - 2015 Scheme

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Dr. SUNNY JOSEPH KALAYATHANKAL

M.Tech, MCA, M.Sc, M.Phil, B.Ed

Ph.D (Computer Science), Ph.D (Maths)

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COs of First year (Common to ALL Branches)

Course Code	Course Name	Course Outcome - On completion of this course the students will be able to	
C101	CALCULUS	C101.1	Acquire the knowledge of analysis compounds using various spectroscopic methods.
		C101.2	To acquire the knowledge about energy efficient batteries
		C101.3	Apply the knowledge in the analysis and separation of complex organic compounds, using modern instrumentation like TGA,DTA,HPLC,GC
		C101.4	To design and synthesis nano materials and polymers which are essential to human life.
		C101.5	Knowledge of methods to determine the calorific value of fuels and detailed knowledge about petroleum products and its application
		C101.6	Develop innovative methods to produce soft water for industrial use and different methods to purify waste water
C102	ENGINEERING PHYSICS	C102.1	Students will be able to familiarise with the basic concepts of oscillations and waves.
		C102.2	Students will be able to know the various phenomena of interference and diffraction of light.
		C102.3	Students will be able to study the wonderful aspects of polarization of light and superconductivity
		C102.4	Students will be able to develop the basic concepts of Quantum Mechanics and statistical mechanics

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		C102.5	Students will be able to familiarise with the applications of acoustics and ultrasonics.
		C102.6	Students will be able to understand the concepts of lasers , optical fibres and solid state devices.
C103	ENGINEERING GRAPHICS	C103.1	Ability to know the fundamentals of Engineering Drawing Standards.
		C103.2	Able to prepare the orthographic projections of points and straight lines placed in various quadrants.
		C103.3	Demonstrate the ability to draw orthographic projections of various solids, sectioned views of solids, developments of solids, perspective projection and intersection of solids.
		C103.4	Ability to prepare neat drawings and proper dimensioning.
		C103.5	Able to understand the features of CAD software and preparation of Isometric and free hand sketching.
C104	INTRODUCTION TO COMPUTING & PROBLEM SOLVING	C104.1	Ability to identify different components of a computer
		C104.2	Ability to design algorithmic solution to problems.
		C104.3	Ability to convert algorithms to Python programs.
		C104.4	Ability to solve problems using object-oriented concept.
		C104.5	Ability to design modular Python programs using functions.
		C104.6	Ability to develop recursive solutions
C105		C105.1	Student will be able to understand the different types of environmental pollution problems and their sustainable solutions

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	INTRODUCTION TO SUSTAINABLE ENGINEERING	C105.2	Student will be able to work in the area of sustainability for research and education
		C105.3	Student will have a broader perspective in thinking for sustainable practices by utilizing the engineering knowledge and principles
C106	BASICS OF ELECTRONICS ENGG	C106.1	Acquire the knowledge of analysis compounds using various spectroscopic methods.
		C106.2	To acquire the knowledge about energy efficient batteries
		C106.3	Apply the knowledge in the analysis and separation of complex organic compounds, using modern instrumentation like TGA,DTA,HPLC,GC
		C106.4	To design and synthesis nano materials and polymers which are essential to human life.
		C106.5	Knowledge of methods to determine the calorific value of fuels and detailed knowledge about petroleum products and its application
		C106.6	Develop innovative methods to produce soft water for industrial use and different methods to purify waste water
C107	ENGINEERING PHYSICS LAB	C107.1	Students will be able to develop skills to impart practical knowledge in real time solution about some of the phenomena they have studied in the Engineering Physics course.
		C107.2	Students will be able to conduct, analyze and interpret experiments in Engineering Physics.
		C107.3	Students will be able to understand measurement technology and real time applications in engineering studies.
		C107.4	Students will be able to communicate verbally and graphically.
		C107.5	Students will be able to write the results of calculations in a clear and concise manner.

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		C107.6	Students will be able to understand principle, concept, working and application of new technology.
C108	COMPUTER PROGRAMMING LAB	C108.1	To familiarize the students with basic hardware & Software tools
		C108.2	To implement algorithms studied in the course ICPS
		C108.3	To learn the implementation of control structures , Iterations, and recursive functions , Lists & Tuples & Dictionaries
		C108.4	To implement operation on files
		C108.5	To implement a small micro project using python
C109	Basic Engineering Workshop(EC)	C109.1	Students will gain knowledge of standard voltages and their tolerances, safety aspects of electrical systems and importance of protective measures in wiring systems.
		C109.2	Students will be familiarized with the types of wires, cables and other accessories used in wiring.
		C109.3	Students should be able to wire simple lighting circuits for domestic buildings.
		C109.4	Students should be able to distinguish between light and power circuits.
C110	DIFFERENTIAL EQUATIONS	C110.1	Students can form and solve homogenous differential equations
		C110.2	Students can apply solution of homogeneous differential equations to form general solution
		C110.3	Students can analyze periodic functions in terms of their frequency components.
		C110.4	Students can identify and solve various partial differential equations

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		C110.5	Students can form Wave equation and physically interpret the solutions.
		C110.6	Students can conclude quantitative statements about the physical meaning of the solution of heat equations related to engineering process.
C111	ENGINEERING CHEMISTRY	C111.1	Acquire the knowledge of analysis compounds using various spectroscopic methods
		C111.2	To acquire the knowledge about energy efficient batteries.
		C111.3	Apply the knowledge in the analysis and separation of complex organic compounds, using modern instrumentation like TGA,DTA,HPLC,GC
		C111.4	To design and synthesis nano materials and polymers which are essential to human life.
		C111.5	Knowledge of methods to determine the calorific value of fuels and detailed knowledge about petroleum products and its application
		C111.6	Develop innovative methods to produce soft water for industrial use and different methods to purify waste water.
C112	BE100: MECHANICS	C112.1	Students will be able to apply and demonstrate the concepts of mechanics to practical engineering problems.
		C112.2	Students will be able to determine the properties of planes and solids.
		C112.3	Students will be able to apply fundamental concepts of dynamics to practical problems
		C112.2	Students will able to understand different types of Vibration and solve problems
		C112.5	Ability of the students to solve mechanics problems associated with friction forces
		C112.6	Students will be able to find out centre of mass and Momemnt of inertia of different geometry.

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M.Tech
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C113	BE102: DESIGN ENGINEERING	C113.1	Able to appreciate the different elements involved in good designs and to apply them in practice when called for
		C113.2	Aware of the product oriented and user oriented aspects that make the design a success.
		C113.3	Will be capable to think of innovative designs incorporating different segments of knowledge gained in the course
		C113.4	Students will have a broader perspective of design covering function, cost, environmental sensitivity, safety and other factors other than engineering analysis.
C114	CS100 : COMPUTER PROGRAMMING	C114.1	Students will be able to identify appropriate C language constructs to solve problems.
		C114.2	Students will be able to analyze problems, identify subtasks and implement them as functions/procedures.
		C114.3	Students will be able to implement algorithms using efficient C-programming techniques
		C114.4	Students will be able to explain the concept of file system for handling data storage and apply it for solving problems
		C114.5	Students will be able to apply sorting & searching techniques to solve application programs.
C115	EC100 : BASICS OF ELECTRONICS ENGINEERING	C115.1	Student can identify the active and passive electronic components, Will be able to know various types of components Understand its specifications.
		C115.2	Student can familiarize the working of diodes, transistors, and integrated circuits.
		C115.3	Student can understand the working of rectifiers, amplifiers and oscillators.
		C115.4	Student can have a basic knowledge about measuring instruments
		C115.5	Students can get a fundamental idea of basic communication systems.

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		C115.6	Student can get a basic idea of Entertainment systems.
C116	CY110:ENGINEERING CHEMISTRY LAB	C116.1	An ability to gain knowledge about different types of qualitative and quantitative estimation
		C116.2	An ability to understand, explain and use instrumental techniques for chemical analysis
		C116.3	Students will be able to apply and demonstrate the theoretical concepts of engineering chemistry and to develop scientific attitude
		C116.4	Students will be able to analyze the quality of water by determining its chemical parameters
		C116.5	Students will be able to measure chemical parameters to solve problems both individually as well as in team by analyzing and interpreting data from arrange of sources.
		C116.6	To acquire the skill for the preparation of engineering materials like polymers.
C117	CS120 : COMPUTER PROGRAMMING LAB	C117.1	Students will be able to analyse a problem, find appropriate programming language construct should be used and implement C program for the problem.
		C117.2	Develop C programs involving functions, recursion, pointers, and structures.
		C117.3	Design applications using sequential and random access file processing.
		C117.4	Develop C programs for simple applications making use of basic constructs, arrays and strings
		C117.5	Write programs that perform operations using derived data types
C118	EC110: BASIC ENGINEERING WORKSHOP - EC	C118.1	Graduates will be able to identify electronics components like Resistors, Capacitors, Diodes, Transistors and UJT
		C118.2	Graduates will be able to use measuring instruments like the multimeter, Function generator, Power supply & DSO.
		C118.3	Graduates will be able to test all Active and Passive Components

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		C118.4	Graduates will be able to assemble circuits on a breadboard.
		C118.5	Graduates will be able to Understand PCB fabrication process, assembling, dismantling systems.
		C118.6	Graduates understand soldering and desoldering skills, useful in electronic circuit interconnections

COs of Civil Engineering

C201	MA201 : LINEAR ALGEBRA & COMPLEX ANALYSIS	C201.1	Students will be able to achieve algebraic methods to find the solution for engineering computational problems ,including vector spaces and eigen value problems
		C201.2	Students will be able to apply the properties of matrix in various situations.
		C201.3	Students will be able to analyse the properties of points lying in the n-dimensional plane.
		C201.4	Students will be able to sketch out complex functions and evaluate the definite Integrals
		C201.5	Students will be able to represent the complex functions and its image graphically
		C201.6	Students will be able to solve complex integrals in different ways
C202	CE 201: Mechanics of Solids	C202.1	Able to calculate internal forces in members subject to axial loads, shear, torsion and bending and plot their distributions
		C202.2	Able to calculate normal, shear, torsion and bending stresses and strains
		C202.3	Able to transform the state of stress at a point and can determine the principal and maximum shear stresses using equations as well as the Mohr's circle
		C202.4	Able to understand the column buckling and the critical load and stress

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		C202.5	Able to evaluate beams by finding their deflection by various methods.
		C202.6	Able to assess the mechanical properties of elastic materials
C203	CE 203: Fluid Mechanics – I	C203.1	Able to get a basic knowledge of fluids in static, kinematic and dynamic equilibrium, so as to solve real life problems in fluid mechanics
		C203.2	Able to get a basic knowledge of fluids in kinematic and dynamic equilibrium, so as to solve real life problems in fluid mechanics
		C203.3	State Euler's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and inviscid fluids.
		C203.4	Design simple pipe systems to deliver fluids under specified conditions.
		C203.5	Describe the concepts of viscous boundary layers and the momentum integral and use them to determine integral thicknesses.
C204	CE 205: Engineering Geology	C204.1	Able to awareness about earth resources and processes to be considered in various facets of civil engineering
		C204.2	Able to awareness about hydrogeology, problems created in construction and subsurface control methods
		C204.3	Able to awareness about earthquakes, various minerals and their properties
		C204.4	Able to awareness about rocks, formation of rocks, and their physical properties
		C204.5	Able to awareness about altitude of geological structures, natural hazards, geological factors considered in the construction of various structural members
C205	CE 207: Surveying	C205.1	explain the concepts of principles of surveying and methods of ranging
		C205.2	understand fundamental idea about levelling and its application contour maps its relevance etc
		C205.3	understand fundamental concepts to find area and volume of irregular plot and application of theodolite
		C205.4	understand fundamental concepts theory of triangulation satellite station its application etc

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		C205.5	understand fundamental concepts of theory of errors and its practical application
		C205.6	understand fundamental concepts and get aware about EDM and Total station
C206	HS 210: Life Skills	C206.1	Communicate effectively.
		C206.2	Make effective presentations
		C206.3	Write different types of reports
		C206.4	Face interview & group discussion
		C206.5	Critically think on a particular problem
		C206.6	Solve problems.
C207	CE 231: Civil Engineering Drafting Lab	C207.1	Students will be able to understand the fundamentals of Civil Engineering drawing
		C207.2	Students will be able to get the knowledge to interpret base level building plans.
		C207.3	Students will be able to understand the principles of planning
		C207.4	Students will be able to learn drafting of buildings
		C207.5	Students will be able to impart knowledge on drafting software such as AutoCAD.
C208	CE 233: Surveying Lab	C208.1	To equip the students to undertake survey using tacheometer
		C208.2	To equip the students to undertake survey using total station
		C208.3	To impart awareness on distomat and handheld GPS
		C208.4	To provide an awareness of conventional methods in surveying
		C208.5	To improve their ability to work as team
		C208.6	To understand the real life hurdles while conducting a survey

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C209	MA 201: Probability Distributions, Transforms and Numerical Methods	C209.1	Students will be able to apply the concept of discrete probability density functions and special probability Distributions in different engineering fields.
		C209.2	Students will be able to apply the concept of continuous discrete probability density functions and special probability Distributions in different engineering fields.
		C209.3	Students will be able to express the non periodic function as fourier integrals.
		C209.4	Students will be able to solve differential equations using Laplace Transform
		C209.5	Students will be able to use numerical methods and their applications in solving engineering problems.
		C209.6	Students will be able to solve the differential equations using numerical techniques
C210	CE202: Structural Analysis- I	C210.1	To utilize comprehensive methods of structural analysis with emphasis on analysis of elementary structures
		C210.2	To apply different methods to find out deflection of a structure
		C210.3	To identify, formulate and solve engineering problems connected to indeterminate structures and their analysis
		C210.4	To apply basic knowledge of moving loads and influence line diagrams
		C210.5	To get the basic concept to analyse the forces in cables and suspension bridges
		C210.6	To apply the concept of three hinged arches in practical engineering problems
C211	CE204: Construction Technology	C211.1	To understand construction materials , their components and manufacturing process
		C211.2	To know the properties of concrete and different mix design methods
		C211.3	To get the details regarding the construction of building components.
		C211.4	To analyse and apply learning of materials , structure , servicing and construction of masonry domestic buildings
		C211.5	To define and describe the concepts and design criteria of tall framed and load bearing buildings.

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C212	CE206: Fluid Mechanics- II	C212.1	Explore the Concept of open channel flow
		C212.2	Understand fundamental meaning of Hydraulic jump
		C212.3	Analyze the fundamentals of Non uniform flow
		C212.4	Understand fundamental concepts of Turbines & Pumps
		C212.5	Importance of Dimensional analysis in real world problems
C213	CE208: Geotechnical Engineering- I	C213.1	The students will be able to create an awareness on the basic principles governing soil behavior
		C213.2	The students will be able to analyse and classify soil based on standard geotechnical engineering practice.
		C213.3	The students will be able to perform and laboratory tests on permeability of soils and analyze the coefficient of permeability of soils
		C213.4	The students will be able to understand the shear strength of soil and laboratory methods to find out the shear strength parameters of soil
		C213.5	The students be able to conduct one-dimensional compression tests and estimate settlement parameters
		C213.6	The students will be able to evaluate the stability of slopes by considering various slope analysis methods
C214	HS 200: Business Economics	C214.1	To familiarize the prospective engineers with elementary Principles of Economics and Business Economics
		C214.2	To acquaint the students with tools and techniques that are useful in their profession in Business Decision Making which will enhance their employability.
		C214.3	To apply business analysis to the "firm" under different market conditions.
		C214.4	To apply economic models to examine current economic scenario and evaluate policy options for addressing economic issues
		C214.5	To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate

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		C214.6	To prepare and analyse various business tools like balance sheet, cost benefit analysis and rate of returns at an elementary level
C215	CE232: Materials Testing Lab I	C215.1	Students will understand different mechanical properties and characteristics of materials
		C215.2	Students will be to evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion
		C215.3	Students will be able to develop skills on drawing inference from their practical experience that help them to design mechanical components
		C215.4	Students will be able to derive knowledge individually and as a team that will help them to learn courses related to material science.
		C215.5	Students will be to evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts
C216	CE234: Fluid Mechanics Lab	C216.1	Students will be able to develop the skill on selecting various taps, valves, pipe fittings, gauges, pitot tubes, water meters etc.
		C216.2	Students will be able to apply the fundamental principles of fluid mechanics in calculations involving basic flow measuring devices in both closed and open channel flows
		C216.3	Students will be able to select an appropriate pump/turbine with reference to given application/situation.
		C216.4	Students will be able to analyze the performance characteristics pumps/turbines.
		C216.5	Students will be able to predict the stability of a floating vessel following the principles of metacentric height and radius of gyration
C301	CE301: Design of Concrete Structures I	C301.1	The students will be able to apply the fundamental concepts of limit state method.
		C301.2	The students will be able to design for shear using IS code of practice.
		C301.3	The students will be able design reinforced concrete elements in bending and torsion.
		C301.4	The students will be able to design slabs subjected to various load conditions

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		C301.5	The students will be able to analyze and design for deflection and crack control of reinforced concrete members and also to design two way slabs
		C301.6	The students will be able to design columns and staircases.
C302	CE303: Structural Analysis- II	C302.1	Students will be able to analyze the continuous beams using Clapeyrons Theorem
		C302.2	Students will be able to analyze beams and frames using Slope deflection method
		C302.3	Students will be able to analyze beams and frames using Moment distribution method
		C302.4	Students will be able to analyze beams and frames using Kani's method
		C302.5	Students will be able to analyze curved beams in plan
		C302.6	Students will be able to analyze structures using plastic theory
C303	CE305: Geotechnical Engineering- II	C303.1	To understand the basic concepts, theories and methods of analysis and design in foundation engineering;
		C303.2	To identify the field problems related to geotechnical engineering and to take appropriate engineering decisions.
		C303.3	To select and design the foundations as per field condition
		C303.4	To evaluate the consolidation settlement in the field
		C303.5	To learn the ability to use modern soil mechanics equipment for ground improvement and soil investigation procedures.
C304	CE307: Geomatics	C304.1	The students will possess knowledge on the Concepts of Traverse Surveying.
		C304.2	Understanding of the layout of Horizontal Curves and Vertical curves.
		C304.3	Gain a basic understanding of the principles,operation and surveying of the Global Positioning System.
		C304.4	Understand the concept of Remote Sensing and its Application
		C304.5	Identifying the concept and uses of the GIS system

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C305	CE309: Water Resources Engineering	C305.1	Students will be able to understand the availability of water on hydrosphere, its distribution and quantification.
		C305.2	Students will be able to determine crop water requirements for design of irrigation systems.
		C305.3	Students will be able to compute the yield of aquifers and wells.
		C305.4	Students will be able to understand the various features of river training works.
		C305.5	Students will be able to estimate the storage capacity of reservoirs and their useful life
		C305.6	Students will be able to acquire the knowledge on the scientific methods for computing irrigation water requirements.
		C305.7	Students will be able to acquire fundamental knowledge on reservoir engineering and river engineering
C306	CE365: Functional Design of Buildings	C306.1	to understand and analyze effective decisions in use of principles of functional planning with respect to acoustics
		C306.2	to understand various auditorium design and lighting and thermal design of building in various climatic zones that the students may encounter in his/her professional career
		C306.3	to select different building material and explain the manner in which they can be used in different types of buildings with respect to various functional requirements like Acoustics lighting thermal comfort etc
		C306.4	To apply the techniques learned to the estimate of solar radiation falling on different surfaces of buildings
		C306.5	to design shading device to protect from direct sunlight and also design energy efficient design functionally comfortable low energy green buildings considering various climatic conditions
C307	CE371: Environment and Pollution	C307.1	Students will be able to learn about environment, various types of pollution, pollutants, related diseases
		C307.2	To study about source and effects of air pollution and different control measures
		C307.3	To understand about water pollution, its causes and treatments
		C307.4	To study about solid wastes and its management

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		C307.5	To learn about effects of land pollution and its abatement measures
		C307.6	To understand about noise pollution, its effects and control measures
C308	CE341: Design Project	C308.1	Students can explore the latest developments in engineering
		C308.2	Students can undertake a thorough review on literature
		C308.3	Students can understand the engineering aspects of design
		C308.4	Students can understand the various concepts in design, process and systems
		C308.5	Students can explore the various solutions for engineering problems
		C308.6	Students get an overview on technical presentations and writing
C309	CE331: Materials Testing Lab II	C309.1	Understand the fundamentals of civil constructions
		C309.2	Preparation of concrete mix design
		C309.3	Acquire the knowledge of properties of building materials like cement, aggregates, tiles.
		C309.4	Study the tests on fresh concrete
		C309.5	Improve the ability of team work
C310	CE 333: Geotechnical Engineering Lab	C310.1	Students will be able to gain knowledge about the procedures of laboratory tests used for determination of physical, index and engineering properties of soils
		C310.2	Students should have the capability to classify soils based on test results and interpret engineering behavior based on test results
		C310.3	Students will be able to evaluate the permeability and shear strength of soils
		C310.4	Students will be able to evaluate settlement characteristics of soils
		C310.5	Students will be able to evaluate compaction characteristics required for field application

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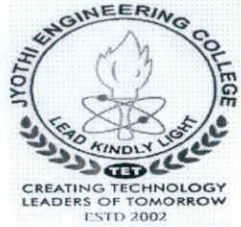
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C311	CE302: Design of Hydraulic Structures	C311.1	Perform the stability analysis of gravity dams
		C311.2	Graduates shall be able to familiar with the different types of dams, components, design criteria and causes of failure
		C311.3	Design major and minor irrigation structures such as surplus works, regulators, canal fall and cross drainage works
		C311.4	Graduates shall be able to understand basic knowledge about hydraulic structures
		C311.5	Graduates can be able to read working drawings
C314	CE308: Transportation Engineering- I	C314.1	Design various geometric elements of a highway
		C314.2	Determine the characteristics of pavement materials and design flexible pavements
		C314.3	Conduct traffic engineering studies and analyze data for efficient management of roadway facilities
		C314.4	Plan and design basic airport facilities
		C314.5	Enhance the presentation ability and team work
		C314.6	Identification of traffic aids and failures in pavement
C315	HS300 : Principle of Management	C315.1	Students will be able to recall and identify the relevance of management concepts
		C315.2	Students will be able to describe, discuss and relate management techniques adopted within an organization
		C315.3	Students will be able to apply management techniques for meeting current and future management challenges faced by the organization
		C315.4	Students will be able to compare the management theories and models critically and to inspect and question its validity in the real world
		C315.5	Students will be able to assess and modify different theories of management so as to relate it to current management challenges

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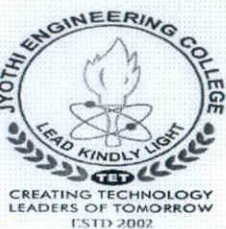


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		C315.6	Students will be able to apply principles of management in order to execute the role as a manager
C317	CE332: Transportation Engineering Lab	C317.1	Know about various properties required for different types of pavement constructions
		C317.2	Know about selection of different pavement construction materials based on the properties..
		C317.3	Students will be able to correlate the lab experience with field and can identify the tests to be done for checking the quality.
		C317.4	students will be able to enhance their learning and thinking ability
		C317.5	Students will be able to work independently and in groups
		C317.6	Students will be able to communicate their ideas and concepts
C401	CE 401: Design of steel Structures	C401.1	Students should be able to analyze and design bolted and welded connections.
		C401.2	Students should be capable to analyze and design tension members using the IS specifications
		C401.3	Students should be aware of various connections in steel columns and able to design columns under axial loads using IS specifications
		C401.4	Students should be able to design beams and plate girders
		C401.5	Students should be able to assess loads on truss and design purlins.
		C401.6	Students should be aware on design of Structural Components Using Timber.
C402	CE 403: Structural Analysis- III	C402.1	Students will be able to analyse structures using the approximate method
		C402.2	Students will be able to understand the basics of matrix analysis
		C402.3	Students will be able to analyse trusses, continuous beams, and rigid frames using flexibility method
		C402.4	Students will be able to analyse trusses, continuous beams, and rigid frames by stiffness method
		C402.5	Students will be able to conceive Finite element procedures by direct stiffness method

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		C402.6	Students will be able to use the basics of structural dynamics and analyse the response of SDOF systems
C403	CE 405: Environmental Engineering I	C403.1	Students will be able to understand the various water quality parameters and its interpretation
		C403.2	Students will be able to design sedimentation tanks for water treatment
		C403.3	students will be able to design slow and rapid sand filters of water treatment plants
		C403.4	Students will be able to study the various disinfection methods of drinking water
		C403.5	Students will be able to design a water distribution system
		C403.6	Students will be able to study the various methods for remediation of domestic water quality problems
		C404	CE 407: Transportation Engineering- II
C404.2	Graduates will be able to plan, design, construct and operate systems in railway transportation		
C404.3	They will be learning the need and frequency and method of maintenance of railway track and the factors that cause railway accidents		
C404.4	Students will gain knowledge in various aspects of tunnel engineering starting from the selection of site, fixing alignment, constructing and providing proper lighting, ventilation and drainage.		
C404.5	Students will be able to learn about various components in water transportation such as harbours, break waters and docks.		
C404.6	Analytical skill as well as problem solving and optimizing ability is enhanced along with the ability to work individually and in a group, prepare presentations and improve on communication skill		
C405	CE 409: Quantity Surveying and Valuation	C405.1	Students will be able to prepare approximate estimation and detailed estimation for buildings.
		C405.2	Students will be able to study draw the specifications for the different items of civil engineering project and also to prepare the schedule of programming of the project
		C405.3	Students will be able to prepare detail estimation for sanitary works, road works etc.

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		C405.4	Students will able to calculate the exact quantities and rates for different materials required for various items of work by using data book and schedule of rate.
		C405.5	Students will able to prepare valuation report of real and landed property
C406	CE473 : ADVANCED COMPUTATIONAL TECHNIQUES AND OPTIMIZATION	C406.1	Students will be able find different numerical solutions of complicated problems
		C406.2	Students will be able identify different types of optimization problems and to solve various multivariable optimization problems
		C406.3	Students will be able determine solutions of real time problems applying numerical methods in mathematics
		C406.4	Students will be able convert problem solving strategies to procedural algorithms and to write program structures
		C406.5	Students will be able understand fundamental mathematics and to solve problems of algebraic and differential equations, simultaneous equation, partial differential equations
		C406.6	Students will be able understand the importance of optimization and apply optimization techniques in real time problems
C407	CE465 : GEO ENVIRONMENTAL ENGINEERING	C407.1	Students will be able to understand the relevance of geoenvironmental engineering with emphasis on soil-water-contaminant interaction
		C407.2	Students will be able to appreciate the concept of valorization of waste in geotechnical applications
		C407.3	Students will be able to understand the various components in a landfill and its design
		C407.4	The students will be able to understand the characteristics of the various by-products generated from the landfill
		C407.5	The students will be able to understand the techniques available and its applicability for soil remediation
		C407.6	The students will be able to understand the change in engineering properties of soil due to change in environment
C408		C408.1	Student can explore the latest developments in various spheres of civil engineering

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	CE 451: Seminar & Project Preliminary	C408.2	Student can undertake a critical review of the literature on the chosen topic
		C408.3	Student can learn technical report writing effectively
		C408.4	Student can present a technical paper fluently and convincingly
		C408.5	Student will be able to develop right competency and skill to learn new technologies and apply it in professional practices and motivate fellow professionals to imbibe them
C409	CE431: Environmental Engineering Lab	C409.1	Students will be able to analyze the physical water quality parameters like turbidity pH, color, taste and odor and to meaningfully interpret the results
		C409.2	Students will be able Analyze the chemical water quality parameters like iron, manganese, hardness , organic matter etc and to interpret the test result
		C409.3	Students will be able To study the water treatment by conventional plant operation and to find the optimum quantity of coagulant using jar test
		C409.4	Students will be able To analyze the presence of indicator bacteriological organisms like coliform in water and interpret the result to give guidance to the people
		C409.5	Students will be able to deal with domestic water quality issues of the area and to guide the people for its remediation
C410	CE 402: Environmental Engineering II	C410.1	Measure the waste water flow and design of circular sewer
		C410.2	Understand and interpret various characteristics of waste water with special reference to organic matter
		C410.3	Assess the self-purification capacity of rivers
		C410.4	Design conventional waste water systems like activated sludge and trickling filter
		C410.5	Design septic tank , oxidation pond and UASB
		C410.6	Design of various sludge disposal systems
C411		C411.1	Plan and schedule a construction project.

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	CE 404: Civil Engineering Project Management	C411.2	Will be able to understand the uses and suitability of various construction equipment and codification of planning system
		C411.3	Study the role arbitrator and the process of arbitration and importance of construction cost
		C411.4	Study the legal and ethical issues related to construction projects and concepts of computerized information system
		C411.5	Impart knowledge in the principles of safe construction practices and material management
		C411.6	Understand the need of different construction procedure and preparation of tender document and contract document and familiar with TQM and similar concepts related to quality
C412		CE462 : TOWN AND COUNTRY PLANNING	C412.1
	C412.2		Student will be able to learn urban-rural nexus in planning and integrated planning approach
	C412.3		Student will be able to learn theories of urbanization in thier planning, principles and strategies
	C412.4		Student will be able to familiarize with spatial standards of facilities and prepare base maps for urban development
	C412.5		Student will be able to learn the development control rule which gives the required legal support to the city plans and also contain elementary aspects of urban renewal.
	C412.6		Student will be able to identify and develop the various components of Town Development Plan
C413	CE474 : Municipal solid waste management	C413.1	Students will have an awareness of different types of solid wastes in the environment.
		C413.2	Students will be able to understand the various methods available for estimation of generation rate of solid waste and its quantities.
		C413.3	Students will have an awareness about the collection methods of solid waste.
		C413.4	Students will have an awareness about the processing techniques of solid waste.
		C413.5	Students will be able to understand the various methods for the disposal of solid waste.



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		C413.6	Students will be able to understand the various composting techniques of solid waste.
C414	BT 362 : SUSTAINABLE ENERGY PROCESS	C414.1	Students should be able to identify global and Indian energy sources.
		C414.2	Students should be able to explain capture, conversion and application of solar energy
		C414.3	Students should be able to explain capture, conversion and application of wind energy
		C414.4	Students should be able to explain conversion of biomass to energy
		C414.5	Students should be able to explain the capture of energy from oceans
		C414.6	Students should be able to explain fuel cells and energy storage routes
		C415	CE 492: Project
C415.2	Knowledge about various data collection techniques and methods.		
C415.3	Knowledge of data preparation and exploration and further drawing of inferences		
C415.4	Learn application of various analysis software, interpret the output and present the results		
C415.5	Improvement in technical report writing and presentation skills.		

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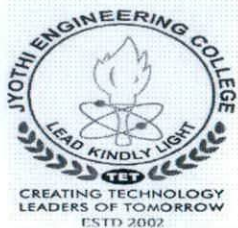
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COs of Computer Science & Engineering

C201	MA201 : LINEAR ALGEBRA & COMPLEX ANALYSIS	C201.1	Students will be able to achieve algebraic methods to find the solution for engineering computational problems ,including vector spaces and eigen value problems
		C201.2	Students will be able to apply the properties of matrix in various situations.
		C201.3	Students will be able to analyse the properties of points lying in the n-dimensional plane.
		C201.4	Students will be able to sketch out complex functions and evaluate the definite Integrals
		C201.5	Students will be able to represent the complex functions and its image graphically
C202	CS201 : DCS	C202.1	To identify and apply operations on discrete structures such as sets, relations and functions in different areas of computing
		C202.2	To verify the validity of an argument using propositional and predicate logic.
		C202.3	To construct proofs using direct proof, proof by contraposition, proof by contradiction and proof by cases, and by mathematical induction
		C202.4	To apply recurrence relations to solve problems in different domains
		C202.5	To solve problems using algebraic structures.

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		C202.6	To solve problems using counting techniques and combinatorics
C203	CS203 : Switching Theory and Logic Design		Students will be able to apply the basic concepts of Boolean algebra for the simplification and implementation of logic functions using suitable gates namely NAND, NOR etc
		C203.1	
		C203.2	Students will be able to design simple Combinational Circuits such as Adders, Subtractors, Code Convertors, Decoders, Multiplexers, Magnitude Comparators etc.
		C203.3	Students will be able to design Sequential Circuits such as different types of Counters, Shift Registers, Serial Adders, Sequence Generators
		C203.4	Students will be able to use Hardware Description Language for describing simple logic circuits
		C203.5	Students will be able to apply algorithms for addition/subtraction operations on Binary, BCD and Floating Point Numbers.
C204	CS205 : DATA STRUCTURES AND ALGORITHMS	C204.1	Compare different programming methodologies and define asymptotic notations to analyze Performance of algorithms.
		C204.2	Use appropriate data structures like arrays, linked list, stacks and queues to solve real world Problems efficiently.
		C204.3	Represent and manipulate data using nonlinear data structures like trees and graphs to design Algorithms for various applications.
		C204.4	Illustrate and compare various techniques for searching and sorting.

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		C204.5	Appreciate different memory management techniques and their significance.
		C204.6	Illustrate various hashing techniques.
C205	CS207 : ELECTRONIC DEVICES AND CIRCUITS	C205.1	Students will be able to explain the concept of electronic devices and circuits
		C205.2	Students will be able to illustrate and design the different electronic circuits using electronic devices
		C205.3	Students will be able to explain the working principle, operation and applications of Electronic circuits
		C205.4	Students will be able to explain the fundamental concept of Operational Amplifiers
		C205.5	Students will be able to design circuits using operational amplifiers for various applications
		C205.6	Students will be able to understand the concept of various electronic circuits/systems using analog Ics
C206	HS210 : LIFE SKILLS	C206.1	Communicate effectively. Make effective presentations, Write different types of reports, Face interview & group discussion
		C206.2	Critically think on a particular problem
		C206.3	Solve problems.
		C206.4	Work in Group & Teams

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		C206.5	Handle Engineering Ethics and Human Values
		C206.6	Become an effective leader.
C207	CS231 : DS LAB	C207.1	Students will be able to appreciate the importance of structure and abstract data type, and their basic usability in different applications
		C207.2	Students will be able to analyze and differentiate different algorithms based on their time complexity.
		C207.3	Students will be able to implement linear and non-linear data structures using linked lists.
		C207.4	Students will be able to understand and apply various data structure such as stacks, queues, trees, graphs, etc. to solve various computing problems.
		C207.5	Students will be able to implement various kinds of searching and sorting techniques, and decide when to choose which technique.
C208	CS233 : ELECTRONIC CIRCUITS LAB	C208.1	Students will be able to identify basic electronic components, design and develop electronic circuits.
		C208.2	Students will be able Design and demonstrate functioning of various discrete analog circuits.
		C208.3	Students will be familiar with computer simulation of electronic circuits and how to use it proficiently for design and development of electronic circuits.
		C208.4	Students will Understand the concepts and their applications in engineering
		C208.5	Communicate effectively the scientific procedures and explanations in formal technical presentations/reports.

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C209	MA202 : PDTNM	C209.1	Students will be able to apply the concept of discrete probability density functions and special probability Distributions in different engineering fields.
		C209.2	Students will be able to apply the concept of continuous discrete probability density functions and special probability Distributions in different engineering fields.
		C209.3	Students will be able to express the non periodic function as fourier integrals.
		C209.4	Students will be able to solve differential equations using Laplace Transform
		C209.5	Students will be able to use numerical methods and their applications in solving engineering problems.
		C209.6	Students will be able to solve the differential equations using numerical techniques
C210	CS202 : computer organization and architecture	C210.1	Identify the basic structure and functional units of a digital computer.
		C210.2	Analyze the effect of addressing modes on the execution time of a program.
		C210.3	Design processing unit using the concepts of ALU and control logic design
		C210.4	Identify the pros and cons of different types of control logic design in processors.
		C210.5	Select appropriate interfacing standards for i/o devices.
		C210.6	Identify the roles of various functional units of a computer in instruction execution.

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C211	CS204 : OPERATING SYSTEM	C211.1	Identify the significance of operating system in computing devices
		C211.2	Exemplify the communication between application programs and hardware devices through system calls.
		C211.3	Compare and illustrate various process scheduling algorithms.
		C211.4	Apply appropriate memory and file management schemes.
		C211.5	Illustrate various disk scheduling algorithms.
		C211.6	Appreciate the need of access control and protection in an operating system
C212	CS206 : Object Oriented Design & Programming	C212.1	Students will be able to apply object oriented principles in software design process.
		C212.2	Students will be able to Develop Java programs for real applications using java constructs and libraries.
		C212.3	Students will be able to Understand and apply various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems using Java language
		C212.4	Students will be able to Implement Exception Handling in java.
		C212.5	Students will be able to Use graphical user interface and Event Handling in java.
		C212.6	Students will be able to Develop and deploy Android in java.

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C213	CS208 : Principles of Database Design	C213.1	Students will understand define, explain and illustrate the fundamental concepts of databases.
		C213.2	Students will understand construct an Entity-Relationship (E-R) model from specifications and to perform the transformation of the conceptual model into corresponding logical data structures.
		C213.3	Students will be able to model and design a relational database following the design principles.
		C213.4	Students will be able to develop queries for relational database in the context of practical applications
		C213.5	Students will be able to define, explain and illustrate fundamental principles of data organization, query optimization and concurrent transaction processing.
		C213.6	Students will be able to appreciate the latest trends in databases.
C214	HS200 : Business Economics	C214.1	To familiarize the prospective engineers with elementary Principles of Economics and Business Economics
		C214.2	To acquaint the students with tools and techniques that are useful in their profession in Business Decision Making which will enhance their employability.
		C214.3	To apply business analysis to the "firm" under different market conditions.
		C214.4	To apply economic models to examine current economic scenario and evaluate policy options for addressing economic issues
		C214.5	To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate.
		C214.6	To prepare and analyse various business tools like balance sheet, cost benefit analysis and rate of returns at an elementary level

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C215	CS208 : Free and Open Source Software Lab	C215.1	The students will be able to identify and apply various Linux commands
		C215.2	The students will be able to develop shell scripts and GUI for specific needs.
		C215.3	The students will be able to use tools like GIT.
		C215.4	The students will be able to perform basic level application deployment, kernel configuration and installation, packet management and installation etc.
C216	CS234 : DIGITAL SYSTEMS LAB	C216.1	Students will be able to familiarize with digital ICs.
		C216.2	Students will be able to set up different types of digital circuits and study their behavior
		C216.3	Students will be able to identify and explain the digital ICs and their use in implementing digital circuits.
		C216.4	Students will Understand the basic concepts and their applications.
		C216.5	Communicate effectively the scientific procedures and explanations in formal technical presentations/reports.
C301	CS301 : THEORY OF COMPUTATION	C301.1	Classify formal languages into regular, context-free, context sensitive and unrestricted languages.
		C301.2	Design finite state automata, regular grammar, regular expression and Myhill- Nerode relation
		C301.3	Representations for regular languages

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		C301.4	Design push-down automata and context-free grammar representations for context-free languages.
		C301.5	Design Turing Machines for accepting recursively enumerable languages.
		C301.6	Understand the notions of decidability and undecidability of problems, Halting problem.
		CS302.1	Distinguish different software into different categories.
CS302	CS303 : System Software	CS302.2	Design, analyze and implement one pass, two pass or multi pass assembler.
		CS302.3	Design, analyze and implement loader and linker.
		CS302.4	Design, analyze and implement macro processors.
		CS302.5	Critique the features of modern editing /debugging tools.
		C303.1	Describe different modes of operations of a typical microprocessor and microcontroller.
C303	CS305 : MICRO PROCESSORS AND MICROCONTROLLERS	C303.2	Design and develop 8086 assembly language programs using software interrupts and various assembler directives.
		C303.3	Interface microprocessors with various external devices.
		C303.4	Analyze and compare the features of microprocessors and microcontrollers.

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C304	CS307 : DATA COMMUNICATION	C304.1	Students will be able to Identify and list the various issues present in the design of a data communication system
		C304.2	Students will be able to Apply the time domain and frequency domain concepts of signals in data communication
		C304.3	Students will be able to Compare and select transmission media based on transmission impairments and channel capacity
		C304.4	Students will be able to Select and use appropriate signal encoding techniques and multiplexing techniques for a given Scenario
		C304.5	Students will be able to Design suitable error detection and error correction algorithms to achieve error free data Communication and explain different switching techniques
		C304.6	Students will be able to analyze various protocols
C305	CS309 : GRAPH THEORY AND COMBINATORICS	C305.1	Demonstrate the knowledge of fundamental concepts in graph theory,
		C305.2	Use graphs for solving real life problems.
		C305.3	Distinguish between planar and non-planar graphs and solve problems.
		C305.4	Develop efficient algorithms for graph related problems in different domains of engineering and science.
		C305.5	Students will be able to represent the graph in different computer storable format

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C306	CS361 : Soft Computing	C306.1	Students will be able to learn soft computing techniques and their applications.
		C306.2	Students will be able to analyze various neural network architectures.
		C306.3	Students will be able to define the fuzzy systems.
		C306.4	Students will be able to understand the genetic algorithm concepts and their applications
		C306.5	Students will be able to identify and select a suitable soft computing technology to solve the problem; construct a solution and implement a soft computing solution
C307	CS367 : Logic For Computer Science	C307.1	Explain the concept of logic and its importance.
		C307.2	Understand fundamental concepts in propositional logic and apply resolution techniques.
		C307.3	Understand fundamental concepts in predicate logic and apply resolution techniques
		C307.4	Understand fundamental concepts in temporal logic and apply resolution techniques.
		C307.5	Understand the concept of program verification and apply it in real-world scenarios.
		C307.6	Understand fundamental concepts in modal logic
C308		C308.1	Students will understand define, explain and illustrate the fundamental concepts of databases.

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	CS333 : Application Software Development Lab	C308.2	Students will be able to apply stored programming using cursors and triggers
		C308.3	Students will be able to use GUI and database connectivity to develop and deploy applications and applets.
		C308.4	Students will be able to develop medium sized project in a term.
		C308.5	Students will be able to define, explain and illustrate fundamental principles of data organization, query optimization and concurrent transaction processing.
		C308.6	Students will be able to appreciate the latest trends in databases.
CS309		CS331 : System Software Lab	CS309.1
	CS309.2		Implement basic memory management schemes like paging.
	CS309.3		Implement synchronization techniques using semaphores etc.
	CS309.4		Implement banker's algorithm for deadlock avoidance.
	CS309.5		Implement memory management schemes and page replacement schemes and file allocation and organization techniques.
	CS309.6		Implement system software such as loaders, assemblers and macro processor.
C310	CS309 : design project	C310.1	The students will be able to analyse a current topic of professional interest and present it before an audience

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		C310.2	Students will be able to identify an engineering problem, analyse it and propose a work plan to solve it.
		C310.3	Students will have gained thorough knowledge in design of Computer science related projects.
		C310.4	Students will have attained the practical knowledge of what they learned in theory subjects.
		C310.5	Students will become familiar with usage of modern tools
C311	CS302 : Design and Analysis of Algorithms	C311.1	Compare different programming methodologies and define asymptotic notations to analyze Performance of algorithms.
		C311.2	Use appropriate data structures like arrays, linked list, stacks and queues to solve real world Problems efficiently.
		C311.3	Represent and manipulate data using nonlinear data structures like trees and graphs to design Algorithms for various applications.
		C311.4	Illustrate and compare various techniques for searching and sorting.
		C311.5	Appreciate different memory management techniques and their significance.
		C311.6	Illustrate various hashing techniques.
C312	CS304 : COMPILER DESIGN	C312.1	Explain the concepts and different phases of compilation with compile time error handling
		C312.2	Represent language tokens using regular expressions, context free grammar and finite automata and design lexical analyzer for a language.

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		C312.3	Compare top down with bottom up parsers, and develop appropriate parser to produce parse tree representation of the input.
		C312.4	Generate intermediate code for statements in high level language
		C312.5	Design syntax directed translation schemes for a given context free grammar
		C312.6	Apply optimization techniques to intermediate code and generate machine code for high level language program
C313	CS306 : COMPUTER NETWORKS	C313.1	Visualize the different aspects of networks, protocols and network design models.
		C313.2	Examine various Data Link layer design issues and Data Link protocols.
		C313.3	Analyze and compare different LAN protocols.
		C313.4	Compare and select appropriate routing algorithms for a network.
		C313.5	Examine the important aspects and functions of network layer, transport layer and application layer in internetworking.
C314	CS308 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT	C314.1	Students will be able to Identify suitable life cycle models to be used.
		C314.2	Students will be able to Analyze a problem and identify and define the computing requirements to the problem.
		C314.3	Students will be able to Translate a requirement specification to a design using an appropriate software engineering methodology.

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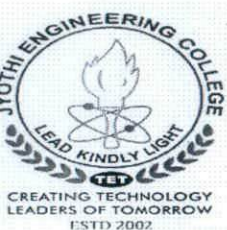
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		C314.4	Students will be able to Formulate appropriate testing strategy for the given software system
		C314.5	Students will be able to Develop software projects based on current technology, by managing resources economically and keeping ethical values
C315	CS308 : Principles of Management	C315.1	Students will be able to Identify suitable life cycle models to be used.
		C315.2	Students will be able to Analyze a problem and identify and define the computing requirements to the problem.
		C315.3	Students will be able to Translate a requirement specification to a design using an appropriate software engineering methodology.
		C315.4	Students will be able to Formulate appropriate testing strategy for the given software system
		C315.5	Students will be able to Develop software projects based on current technology, by managing resources economically and keeping ethical values
C316	CS364 : Mobile Computing	C316.1	Explain various Mobile Computing application, services and architecture.
		C316.2	Understand various technology trends for next generation cellular wireless networks.
		C316.3	Describe protocol architecture of WLAN technology.
		C316.4	Understand Security Issues in mobile computing.
		C316.5	Expose students to various aspects of mobile and ad-hoc networks

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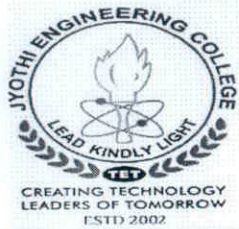


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C317	CS368 : Web Technologies	C317.1	Students will Understand different components in web technology and to know about CGI and CMS.
		C317.2	Students will able to Develop interactive Web pages using HTML/XHTML.
		C317.3	Students will be able to Present a professional document using Cascaded Style Sheets.
		C317.4	Students will be able to Construct websites for user interactions using JavaScript and JQuery.
		C317.5	Students will be able to Know the different information interchange formats like XML and JSON.
		C317.6	Students will be able to Develop Web applications using PHP.
C318	CS372 : HIGH PERFORMANCE COMPUTING	C318.1	Appreciate the concepts used in Modern Processors for increasing the performance.
		C318.2	Appreciate Optimization techniques for serial code.
		C318.3	Appreciate Parallel Computing Paradigms.
		C318.4	Identify the performance issues in Parallel Programming using OpenMP and MPI.
C319	CS332 : Microprocessor LAB	C319.1	Students will be able to develop assembly language programs for problem solving using software interrupts and various assembler directives.
		C319.2	Students will understand to implement interfacing of various I/O devices to the microprocessor through assembly language programming.

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		C319.3	Students will be able to implement interfacing of various I/O devices to the microcontroller through assembly language programming.
		C319.4	Students will be able to implement assembly language programs using 80806 trainer kit.
C320	CS334 : NETWORK PROGRAMMING LAB	C321.1	Usenetwork related commands and configuration files in Linux Operating System.
		C320.2	Develop operating system and network application programs.
		C320.3	Analyze network traffic using network monitoring tools.
C321	CS334 : Comprehensive Viva	C321.1	The students will be confident in fundamental aspects
C401	CS401 : COMPUTER GRAPHICS	C401.1	Compare various graphics devices
		C401.2	Analyze and implement algorithms for line drawing, circle drawing and polygon filling
		C401.3	Apply geometrical transformation on 2D and 3D objects
		C401.4	Analyze and implement algorithms for clipping v. apply various projection techniques on 3D objects
		C401.5	Summarize visible surface detection methods
		C401.6	Interpret various concepts and basic operations of image processing

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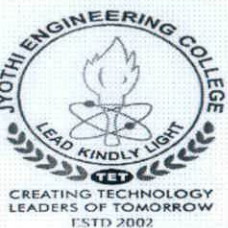
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C402	CS403 : PROGRAMMING PARADIGM	C402.1	Students will understand be able to compare scope and binding of names in different programming languages
		C402.2	Students will understand analyze control flow structures in different programming languages
		C402.3	Students will be able to appraise data types in different programming languages
		C402.4	Students will be able to analyze different control abstraction mechanisms
		C402.5	Students will be able to appraise constructs in functional, logic and scripting languages
C403	CS405 : Computer System Architecture	C403.1	Students will understand to Summarize different parallel computer models
		C403.2	Students will Analyze the advanced processor technologies
		C403.3	Students will be able to Interpret memory hierarchy
		C403.4	Students will be able to Compare different multiprocessor system interconnecting mechanisms
		C403.5	Students will be able to Interpret the mechanisms for enforcing cache coherence
C404	CS407 : DISTRIBUTED COMPUTING	C404.1	The Students will be able to distinguish distributed computing paradigm from other computing paradigms
		C404.2	The Students will be able to identify the core concepts of distributed systems

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		C404.3	The Students will be able to illustrate the mechanisms of inter process communication in distributed system
		C404.4	The Students will be able to apply appropriate distributed system principles in ensuring transparency, consistency and fault-tolerance in distributed file system
		C404.5	The Students will be able to compare the concurrency control mechanisms in distributed transactional environment
		C404.6	The Students will be able to outline the need for mutual exclusion and election algorithms in distributed systems
C405	CS409 : CRYPTOGRAPHY AND NETWORK SECURITY	C405.1	The Students will be able to summarize different classical encryption techniques
		C405.2	The Students will be able to identify mathematical concepts for different cryptographic algorithms
		C405.3	The Students will be able to demonstrate cryptographic algorithms for encryption/key exchange
		C405.4	The Students will be able to analyse the performance of different cryptographic algorithms
		C405.5	The Students will be able to summarize different authentication and digital signature schemes
		C405.6	The Students will be able to identify security issues in network, transport and application layers and outline appropriate security protocols
C406	CS453 : Bio Informatics	C406.1	Students will understand Students become comfortable to think about problems and arriving at solutions as biologists and as computer scientists
		C406.2	Identify different types of biological sequences

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		C406.3	Students will be able to Analyse multiple sequences and find conserved regions
		C406.4	Students will be able to Capable to predict RNA, Protein secondary structures
		C406.5	Students will be able to Analyse genomic sequences and able to identify regions that encoded genes
		C407.1	The students will be able to differentiate various learning approaches, and to interpret the concepts of supervised learning
C407	CS465 : Machine Learning	C407.2	The students will be able to compare the different dimensionality reduction techniques
		C407.3	The students will be able to apply theoretical foundations of decision trees to identify best split and Bayesian Classifier to label data points
		C407.4	The students will be able to illustrate the working of classifier models like SVM, Neural Networks and identify classifier model for typical machine learning applications
		C407.5	The students will be able to identify the state sequence and evaluate a sequence emission probability from a given HMM
C408	CS431 : COMPILER DESIGN LAB	C408.1	Students will be able to implement the techniques of lexical analysis and syntax analysis
		C408.2	Students will be able to apply the knowledge of lex & Yacc tools to develop programs
		C408.3	Students will be able to identify the language defined using DFA
		C408.4	Students will be able to generate intermediate code

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		C408.5	Students will be able to implement optimization techniques and generate machine level code
C409	CS451 : Seminar & Project	C409.1	The students will be able to analyse a current topic of professional interest and present it before an audience
		C409.2	Students will be able to identify an engineering problem, analyse it and propose a work plan to solve it.
		C409.3	Students will have gained thorough knowledge in design, implementations and execution of Computer science related projects.
		C409.4	Students will have attained the practical knowledge of what they learned in theory subjects.
		C409.5	Students will become familiar with usage of modern tools
C410	CS 402 : Datamining & Warehousing	C410.1	Graduates will have a broad knowledge of the data mining and warehousing techniques.
		C410.2	Students will have the ability to explore the pre processing Techniques and data reduction techniques
		C410.3	Graduates will acquire the knowledge about classification and prediction . Also get the knowledge of the decision Tree Algorithms in data mining.
		C410.4	Graduates will acquire deep knowledge of the different types of classifiers in data mining.
		C410.5	Graduates will get the ability to explore the clustering Techniques in data mining
C411	CS 404 : EMBEDDED SYSTEM	C411.1	Demonstrate the role of individual components involved in a typical embedded system

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		C411.2	Analyze the characteristics of different computing elements and select the most appropriate one for an embedded system
		C411.3	Model the operation of a given embedded system
		C411.4	Substantiate the role of different software modules in the development of an embedded system
		C411.5	Develop simple tasks to run on an RTOS
		C411.6	Examine the latest trends prevalent in embedded system design
C412	CS472 : CLOUD COMPUTING	C412.1	To identify the significance of implementing virtualisation techniques
		C412.2	To interpret the various cloud computing models and services
		C412.3	To compare the various public cloud platforms and software environments
		C412.4	To apply appropriate cloud programming methods to solve big data problems
		C412.5	To appreciate the need of security mechanisms in cloud
			To illustrate the use of various cloud services available online
C413		C413.1	The Student will be able to appreciate the common trends faced today

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	CS472 : PRINCIPLES OF INFORMATION SECURITY	C413.2	The Student will be able to interpret the foundational theory behind information security
		C413.3	The Student will be able to design a secure system
		C413.4	The Student will be able to identify the potential vulnerabilities in software
		C413.5	The Student will be able to appreciate the relevance of security in various domains
		C413.6	The Student will be able to develop secure web services and perform secure e-transactions
C414		CE482 : Environmental impact assessment	C414.1
	C414.2		Student will be able to understand water pollution, its causes, and treatments
	C414.3		Student will be able to understand about water pollution, land pollution, its causes and abatement measures
	C414.4		Student will be able to understand about noise pollution, its effects and control measures
	C414.5		Student will be able to study the impact of pollutants on the environment and need of impact assessment techniques
C415	CS 492 : Project	C415.1	The students will be able to analyse a current topic of professional interest and present it before an audience

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		C415.2	Students will be able to identify an engineering problem, analyse it and propose a work plan to solve it
		C415.3	Students will have gained thorough knowledge in design, implementations and execution of Computer science related projects.
		C415.4	Students will have attained the practical knowledge of what they learned in theory subjects.
		C415.5	Students will become familiar with usage of modern tools
		C415.6	Students will have ability to plan and work in a team

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C201	MA201 : LINEAR ALGEBRA & COMPLEX ANALYSIS	C201.1	Students will be able to achieve algebraic methods to find the solution for engineering computational problems ,including vector spaces and eigen value problems
		C201.2	Students will be able to apply the properties of matrix in various situations.
		C201.3	Students will be able to analyse the properties of points lying in the n-dimensional plane.

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		C203.4	students will be able to illustrate the physics that influences the presence of charge carriers in a semiconductor
		C203.5	students will be able to summarize concepts relating different modes of operation and the various current components in BJTs and analyze energy band diagram of PN junction diodes, BJTs, metal semiconductor junctions and MOS capacitors
		C203.6	Students will be able to analyse voltage and current changes in semiconductor devices and also develop research in new concepts
		C204.1	Students will be able to design RC circuits for low and high frequency
C204	EC205 : ELECTRONIC CIRCUITS	C204.2	Students have knowledge about the small signal and large signal analysis of the different circuit configurations using BJT and MOSFET
		C204.3	Students will be able to design various Feedback amplifier circuits and voltage regulators using BJT
		C204.4	Students have the knowledge about the working and design of various power amplifier circuits and Switching circuits using BJT
		C204.5	Students have the knowledge about the various frequency compensation techniques
C205	EC207 : Logic Circuit Design	C205.2	To have a deep understanding of digital gates
		C205.3	To apply boolean algebra in logic circuit design

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		C205.4	To Design combinational circuits
		C205.5	To design various synchronous and asynchronous sequential circuits
		C205.6	To compare various logic families and programmable logic devices
		C206.1	To familiarize the prospective engineers with elementary Principles of Economics and Business Economics
C206	HS200 : Business Economics	C206.2	To acquaint the students with tools and techniques that are useful in their profession in Business Decision Making which will enhance their employability
		C206.3	To apply business analysis to the "firm" under different market conditions
		C206.4	To apply economic models to examine current economic scenario and evaluate policy options for addressing economic issues
		C206.5	To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate
		C206.6	To prepare and analyse various business tools like balance sheet, cost benefit analysis and rate of returns at an elementary level.
C207	EC231 : ELECTRONIC CIRCUITS LAB	C207.1	Students will be able to understand the forward and reverse characteristics of semiconductor devices
		C207.2	Students will be able to design the filter circuits for a given frequency

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		C207.3	Students will be able to generate waveforms for particular applications
		C207.4	Students will be able to design amplifier circuits for a particular gain
		C207.5	Students will be able to design dc voltages for various applications
		C207.6	Students will be able to generate oscillations for a given frequency
C208	EC223 : Electronics Design Automation Lab	C208.1	Students will understand to apply knowledge of computer, science, and engineering to the analysis of electrical and electronic engineering problems
		C208.2	Students will understand to use modern engineering techniques
		C208.3	Students will be able to design systems which include hardware and software components.
		C208.4	Students will be able to identify, formulate and solve engineering problems
C209	MA 204 : Probability Distributions, Random Process & Numerical Methods	C209.1	Students will be familiar with quantifying and analyzing random phenomena using various models of discrete probability distributions
		C209.2	Students will learn the concepts of continuous probability distributions
		C209.3	Students will be able to connect bivariate distributions & basic two variable statistics to real life situations.

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		C209.4	Students will learn the concepts of autocorrelation and power spectral density which are useful in the analysis of random signals.
		C209.5	Students can understand the concept of random processes and demonstrate the specific applications to Poisson Processes
		C209.6	Students can determine approximate numerical solutions to mathematical problems which cannot always be solved by conventional analytical techniques, and to demonstrate the importance of selecting the right numerical technique for a particular application, and carefully analysing and interpreting the results obtained.
		C210.1	Students will be able to define, represent, classify and characterize basic properties of continuous and discrete time signals and systems
C210	EC 202 : SIGNALS AND SYSTEMS	C210.2	Students will be able to Represent the CT signals and DT signals in Fourier series and interpret the properties of Fourier transform
		C210.3	Students will be able to Outline the relation between convolutions, correlation and to describe the correlation of signals
		C210.4	Students will be able to Illustrate concept of transfer function and determine magnitude and phase response of LTI system
		C210.5	Students will be able to Explain sampling theorem and techniques for sampling and reconstruction.
		C210.6	Students will be able to determine Z transform and Laplace transform, inverse Z transform and Laplace transform, and analyse LTI system using Z transform and Laplace transform
		C211	EC204 : ANALOG INTEGRATED CIRCUITS
C211.2	Students will be able to design circuits using operational amplifiers which helps in independent and life-long learning		

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Ph.D (Computer Science), Ph.D (Maths)
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Jyothi Engineering College
Cheruthuruthy P.O. - 679 531



Jyothi Engineering College

NAAC Accredited College with NBA Accredited Programmes*

Approved by AICTE & affiliated to APJ Abdul Kalam Technological University

A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR

JYOTHI HILLS, VETIKATTIRI P.O., CHERUTHURUTHY, THRISSUR. PIN-679531 PH : +91- 4884-259000, 274423 FAX : 04884-274777



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		C211.3	Students can demonstrate the ability to identify, formulate and solve engineering problems in the field of analog devices
		C211.4	Students will demonstrate the ability to design and conduct analyze and interpret data and to design system for society
		C211.5	Students will be able to design real-time circuits analytically and verify the results by using modern tools like Proteus, Scilab etc
		C211.6	Students will be able to demonstrate the knowledge of opamps which helps in sustainable development
C212	EC206 : COMPUTER ORGANIZATION	C212.1	Illustrate the structure of a computer.
		C212.2	Categorize different types of memories
		C212.3	To develop understanding about processor architecture.
		C212.4	To develop understanding on I/O accessing techniques and memory structures.
		C212.5	Knowledge in different aspects of processor design.
		C212.6	To impart knowledge in programming concepts.
C213		C213.1	Students will be able to understand the different analog modulation schemes.

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	EC208 : ANALOG COMMUNICATION ENGINEERING	C213.2	Students will be able to understand the fundamental ideas of noises and its effect in communication systems.
		C213.3	Students will be able to explain the principle and working of analog transmitters and receivers.
		C213.4	Students will be able to. know the basic idea of telephone systems.
C214	HS 210 : Life Skills	C214.1	Communicate effectively.
		C214.2	Make effective presentations
		C214.3	Solve problems.
C215	EC232 : ANALOG INTEGRATED CIRCUITS LAB	C215.1	Students will be able to Design and demonstrate functioning of various analog circuits
		C215.2	Students will be to analyze and design various applications of analog circuits
		C215.3	Students will be able to perform design of simple circuits using opamps
		C215.4	Students will be able to design different wave generation circuits and oscillator circuits using opamp
		C215.5	Students will be able to work with 555 timer for day to day applications

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		C215.6	Students will be able to design and construct simple ADC and DAC circuits using opamp
C216	EC230 : logic circuit design lab	C216.1	Students will be able to identify and explain the digital ICs and their use in implementing digital circuits.
		C216.2	Students will be able to design and implement different kinds of counters circuits.
		C216.3	Students will be able to design and implement of flip flop circuits.
		C216.4	Students will be able to understand seven segment display concept
C301	EC301 : Digital Signal Processing	C301.1	Students will be able to have deep understanding of the basic concepts of DFT for processing of signals on a computer
		C301.2	Students will be able to have a sound understanding of the computational analysis of DFT using FFT algorithms
		C301.3	Students will be able to describe the most important methods in DSP, including digital filter design of both FIR & IIR, transform-domain processing
		C301.4	Students will be able to understand the realizations of filters used in Digital Signal Processing
		C301.5	Students will be able to understand the Multirate signal processing and its applications
		C301.6	Students will be able to understand finite word length effects in DSP systems

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C303 : APPLIED ELECTROMAGNETIC THEORY	C302.1	Students will be able to develop a solid foundation and a fresh perspective in the analysis and application of electromagnetic fields.
	C302.2	Students will be able to understand the importance and application of Maxwell's equations.
	C302.3	Students will be able to analyze the characteristics of transmission lines.
	C302.4	Students will be able to solve the different transmission line problems using Smith chart
	C302.5	Students will be able to understand the different modes of propagation in waveguides.
	C302.6	Students will be able to understand the different waveguides.
EC 305 : Microprocessors and Microcontrollers	C303.1	Student will be able to Describe architectures, memory organization of 8085 microprocessor
	C303.2	Student will be able to Understand need of different peripheral ics and its operation
	C303.3	Student will be able to Distinguish various types of processor architectures.
	C303.4	Student will be able to Understand instruction set for 8051
	C303.5	Student will be able to Understand the working of various peripherals in the 8051

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		C303.6	Student will be able to Develop programming skills in assembly for interfacing peripheral devices with 8051
C304	EC307 : POWER ELECTRONICS & INSTRUMENTATION	C304.1	Students will be able to acquire concepts of Power Electronics.
		C304.2	Students will be able to distinguish various types of Switched mode regulators
		C304.3	Students will be able to recall and state applications of Power electronics such as Switched mode regulators and inverses
		C304.4	Students will be able to analyze different types of bridges.
		C304.5	Students will be able to compare various types of Instrument transducers.
		C304.6	Students will be able to understand and learn about various measuring equipments
C305	HS300 : Principle of Management	C305.1	Students will be able to recall and identify the relevance of management concepts
		C305.2	Students will be able to describe, discuss and relate management techniques adopted within an organization
		C305.3	Students will be able to apply management techniques for meeting current and future management challenges faced by the organization
		C305.4	Students will be able to compare the management theories and models critically and to inspect and question its validity in the real world

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		C305.5	Students will be able to assess and modify different theories of management so as to relate it to current management challenges
		C305.6	Students will be able to apply principles of management in order to execute the role as a manager
		C306.1	Students will have the knowledge of important systems of human physiology
		C306.2	Students capable to apply science and engineering concepts to analyse and solve problems at man-machine interface
C306	EC365 : BIOMEDICAL ENGINEERING	C306.3	Students will be able to interpret data from living systems
		C306.4	Students will be capable to design a system to meet the requirements in biomedical engineering including patient care and patient safety measures
		C306.5	Students will be able to understand the fundamentals of advanced medical diagnosis and therapy of diseases
		C307.1	Students will be able to distinguish the various concepts and mathematical transforms necessary for image processing
		C307.2	Students will be able to use relevant and suitable methods when carrying out research and development activities in the area of image processing
		C307.3	Students will be able to implement the techniques in the topics studied and compare their performances in certain image processing tasks.
C307	EC333 : Digital Signal Processing Lab	C307.4	Students will be able to apply the knowledge of image processing to the solution of complex engineering problems

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		C307.5	Students will be able to apply knowledge and understanding of the mathematical methods commonly used for representing, compressing and processing signals and images
		C307.6	Students will be able to apply different image processing algorithms in real time applications
		308.1	Design and demonstrate basic power electronic circuits.
		308.2	Use transducers for application.
308	EC335 : POWER ELECTRONICS & INSTRUMENTATION LAB	308.3	Function effectively as an individual and in a team to accomplish the given task.
		308.4	understand the concepts of Power Electronics and the various applications.
		308.5	understand the principle of operation of Transducers
		308.6	understand the working of modern digital instruments like DSO, multimeter and other meters useful for communication engineering.
C309	EC341 : Design Project	C309.1	The students will be able to think innovatively on the development of components, products, processes or technologies in the engineering field
		C309.2	The students will be able to analyse the problem requirements and arrive workable design solutions
		C309.3	The students will be able to understand reverse engineering

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		C309.4	The students will be able to use modern tools for their design
C310	EC302 : DIGITAL COMMUNICATION	C310.1	Students will be able to design different types of digital communication techniques
		C310.2	Students will be able to design digital modulations like ASK, FSK, PSK.
		C310.3	Students will be able to train themselves in designing different type waveform coding techniques like DM, PCM, DPCM and ADM
		C310.4	Students s will be able to apply their idea in different types of receiver systems with adaptive filters
		C310.5	Students s will be able to understand the idea of spread spectrum, OFDM and various diversity techniques
		C310.6	Students will be able to understand and learn about various measuring equipments
C311	EC304 : VLSI	C311.1	Students will be able to understand the basic steps in IC integration
		C311.2	Students will be able to know about the CMOS fabrication process
		C311.3	Students will be able to understand the concepts in CMOS inverter
		C311.4	Students will be able to design CMOS inverter and CMOS NAND gate using layout design rules

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		C311.5	Students will be able to analyze CMOS design types and to design RAM, ROM and different types of adders
C312	EC 306 : Antenna and Wave Propagation	C312.1	Students will understand will have a understanding of basic working of antennas
		C312.2	Students will have a sound understanding of the concept of antenna arrays, its analysis and their different types
		C312.3	Students will have a sound understanding of the different antenna types and their applications
		C312.4	Students will be able to understand the various modes of radio propagation and relate it to real communication instances
		C313.1	Ability to understand the basics of the embedded system and to design an embedded system product
C313	EC 308 : Embedded Systems	C313.2	Ability to understand the different standards and protocols used for communication with I/O devices
		C313.3	Ability to distinguish different ways of communication with I/O devices.
		C313.4	Ability to understand basic programming concepts of Embedded Systems
		C313.5	Ability to understand about inter-process communication. and to design real-time embedded systems using the concepts of RTOS
		C314	EC312 : Object Oriented Programming

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		C314.2	Students will be able to An understanding of advanced features of C++ such as templates, abstract classes and virtual functions.
		C314.3	Students will be able to Knowledge of advanced features of Java such as multithreading, packages and error management.
		C314.4	Students will be able to Skills in designing android application development.
		C314.5	Students will be able to Skills in debugging, deploying and testing mobile applications.
C315	EC 368 : Robotics	C315.1	Ability to understand the basics of the embedded system and to design an embedded system product
		C315.2	Ability to understand the different standards and protocols used for communication with I/O devices
		C315.3	Ability to distinguish different ways of communication with I/O devices.
		C315.4	Ability to understand basic programming concepts of Embedded Systems
		C315.5	Ability to understand about inter-process communication and to design real-time embedded systems using the concepts of RTOS
C316	EC 370 : Digital Image Processing	C316.1	Students will be able to distinguish the various concepts and mathematical transforms necessary for image processing
		C316.2	Students will be able to use relevant and suitable methods when carrying out research and development activities in the area of image processing

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		C316.3	Students will be able to implement the techniques in the topics studied and compare their performances in certain image processing tasks
		C316.4	Students will be apply the knowledge of image processing to the solution of complex engineering problems
		C316.5	Students will be able to apply knowledge and understanding of the mathematical methods commonly used for representing, compressing and processing signals and images
		C316.6	Students will be able to apply different image processing algorithms in real time applications
C318	EC332 : COMMUNICATION ENGG LAB (ANALOG & DIGITAL)	C318.1	The students will be able to design Analog Communication Circuits
		C318.2	The students will be able to Perform different digital communication circuits
		C318.3	Students will be able to do ADC circuits
		C318.4	Students will be able to perform TDMA circuit
C319	EC334 : Microcontroller Lab	C319.1	The students will be able to Program Micro controllers.
		C319.2	The students will be able to Interface various peripheral devices to Micro controller.
		C319.3	Students will be able to program Arduino Board

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		C319.4	Students will be able to Function effectively as an individual and in a team to accomplish the given task.
C401	EC 401 : INFORMATION THEORY AND CODING	C401.1	To introduce the concept of information
		C401.2	To understand the limits of error free representation of information signals and the transmission of such signals over a noisy channel
		C401.3	To design and analyze data compression techniques with varying efficiencies as per requirements
		C401.4	To understand the concept of various theorems proposed by Shannon for efficient data compression and reliable transmission
		C401.5	To give idea on different coding techniques for reliable data transmission
C402	EC403 : MICROWAVE AND RADAR ENGINEERING	C402.1	Students will Acquire knowledge about the characteristics of microwaves, Cavity resonators and Klystron amplifiers.
		C402.2	Analyse the performance of Reflex Klystron and Magnetron oscillators
		C402.3	Know the concept of Travelling Wave Tube and solid state microwave devices.
		C402.4	Students will be able to understand the basics of various hybrid circuits ,Directional couplers and scattering parameters with S matrix formulation.
		C402.5	Knows the basic theory of operation of microwave transistor, Tunnel Diodes and Gunn Diodes

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C403	EC 405 : Optical Communication	C403.1	To understand the concept of light transmission through optical fibers
		C403.2	The students will be able to Know the working of optical source and detectors
		C403.3	Understand the performance comparison of various optical transmission schemes.
		C403.4	Students can understand working and characteristics of LED and Laser Diode.
		C403.5	To understand the principle of operation of optical amplifiers.
		C403.6	To understand WDM technique.
C404	EC407 : COMPUTER COMMUNICATION	C404.1	The students will have a thorough understanding of; Different types of network topologies and protocols.
		C404.2	The layers of the OSI model and TCP/IP with their functions.
		C404.3	The concept of subnetting and routing mechanisms.
		C404.4	The basic protocols of computer networks, and how they can be used to assist in network design and implementation.
		C404.5	Security aspects in designing a trusted computer communication system.

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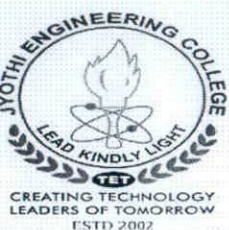


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C405	EC409 : CONTROL SYSTEMS	C405.1	To introduce the elements of control system and their modeling the system.
		C405.2	To introduce methods for analyzing the time response, the frequency response and the stability of systems
		C405.3	To design control systems with compensating techniques
		C405.4	To introduce the state variable analysis method.
		C405.5	To introduce basic concepts of digital control systems.
C406	EC461 : Microwave Devices and Circuits.	C406.1	Graduates will be able to understand with active & passive microwave devices & components, used in microwave communication systems and analyse microwave networks
		C406.2	Graduates will be able to understand the difference between ordinary amplifiers and microwave sources and amplifiers.
		C406.3	Graduates will be able to analyse microwave networks
		C406.4	Graduates will be able to understand the microwave filters.
		C406.5	Graduates will be able to understand the MICS
		C406.6	Graduates will be able to understand MICs, Distributed and lumped of Integrated circuits.

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C410	EC469 : OPTOELECTRONIC DEVICES	C410.1	Explain the property of absorption, recombination and photoemission in semiconductors
		C410.2	Illustrate different types of lasers with distinct properties
		C410.3	Explain different LED structures with material properties.
		C410.4	Analyse different types of photo detectors.
		C410.5	Explain optical modulators and optical components.
C411	EC 431 (P) : COMMUNICATION SYSTEMS LAB	C411.1	This course will help students in research areas of Microwave communication
		C411.2	The students will have a thorough understanding of Vector Network Analyzer
		C411.3	Student will get idea about optical fibers and will be able to implement optical link.
		C411.4	Students can understand working and characteristics of LED and Laser Diode.
C412	EC451 : SEMINAR & PROJECT PRELIMINARY	C412.1	Students will be able to gain knowledge in technically relevant current topics
		C412.2	Students will be able to develop and demonstrate troubleshooting ability in electronics and communication technology and will be able to write technical document related to the work

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		C412.3	Students will be aware of diverse disciplines to apply theories, methods and knowledge bases from multiple fields
		C412.4	Students will be able to identify an engineering problem analyse it and propose a work plan to solve it
C413	EC402 : NANO ELECTRONICS	C413.1	The students will be able to understand basic concepts of nanoelectronic devices and nano technology.
		C413.2	Understand the applications of nanotechnology and nanoelectronics
C414	ECE 404 : ADVANCED COMMUNICATION SYSTEMS	C414.1	The students will be able to understand the basics of microwave communication.
		C414.2	The students will have a thorough understanding of Different types compression standards and Display Technologies
		C414.3	The students will be able to understand the basics of satellite communication and different application using satellite
		C414.4	The student will be able to understand Modern Wireless Communication Systems and various generation wireless network
		C414.5	The students will have a thorough understanding basic concept of cellular and different wireless propagation mechanism
		C414.6	The students will have a thorough understanding Difference between wireless and fixed telephone networks and various aspects in data service communication system.
C415		C415.1	Students will be able to design CMOS amplifier using different loads



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	EC462 : MIXED SIGNAL CIRCUIT DESIGN	C415.2	Students will be able to understand and design MOS current mirror circuits and differential amplifier using different loads
		C415.3	Students will be able to understand the concepts of CMOS op-amp circuits and CMOS comparator
		C415.4	Students will be able to understand about bandgap reference and PLL
		C415.5	Students will have knowledge about dynamic analog circuits and their applications
		C416	EC468 : SECURE COMMUNIAION
C416.2	Students will be able to solve and relate mathematics concepts behind the cryptographic algorithms		
C416.3	Students will be able to explain basic concepts and algorithms of cryptography, including encryption/decryption .		
C416.4	Students will be able analyze and explain the DES analysis		
C416.5	Students will be able analyze different crypto algorithm and its key management in the cryptography		
C416.6	Students will be able to evaluate the role played by various security mechanisms like passwords, access control mechanisms, etc		
C418	EC492 : Project	C418.1	

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		C418.2	students will be able to Analyze the problem requirements and arrive workable design solutions
		C418.3	Students will be able to prepare report on their project work
		C418.4	students will be able to apply knowledge gained in solving real life engineering problems
		C418.5	students will be able to perform presentation to the audience
		C418.6	Students can perform as team leader or individual effectively
C419	MP469 : Industrial Psychology & Organizational Behaviour	C419.1	The students will be able to know the importance of psychology.
		C419.2	The students will be able to have insight into individual and group behavior.
		C419.3	The students will be able to deal with people in better way.
		C419.4	The students will be able to understand a social system.
		C419.5	The students will be able to motivate groups and build teams.
		C419.6	The students will be able to understand how to manage change and organizational development.

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C420	BT362 : SUSTAINABLE ENERGY PROCESS	C420.1	Students should be able to identify global and Indian energy sources.
		C420.2	Students should be able to explain capture, conversion and application of solar energy
		C420.3	Students should be able to explain capture, conversion and application of wind energy
		C420.4	Students should be able to explain conversion of biomass to energy
		C420.5	Students should be able to explain the capture of energy from oceans
		C420.6	Students should be able to explain fuel cells and energy storage routes

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COs of Electrical & Electronics Engineering

C201	MA201 : LINEAR ALGEBRA & COMPLEX ANALYSIS	C201.1	Students will be able to achieve algebraic methods to find the solution for engineering computational problems ,including vector spaces and eigen value problems
		C201.2	Students will be able to apply the properties of matrix in various situations.
		C201.3	Students will be able to analyse the properties of points lying in the n-dimensional plane.
		C201.4	Students will be able to sketch out complex functions and evaluate the definite Integrals
		C201.5	Students will be able to represent the complex functions and its image graphically
		C201.6	Students will be able to solve complex integrals in different ways
C202	HS210 : LIFE SKILLS	C202.1	To develop communication competence in prospective engineers
		C202.2	To develop report writing skills
		C202.3	To equip them to face the world & Group Discussion

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		C202.4	To prepare them on problem solving skills.
		C202.5	To create an awareness on Engineering Ethics and Human Values.
		C202.6	To instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others. To learn leadership qualities and practice them.
C203	EE201 : Circuits & Networks	C203.1	Students will be able to solve any DC and AC circuits
		C203.2	Students will be able to apply graph theory in solving circuits
		C203.3	Students will be able to apply Laplace Transform to find Transient Response
		C203.4	Students will be able to Synthesize Networks
C204	EE14 304 : Electrical Measurements & Instrumentation Systems	C204.1	Students get a clear knowledge of the basic laws governing the operation of the instruments, relevant circuits and their working.
		C204.2	Students acquire knowledge on methods of measurements and about storage & display devices.
		C204.3	Students will be aware of various types of measurements, requirements of calibrations, instruments used in measurement etc.

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		C204.4	Students get exposure to various transducers and its applications.
C205	EE14 305 : Analog Electronics	C205.1	Students will be familiarized with basic concepts of the various electronic components such as diode, BJT, FET, MOSFET, etc.
		C205.2	Students acquire knowledge on the different basic electronic circuits and their characteristics.
		C205.3	Students will be aware of various types of amplifiers circuits based on the BJT, FET and OPAMP as the basic element and their applications.
		C205.4	Students will be familiarized with the different OPAMP circuits and their characteristics.
C206	EE207 : Computer Programming	C206.1	Students will gain knowledge on computer languages, and basic structure of c program
		C206.2	Students will learn about control statements in c.
		C206.3	Students will learn about arrays and strings.
		C206.4	Students will learn about how to write functions and the idea of recursion
		C206.5	Students will learn about structures in c.

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C214	HS210 : LIFE SKILLS	C214.1	To develop communication competence in prospective engineers
		C214.2	To develop report writing skills
		C214.3	To equip them to face interview & Group Discussion.
		C214.4	To prepare them on problem solving skills.
		C214.5	To create an awareness on Engineering Ethics and Human Values.
		C214.6	To instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others.To learn leadership qualities and practice them.
C208	EE233 : C Programming Lab	C208.1	Students will gain knowledge on computer languages, and basic structure of c program
		C208.2	Students will learn about control statements in c.
		C208.3	Students will learn about arrays and strings.
		C208.4	Students will learn about how to write functions and the idea of recursion

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[Signature]

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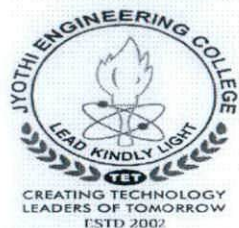
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		C208.5	Students will learn about structures in c
C209	EN14 401 : ENGINEERINE MATHEMATICS IV	C209.1	Students will able to know the basic concept of probability theory
		C209.2	Students will get knowledge about Z transform
		C209.3	Students will acquainted with concept of partial differential equations
		C209.4	Students will able to apply all the mathematical aspects that contribute the solution of heat conduction of a rod .
C209	MA202 : PDTNM	C209.1	Students will be able to apply the concept of discrete probability density functions and special probability Distributions in different engineering fields.
		C209.2	Students will be able to apply the concept of continuous discrete probability density functions and special probability Distributions in different engineering fields.
		C209.3	Students will be able to express the non periodic function as fourier integrals.
		C209.4	Students will be able to solve differential equations using Laplace Transform
		C209.5	Students will be able to use numerical methods and their applications in solving engineering problems.

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		C209.6	Students will be able to solve the differential equations using numerical techniques
C211	EE202 : Synchronous & Induction Machine	C211.1	Identify alternator types and appreciate their performance
		C211.2	Determine the Voltage regulation and analyze the performance of alternators
		C211.3	Describe the principle of operation of Synchronous motor and its different application.
		C211.4	Describe the principle of operation of 3-phase induction machine and its performance.
		C211.5	Familiarise with principle of operation and application of 1-phase Induction motors.
C212	EE14 404 : Signals and Systems	C212.1	Students will have the ability to mathematically represent a digital signal as a function of time or frequency.
		C212.2	Students will be able to apply various transformation techniques to represent time domain signals in frequency domain & vice versa
		C212.3	Students will have the ability to apply various transformation techniques to analyze a digital signal
		C212.4	Students will be able to mathematically represent the functionality of a digital system.

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C213	EE 206 : Material Science	C213.1	Students will be able to describe the characteristics of conducting and semiconducting materials
		C213.2	Students will be able to classify magnetic materials and describe different laws related to them
		C213.3	Students will be able to classify and describe different insulators and to explain the behaviour of dielectrics in static and alternating fields
		C213.4	Students will be able to describe the mechanisms of breakdown in solids, liquids and gases
		C213.5	Students will be able to classify and describe Solar energy materials and superconducting materials and gain knowledge in the modern techniques for material studies
C214	EE208 : Measurements & Instrumentation	C214.1	Students will be able to Compare different types of instruments-their working principles, advantages and disadvantages
		C214.2	Students will be able to describe wattmeter's and energy meters
		C214.3	Students will be able to Describe different flux and permeability measurements methods and to understand the application of CRO
		C214.4	Students will be able to identify different AC potentiometers and bridges and understand various transducers
C215	EE 232 : ELECTRICAL MACHINES LAB I	C215.1	Students can analyze the performance characteristics of different DC generators and DC motors


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		C215.2	Students will be able to analyze the performance characteristic of a transformer
		C215.3	Students will be able to compare the performance of transformers for different modes of connections
		C215.4	Students will be able to separate the losses of DC motors and transformer
		C216.1	Students will be able to analyze RLC circuits and coupled circuit to obtain the voltage current relations.
		C216.2	Students will be able to analyze and verify various network theorems in a dc circuit
C216	EE234 : Circuits and Measurements Lab	C216.3	Students will be able to calibrate single phase energy meter at various power factors.
		C216.4	Students will be able to measure power in single phase and three phase circuits.
		C216.5	Students will be able to measure magnetic characteristics of iron ring specimen.
C301	EE 301 : POWER GENERATION, TRANSMISSION AND PROTECTION	C301.1	Students will be able to understand conventional and non-conventional energy sources.

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		C301.2	Students will be able to understand the parameters and modeling of transmission line.
		C301.3	Students will be able to understand various types of transmission schemes.
		C301.4	Students will be able to understand the basics of HVDC, FASCTS and different types of distributors.
		C301.5	Students will understand different types of circuit breakers and protective relays.
		C301.6	Students will understand different protective schemes.
C302	EE 303 : LINEAR CONTROL SYSTEM	C302.1	Students will be able to understand the fundamental concept of analysis and design techniques of control systems by transfer function approach
		C302.2	Students will be able to adequate knowledge in the time response of systems and different control system components.
		C302.3	Students will be learn the concept of stability of control system and steady state error analysis
		C302.4	Students will be able to Gain knowledge about Root Locus method of stability analysis
		C302.5	Students will be able to understand the concepts of frequency Domain Analysis
		C302.6	Students will be able to learn Polar Plot, Nyquist stability criterion & Nichols chart
C303	EE 305 : POWER ELECTRONICS	C303.1	Students are able to understand the characteristics of power semiconductor devices

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		C303.2	Students are able to analyze various rectifier circuits, derive the utility side harmonics and understand the basic configuration of AC voltage controllers
		C303.3	Students are able to analyze various inverter circuits and design various switching schemes
		C303.4	Students are able to design and analyze the power circuit of a basic SMPS.
		C304.1	Students can understand the basic model of any communication systems
C304	EE14 504 : ANALOG & DIGITAL COMMUNICATION	C304.2	students acquire the skill to identify and interpret various types of communication techniques
		C304.3	students know the basic concepts of communication techniques both analog & digital communication
		C304.4	students can understand through how to implement it in many real time communication systems
		C304.5	students to understand the concept of power line communication and its applications
C305	EE309 : Microprocessor & Embedded Systems	C305.1	Students will be able to identify the different types of lighting systems, schemes, arrangements, methods and their quality.

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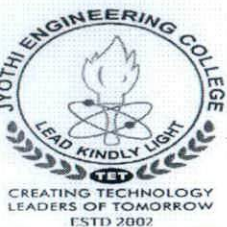
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		C305.2	Students will have the basic concepts of measurements of light and the various definitions associated with that.
		C305.3	Students will know the basics definitions and standards related to both interior and outdoor lighting.
		C305.4	Students will be able to design both interior lighting for simple applications and outdoor lighting for street lighting and flood lighting.
		C305.5	Students will have an awareness of the various special features and design considerations of lighting.
C306	EE367 : New and Renewable Energy Systems	C306.1	Students will be able to describe and classify different types of energy sources. Students will be able to understand the merits and demerits of renewable energy sources. Students will be able to describe different energy storage methods.
		C306.2	Students will be able to understand and analyse different solar thermal and photovoltaic systems.
		C306.3	Students will be able to describe principles of tidal power generation and OTEC systems.
		C306.4	Students will be able to understand the principle of wind energy conversion and do the performance analysis.
		C306.5	Students will gain knowledge on different biomass conversion technologies, different biomass programs in India.
		C306.6	Students will get an understanding of design and selection considerations of small hydro power plants.

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C307	EE331 : Digital Circuits and Embedded Systems Lab	C307.1	Students will be able to realize SOP and POS functions using K Map
		C307.2	Students will be able to realize half and full adders using universal gates.
		C307.3	Students will be able to design a 4 bit adder or subtractor circuit
		C307.4	Students will be able to design synchronous, up down and modulo N counters
		C307.5	Students will be familiarized with shift registers, ring and Johnson counter
C308	EE 333 : ELECTRICAL MACHINES LAB II	C308.1	Students get the knowledge on the performance of different types of induction motors.
		C308.2	Students get the experimental skill to obtain the performance of synchronous generator
		C308.3	Students learn the process of synchronizing alternator with the mains.
		C308.4	Students get the knowledge on the starting methods of different types of induction motors.
C309	EE341 : DESIGN PROJECT	C309.1	Students will be able to Think innovatively on the development of components, products, processes or technologies in the engineering field
		C309.2	Students will be able to Analyse the problem requirements and arrive workable design solutions

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C310	EE 302 : Electromagnetics	C310.1	use different coordinate system and apply them to solve real times problems and also explain the physical meaning of the differential equations for electrostatic and magnetic fields
		C310.2	Analyze fields and potentials due to charges in electrostatics and magneto statics
		C310.3	Understand how materials are affected by electric and magnetic fields
		C310.4	Understand principles of propagation of uniform plane waves and relation between the fields under time varying situations
C311	EE304 : Advanced Control Theory	C311.1	Students will be able to design compensators in time domain.
		C311.2	Students will be able to design compensators in frequency domain.
		C311.3	Students will be able to acquire the fundamental knowledge about state space modeling and stability of nonlinear systems and discrete systems by various methods
		C311.4	Students will be able design controllers and observers and there by acquire full knowledge about the stability of systems
C312	EE 306 : POWER SYSTEM ANALYSIS	C312.1	Students are able to understand the Power System modeling.
		C312.2	Students are able to analyze the Power system network under normal and abnormal conditions

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		C312.3	Students are able to conduct the load flow studies of given Power System network and to understand the concept of stability in Power System network
		C312.4	Students are able to understand the concept of Load frequency control, and the basic concept of Load dispatch
C313	EE308 : Electric Drives	C313.1	Graduates will be able to select a drive for particular application and analyze its stability.
		C313.2	Graduates will be familiarized with the various converter control techniques employed for controlling drives with dc motor.
		C313.3	Graduates will be familiarized with various chopper control techniques employed for controlling drives with ac motors.
		C313.4	Graduates will be familiarized with various control techniques employed for controlling drives with induction motors.
		C313.5	Graduates are able to understand the basics of space vector modulation employed for the control of Induction motors.
		C313.6	Graduates will be familiarized with various control techniques employed for controlling drives with synchronous motors.
C314	EE366 : Illumination Technology	C314.1	Students will be able to identify the different types of lighting systems, schemes, arrangements, methods and their quality.
		C314.2	Students will have the basic concepts of measurements of light and the various definitions associated with that.

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		C314.3	Students will know the basics definitions and standards related to both interior and outdoor lighting.
		C314.4	Students will be able to design both interior lighting for simple applications and outdoor lighting for street lighting and flood lighting.
		C314.5	Students will have an awareness of the various special features and design considerations of lighting.
C315	EE 372 : BIOMEDICAL AND INSTRUMENTATION	C315.1	Students will be acquainted with the physiology of the heart, lung, blood circulation and respiration
		C315.2	Students will be able to understand the various sensing and measuring devices of electrical origin.
		C315.3	Students will get awareness of electrical safety of medical equipments
		C315.4	Students will get ability to use different transducers for biomedical applications
C316	HS 300 : Principles of Management	C316.1	use different coordinate system and apply them to solve real times problems and also explain the physical meaning of the differential equations for electrostatic and magnetic fields
		C316.2	Analyze fields and potentials due to charges in electrostatics and magneto statics
		C316.3	Understand how materials are affected by electric and magnetic fields

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		C316.4	Understand principles of propagation of uniform plane waves and relation between the fields under time varying situations
C317	EE332 : Systems and Control Lab	C317.1	To develop mathematical models for servomotors and other electrical systems
		C317.2	Conduct performance analysis of different process control systems
		C317.3	To design different types of controllers and conduct their performance analysis
		C317.4	Use MATLAB and SIMULINK to design and analyze simple control systems and compensators
C318	EE 334 : Power Electronics and Drives Lab	C318.1	Students are able to design set up and analyze various Power Electronic converters
		C318.2	Students are able to apply these converters for the implementation of various motor drives
C319	EE352 : COMPREHENSIVE EXAM	C319.1	The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them
C401	EE401 : ELECTRONIC COMMUNICATION	C401.1	Students will be able to Understand the need of modulation in transferring a signal through either wireless or wired communication systems
		C401.2	Students will be able to Be able to apply analog modulation techniques and receiver fundamentals in analog communication

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		C401.3	Students will be able to Be to apply baseband digital encoding & decoding techniques in the storage / transmission of digital signal through wired channel
		C401.4	Students will be able to Understand the performance of communication systems in the presence of noise and interference
		C401.5	Students will be able to understand the satellite communication and cellular communication
C402	EE403 : Distributed Generation and Smart Grid	C402.1	The student will be able to explain various distributed generation systems.
		C402.2	The student will be able to understand the microgrids, their control schemes and the microgrid protection issues.
		C402.3	The student will be able to understand NIST Smart Grid architecture and the various developments happening in the field of Smart Grid.
		C402.4	The student will be able to understand Smart Meters and Electricity tariffs.
		C402.5	The student will be able to understand cloud computing in smart grid and the power quality issues in the smart grid.
C403	EE405 : Electrical System Design	C403.1	To Know the basic Rules and Regulations of Electrical System Design
		C403.2	To Know the basic electrical guidelines and safety aspects of domestic systems
		C403.3	To know the general aspects of Industrial electrical Installations

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		C403.4	To design Simple electrical systems and prepare the schematic diagram with all specifications
C404	EE407 : Digital Signal Processing	C404.1	Analyse DT systems with DFT
		C404.2	Design digital filters IIR & FIR filters
		C404.3	Analyse finite word length effects in signal processing
		C404.4	Design filters using Matlab FDA tools
		C404.5	Understand digital signal controllers & their applications
C405	EE409 : ELECTRICAL MACHINE DESIGN	C405.1	Students will able to understand the general principles and specifications of electrical machine design
		C405.2	Students will have the ability to model small size transformers and design cooling tubes for the transformer.
		C405.3	Students will be able to design armature and field systems for D.C. machines
		C405.4	Students will be able to design armature and field systems for alternators.
		C405.5	Students will able to Design Electrical Machines by using modern design software.
C406	EE465 : Power Quality	C406.1	Students will be able to distinguish various power quality problems

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		C406.2	Students will be able to understand the power quality standards and the impact of harmonics on power system equipment and loads.
		C406.3	Students will be able to do harmonic analysis and able to design and analyse filters to reduce harmonic distortion
		C406.4	Students will be able to understand the working of different power quality monitoring equipments and power quality management in smart grid.
		C407.1	Students will be able to Analyze a current topic of professional interest and present it before an audience
		C407.2	Students will be able to write technical document related to the work
C407	EE451 : COMPREHENSIVE EXAM	C407.3	Students will be aware of diverse disciplines to apply theories, methods and knowledge bases from multiple fields
		C407.4	Students will be able to identify an engineering problem, analyse it and propose a work plan to solve it.
		C407.5	Students will be able to improve critical- thinking and analytical decision-making capabilities to investigate complex engineering problems to propose project-based solutions
		C408.1	Students will gain practical knowledge about various power system components.
C408	EE431 : Power System Lab	C408.2	Students will acquire knowledge about the operation of power systems and the relay settings, fault calculations.
		C408.3	Students will be able to simulate the power system operations which will be helpful in the design of power systems.

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		C408.4	Students are introduced into various testing procedures used in power systems.
C414	EE469 : Electric and Hybrid Vehicles	C414.1	Students will be able to understand different drive scheme for developing an electric hybrid vehicle depending on resources
		C414.2	Students will design and develop basic schemes of electric vehicles and hybrid electric vehicles
		C414.3	Students will familiarise to choose proper energy storage systems for vehicle applications
		C414.4	Students can identify various communication protocols and technologies used in vehicle networks
C409	EE402 : Special Electrical Machines	C409.1	Students will get the knowledge on Construction, principle of operation and performance of AC and DC Servomotors
		C409.2	Students will be able to get the knowledge on Construction, principle of operation and performance of Stepper Motor
		C409.3	Students will get the knowledge on Construction and principle of operation of AC Series Motor, Universal Motors and Hysteresis motor
		C409.4	Students will get the knowledge on Construction, principle of operation and performance of Reluctance motors
		C409.5	Students will be able to understand the details of Construction, principle of operation and performance of Permanent Magnet DC Motors & Brushless DC motor

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		C409.6	Students will get the awareness on Construction, principle of operation and performance of Linear motors
		C415.1	Students will be able to explain the basic principles & block diagrams of process control in industrial process plants;
		C415.2	Students will be able to specify the required instrumentation and its dynamic response, Signal Conditional circuits and final elements to ensure proper control for industrial process plants;
C415	EE404 : Industrial Instrumentation And Automation	C415.3	Students will be able to get the concepts of virtual instrumentation
		C415.4	Students will be able to describe working of various blocks of basic automation system
		C415.5	Students will be able to get an insight on data acquisition, processing and monitoring system
		C415.6	Students will be able to understand the basic programming realization of PLC
C412	EE14 803 : POWER SYSTEM PROTECTION	C412.1	Students will get an idea about arc interruption and different types of breaker used for protection.
		C412.2	Students will be able to understand surge protection and insulation coordination in power system.

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		C412.3	Students will understand different types of relays used in power system protection
		C412.4	Students will gain knowledge about microprocessor based relays and static relays and also different protection schemes for transformer, generator and motor.
C319	EE492 : Project	C319.1	Students will be able to identify an engineering problem, analyse it and propose a work plan to solve it.
		C319.2	Students will be able to improve critical- thinking and analytical decision-making capabilities to investigate complex engineering problems to propose project-based solutions
		C319.3	Students will be aware of diverse disciplines to apply theories, methods and knowledge bases from multiple fields
		C319.4	Students will be able to think innovatively on the development of components, products, processes or technologies in the engineering field
		C319.5	Students will be able to write technical document related to the work and present it before an audience
C415	BT362 : SUSTAINABLE ENERGY PROCESS	C415.1	Students should be able to identify global and Indian energy sources.
		C415.2	Students should be able to explain capture, conversion and application of solar energy

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		C415.3	Students should be able to explain capture, conversion and application of wind energy
		C415.4	Students should be able to explain conversion of biomass to energy
		C415.5	Students should be able to explain the capture of energy from oceans
		C415.6	Students should be able to explain fuel cells and energy storage routes
		C416.1	Student will be able to study about source and effects of air pollution and different control measures.
		C416.2	Student will be able to understand water pollution, its causes, and treatments
C416	CE482 : Environmental impact assessment	C416.3	Student will be able to understand about water pollution, land pollution, its causes and abatement measures
		C416.4	Student will be able to understand about noise pollution, its effects and control measures
		C416.5	Student will be able to study the impact of pollutants on the environment and need of impact assessment techniques
		C416.6	Student will be able to understand about impact assessment procedure and analysis method.

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C417	MP469 : Industrial Psychology & Organizational Behaviour	C417.1	The students will be able to know the importance of psychology.
		C417.2	The students will be able to have insight into individual and group behavior.
		C417.3	The students will be able to deal with people in better way.
		C417.4	The students will be able to understand a social system.
		C417.5	The students will be able to motivate groups and build teams.
		C417.6	The students will be able to understand how to manage change and organizational development.

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COs of Mechanical Engineering

C201	MA201 : LINEAR ALGEBRA & COMPLEX ANALYSIS	C201.1	Students will be able to achieve algebraic methods to find the solution for engineering computational problems ,including vector spaces and eigen value problems.
		C201.2	Students will be able to apply the properties of matrix in various situations.
		C201.3	Students will be able to analyze the properties of points lying in the n-dimensional plane.
		C201.4	Students will be able to sketch out complex functions and evaluate the definite Integrals .
		C201.5	Students will be able to represent the complex functions and its image graphically
		C201.6	Students will be able to solve complex integrals in different ways
C202	MECHANICS OF SOLIDS	C202.1	Students will be able to understand basic concepts of stress and strain in solids.
		C202.2	Students will be able to determine the stresses in simple structural members such as shafts, beams, columns etc. and apply these results in simple design problems.
		C202.3	Students will be able to determine principal planes and stresses, and apply the results to combined loading case.

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A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY BY THE CATHOLIC ARCHDIOCESE OF TRICHUR

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		C202.4	Students will be able to analyze and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.
		C202.5	Students will be able to prepare the shear force and bending moment diagrams of beams and analyze them.
		C202.6	Students will be able to determine the slopes and deflection of a loaded beam.
C202	MECHANICS OF FLUIDS	C203.1	Students will be able to Calculate pressure variations in accelerating fluids using Euler's and Bernoulli's equations
		C203.2	students will be able to Become conversant with the concepts of flow measurements and flow through pipes
		C203.3	Srudents will be able to Apply the momentum and energy equations to fluid flow problems.
		C203.4	Students will be able to Evaluate head loss in pipes and conduits
		C203.5	Students will be able to Use dimensional analysis to design physical or numerical experiments and to apply dynamic similarity
		C203.6	
C204	THERMODYNAMICS	C204.1	To understand the basic concepts of thermodynamic such as temperature, pressure, system, properties, process, state, cycles and equilibrium; define energy transfer through mass, heat and work for closed and control volume systems

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		C204.2	To understand and apply the first Law of Thermodynamics on closed and control volume systems and to analyse preliminary problems.
		C204.3	To understand and apply Second Law of Thermodynamics and entropy concepts in analysing the thermal efficiency of a system and to analyse preliminary problems of change in entropy in various thermodynamic processes.
		C204.4	To identify the properties of substances on property diagrams and obtain the data from property tables.
		C204.5	To apply concept of chemical thermodynamics, with emphasis on the first and second laws, to predict physical changes and reaction outcomes based on Gibbs energies.
		C204.6	To understand the basic properties of ideal gases and ideal gas mixtures; also to understand the concept of thermochemistry and various parameters involved.
C206	LIFE SKILLS	C206.1	Students will be able to communicate effectively and make effective presentations.
		C206.2	Students will be able to write different types of reports, face interview & group discussion
		C206.3	Students will be able to critically think on a particular problem and solve problems
		C206.4	Students will be able to work in Group & Teams and handle Engineering Ethics and Human Values
		C206.5	Students will be able to become effective leaders
		C206.6	

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C207	COMPUTER AIDED MACHINE DRAWING LAB	C207.1	Students will able to Acquire the knowledge of various standards and specifications about standard machine components.
		C207.2	Students will able to Make drawings of assemblies with the help of part drawings given
		C207.3	Ability to select, configure and synthesize mechanical components into assemblies.
		C207.4	Apply the knowledge of fits and tolerances for various applications
		C207.5	Able to model components of their choice using CAD software
		C207.6	
C208	MATERIAL TESTING LAB	C208.1	The student will understand different mechanical properties and characteristics of materials.
		C208.2	The student will acquire the knowledge of operating and conducting experiments on mechanical machineries
		C208.3	The student will be able to develop skills on drawing inferences from their practical experience that help them to design mechanical components.
		C208.4	Students will be able to derive knowledge individually and as a team that will help them to learn courses related to material science.
		C208.5	
		C208.6	

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C209	PROBABILITY DISTRIBUTIONS, TRANSFORMS AND NUMERICAL METHODS	C209.1	Students will be able to apply the concept of discrete probability density functions and special probability Distributions in different engineering fields.
		C209.2	Students will be able to apply the concept of continuous discrete probability density functions and special probability Distributions in different engineering fields.
		C209.3	Students will be able to express the non periodic function as fourier integrals.
		C209.4	Students will be able to solve differential equations using Laplace Transform
		C209.5	Students will be able to use numerical methods and their applications in solving engineering problems.
		C209.6	Students will be able to solve the differential equations using numerical techniques
C210	ADVANCED MECHANICS OF SOLIDS	C210.1	Students will be able apply concepts of stress and strain analyses in solids.
		C210.2	Students will be able solve problems using theory of elasticity at a basic level.
		C210.3	Students will be able to solve general bending problems
		C210.4	Students will be able apply energy methods in structural mechanics problems
C211	THERMAL ENGINEERING	C211.1	To acquire knowledge of boilers and its working; understand & analyse different steam power cycles and steam nozzles.
		C211.2	To understand the working of steam turbines and apply the principles for finding solutions to engineering problems.

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		C211.3	To understand the working of various internal combustion engines; understand & analyse its underlying thermodynamic cycles.
		C211.4	To understand the performance testing of IC engines, evaluate various performance parameters and gain knowledge about IC engine fuels & combustion chemistry
		C211.5	To gain knowledge of various components of air pollution from IC engines and its remedies; understand the combustion process and different designs of combustion chamber in IC engines.
		C211.6	To understand and analyse the gas turbine cycle and its modifications; gain knowledge about combustion in gas turbines.
C212	FLUID MACHINERY	C212.1	Students will be able to discuss the characteristics of centrifugal pump and reciprocating pumps
		C212.2	Students will be able to calculate forces and work done by a jet on fixed or moving plate and curved plates
		C212.3	Students will be able to know the working of turbines and select the type of turbine for an application.
		C212.4	Students will be able to do the analysis of air compressors and select the suitable one for a specific application
		C212.5	Students will be able to understand the working of pumps and select the type of pump for an application.
C216	THERMAL ENGINEERING LAB	C216.1	Students will be able to understand the various types IC engines and their parts
		C216.2	Students will be able to conduct the performance test on IC engines, compressors and blowers

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		C216.3	Students will be able to familiarize equipment used for measuring viscosity, flash and fire point and Calorific value of petroleum products
		C301.1	The students will be able to solve practical problems related to kinematics of mechanisms
		C301.2	students will be able to classify different types of links and mechanisms used for different purposes in different machines.
		C301.3	students will be able to solve the forces, velocities and accelerations in different mechanisms and machine components.
C301	MECHANICS OF MACHINERY	C301.4	students can list, predict and design different type of links applied to get the required motion of different types of the parts of machines and able to design cam and gear trains
		C301.5	students will be able to prepare for the engineering challenges regarding human needs in daily life about machines and systems which are possible due to the design of machines
		C301.6	students will be able to propose the processes, methods and develop equations and relations pertaining to the design of machine and machine elements
		C302.1	To introduce students to the scientific principles underlying material behavior during manufacturing processes so as to enable them to undertake calculations of forces, tool stresses and material removal rates.
		C302.2	To understand various machine tools such as lathe, drilling machine, reciprocating machines etc. and their operations.
		C302.3	To impart knowledge of appropriate parameters to be used for various machining operations.
C302	MACHINE TOOLS & DIGITAL MANUFACTURING	C302.4	To understand various machine tools such as milling, grinding and their operations.

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		C302.5	To develop knowledge on the importance of super finishing in metal cutting process.
		C302.6	To introduce the fundamentals of digital manufacturing.
		C303.1	Students will have a fundamental idea about computer programming concept, Keywords, Identifiers, Data types, constants & Variables, Operators and structure of C++ program. And will be able to Prepare algorithm and flowchart to solve simple engineering problems
		C303.2	Students will Demonstrate the ability to Write C++ programs to solve simple engineering problems using control statements, arrays and functions.
		C303.3	Will be able to Write C++ programs to solve simple engineering problems using pointers, function call by value and function call by reference
		C303.4	Students will acquire basic knowledge about sources of errors in numerical methods and Solve linear system of equations using Gauss elimination, Gauss-Jordan and Gauss-Seidel methods
		C303.5	Students will be able carry out interpolation using Lagrange and Aitken techniques. Carry out curve fitting using method of least squares, non-linear relationships, Linear correlation, measures of correlation
		C303.6	Students will have the ability to Solve Partial differential equations using Finite difference method
C303	COMPUTER PROGRAMMING & NUMERICAL METHODS		
C304	ELECTRICAL DRIVES &	C304.1	Students will be able to describe the working and characteristics of DC generator

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	CONTROL FOR AUTOMATION	C304.2	Students will be able to describe the working and characteristics of DC motor
		C304.3	Students will be able to classify and describe about two winding transformer and auto transformer
		C304.4	Students will be able to classify the different types of three phase induction motor
		C304.5	Students will be able to classify single phase motors
		C304.6	Students will be able to gain knowledge about stepper motors and automation
C305		PRINCIPLES OF MANAGEMENT	C305.1
	C305.2		Students will be able to describe, discuss and relate management techniques adopted within an organization
	C305.3		Students will be able to apply management techniques for meeting current and future management challenges faced by the organization
	C305.4		Students will be able to compare the management theories and models critically and to inspect and question its validity in the real world
	C305.5		Students will be able to assess and modify different theories of management so as to relate it to current management challenges
	C305.6		Students will be able to apply principles of management in order to execute the role as a manager
C306	NON-DESTRUCTIVE TESTING	C306.1	Able to understand the basic principles, techniques, equipment, applications and limitations of NDT methods

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		C306.2	Able to understand the Visual, Penetrant Testing, Magnetic Particle Testing, Ultrasonic Testing, Radiography, Eddy Current methods
		C306.3	Able to selection of appropriate NDT methods.
		C306.4	Ability to identify advantages and limitations of nondestructive testing methods
		C306.5	Able to make aware the developments and future trends in NDT.
C307	TRIBOLOGY	C307.1	Understanding the subject tribology and its technological significance.
		C307.2	Understanding the theories/laws of sliding and rolling friction and the effect of viscosity
		C307.3	Get basic idea consequences of wear, wear mechanisms, wear theories and analysis of wear problems
		C307.4	Get an exposure to theories of hydrodynamic and the advanced lubrication techniques and the application of lubrications in metal working
		C307.5	provide students an overview of adhesion property in different applications and to get knowledge about different friction materials
		C307.6	Get basic idea about the nature of engineering surfaces, their topography and learn about surface characterization techniques
C308	MANUFACTURING TECHNOLOGY LAB I	C308.1	Identify various process parameters and their influence on surface properties of various metals.
		C308.2	Recommend appropriate speed, feed and depth of cut for various processes on lathe machine.

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		C308.3	Position, hold and locate work material and cutting tools in various basic machine tools.
		C308.4	Choose suitable welding process for different metals.
		C308.5	Choose appropriate heat treatment process for different metals.
		C309.1	Students will be able to understand the performance of DC machines
C309	ELECTRICAL AND ELECTRONICS LAB	C309.2	Students will be able to understand the characteristics of transformer
		C309.3	Students will be able to understand the performance of AC machines
		C309.4	Students will be able to understand the characteristics of diode, Zener diode
		C309.5	Students will be able to understand the performance of rectifier circuits
C310	DESIGN PROJECT	C310.2	The students will be able to think innovatively on the development of components, products, processes or technologies in the engineering field.
		C310.3	The students will be able to analyse the problem requirements and arrive workable design solutions.
		C310.4	To develop design that add value to products and solve technical problems.

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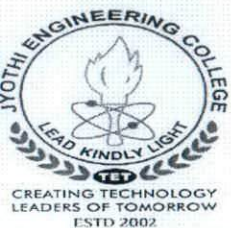


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C311	HEAT & MASS TRANSFER	C311.1	Solve problems involving steady state heat conduction with and without heat generation in simple geometries
		C311.2	Evaluate heat transfer coefficients for Natural convection and Forced convection situations using empirical relations
		C311.3	Design Heat Exchangers and Fins and evaluate its performance.
		C311.4	Solve problems involving transient heat conduction and Understand the basics of Heat pipe, Boiling and Condensation
		C311.5	Estimate radiation heat transfer between black body and gray body surfaces.
		C311.6	Solve problems involving mass transfer due to diffusion, chemical reaction and convection.
C312	DYNAMICS OF MACHINERY	C312.1	Mastery of the knowledge in dynamics of planar mechanism
		C312.2	Analyze static and dynamic force analysis of mechanisms.
		C312.3	Take notice of importance of the balancing and learn procedures of the basic balancing.
		C312.4	Analyse the effect of a gyroscope on ships, aeroplanes and automobiles.
		C312.5	Understand the concepts of vibrating systems
		C312.6	Understand longitudinal, transverse and torsional vibrations.

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C313	ADVANCED MANUFACTURING TECHNOLOGY	C313.1	Become conversant with the non- traditional machining process and to appreciate the effect of process parameters on the surface integrity aspects during the non- traditional machining process.
		C313.2	Appreciate the use of an EDM as a non traditional method of machining complex and hard materials.
		C313.3	Prescribe a laser materials processing technique suitable for a given product with material, size, precision, and surface quality requirements.
		C313.4	Program and operate a CNC mill and lathe.
		C313.5	Select the tool material and machining process parameters.
C314	COMPUTER AIDED DESIGN AND ANALYSIS	C314.1	Students able to express the concept of CAD/CAM/CIM and Other terminologies used in the development and manufacturing of a product.
		C314.2	Students able to demonstrate different methods for geometric modelling in CAD.
		C314.3	Students able to evaluate the types of curves used in creating a geometry.
		C314.4	Students able to formulate stiffness matrix to analyse structural and thermal problems
		C314.5	Students analyse structural finite element problems by getting knowledge about various finite element methods.
C315	METROLOGY AND INSTRUMENTATION	C315.1	The students will be able to understand the working of linear and angular measuring instruments.

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		C315.2	The students will be able to familiarize with the working of optical measuring instruments and fundamentals of limits and limit gauges.
		C315.3	The students will be able to give basic idea about various methods for measurement of screw thread and surface finish parameters
		C315.4	The students will be able to give an exposure to advanced measuring devices and machine tool metrology.
		C315.5	The students will be able to provide students an overview of mechanical measurement systems and principle of instruments for motion and dimension measurement.
		C315.6	The students will be able to provide basic idea about working principle and applications of devices for measurement of force and torque; strain and stress and temperature
C316	OPERATIONS RESEARCH	C316.1	On completion of this course, the students will have a thorough understanding of operation research techniques and apply them solving practical problems in industry
		C316.2	Students will be able to apply appropriate methods for solving the engineering operation research problems
		C316.3	Students will be able to analyze the practical application of O.R in Engineering
		C316.4	Students will be able to evaluate and solve different O.R methods
C317	MAINTENANCE ENGINEERING	C317.1	Explain the principles and practices of maintenance planning for an organization
		C317.2	Discuss maintenance policies with special reference to preventive maintenance

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		C317.3	Predict appropriate condition monitoring (CM) techniques and instruments
		C317.4	Distinguish various repair methods for basic machine elements
		C317.5	Summarize repair methods for material handling equipment
		C317.6	Explain various maintenance categories like PM, CM and repairs of machine elements to control failures, accidents, down time etc
C318	COMPUTER AIDED DESIGN & ANALYSIS LAB	C318.1	Students are capable of developing 3D models of machine components, complex geometries etc. using Modeling Software
		C318.2	Students are capable to assembly the parts created to develop the whole mechanism.
		C318.3	Students are capable to generate 2D sketches of the assembled parts and provide dimensions and symbols to generate 2D drawing.
		C318.4	Students can apply their knowledge in importing CAD geometries and to modify and mesh using different meshing methods and local meshing controls as a part of pre-processing of the FE problem in Analysis software.
		C318.5	Students have knowledge to conduct simple structural, fluid flow and thermal analysis problems in Analysis software.
C319	MANUFACTURING TECHNOLOGY LAB II	C319.1	Students will be able to select and use different linear and angle measuring devices like vernier calipers, micrometers, bevel protractors, slip gauges etc.
		C319.2	Students will be able to use equipments like Surface Roughness tester, Profile projector, and Tool makers Microscope to find out parameters of gear, thread, tool and surface roughness

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		C319.3	Students will be able to do the process of calibration by carrying out experiments on devices like strain gauge, LVDT, and Roughness tester.
		C319.4	Students will be able to understand about CNC machine tool and also to write NC part programming statements to carry out the machining processes using CNC machine tool
		C319.5	Students will be able to make inferences during different measurement processes.
		C319.6	Students will be able to perform, analyse and infer the experiments as a team.
C320	COMPREHENSIVE EXAM	C320.1	To assess the comprehensive knowledge gained in basic courses relevant to the branch of study.
		C320.2	To comprehend the questions asked and answer them with confidence
		C320.3	The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them.
C401	DESIGN OF MACHINE ELEMENTS I	C401.1	Students will be able to explain the various steps in design process and failure theories by identifying various stresses induced in a machine element.
		C401.2	Student will be able to design different temporary and permanent joining methods like threaded joints, bolted joints, cotter and knuckle joints, riveted joints, welded joints etc.
		C401.3	Students will be able to design helical and leaf springs.
		C401.4	Students will be able to design shafts and couplings.

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		C401.5	Enable the students to have high ethical standards in terms of team work to be a good design engineer.
C402	ADVANCED ENERGY ENGINEERING	C402.1	The students will be able to understand global energy scenario.
		C402.2	Students will have an understanding about the conventional power plants.
		C402.3	The students will become aware of different renewable energy sources and choose sustainable energy for development.
		C402.4	The students will be aware about the impacts of energy conversion and importance of sustainable energy.
		C402.5	The students will be able to analysis the technical feasibility of non-conventional energy resources.
		C402.6	The students will be able to design solar, wind and biomass energy systems.
C403	REFRIGERATION AND AIR CONDITIONING	C403.1	To identify and compare different type of refrigerating machines used in industries and in other establishments.
		C403.2	To analyze the influence of all operating parameters of R & AC machines & can select the right refrigerating equipment for a particular application.
		C403.3	To select the right refrigerant for a particular practical situation. Apply their knowledge in unconventional refrigeration methods and working principles of refrigerating and air conditioning equipment to attain sustainable refrigeration methods.
		C403.4	To select the right type of components for a particular refrigerating / air conditioning system used in practice.

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		C403.5	Using the principles of air conditioning, they will be able to design different type of air conditioning systems and duct systems for industrial applications
C404	MECHATRONICS	C404.1	The Student will be able to understand the basic concepts of various sensors in mechatronics
		C404.2	The Student will be able to understand the working of different actuators in mechatronics
		C404.3	The Student will be able to know the functioning of MEMS
		C404.4	The Student will be able to understand the various mechatronics element in CNC machines
		C404.5	The Student will be able to understand the mathematical models in mechatronics
		C404.6	The Student will be able to design a basic mechatronics system
		C405	COMPRESSIBLE FLUID FLOW
C405.2	Student will be able to analyze the behavior of compressible isentropic flow.		
C405.3	Student will be able to formulate and solve problems in one -dimensional steady compressible flow including: isentropic nozzle flow, constant area flow with friction (Fanno flow) and constant area flow with heat transfer (Rayleigh flow).		
C405.4	Student will be familiarized with various visualization techniques and measuring instruments used in compressible flow		

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		C405.5	Student will be able to analyze the concept of irreversible discontinuity (shock) in supersonic flow.
C406	AUTOMOBILE ENGINEERING	C406.1	Students will understand various IC Engine parts, MPFI, CRDI, Super charger and Turbo charger.
		C406.2	Students will understand Clutches, Gear box and hydrodynamic coupling.
		C406.3	Students will be able to apply fundamental concepts of steering mechanism and steer axis inclination.
		C406.4	Students will be able to understand different types of suspension systems, Anti roll bar and Hydrogen suspension mechanism.
		C406.5	Students will be able to understand the working of brakes, ABS system and Pneumatic brake systems.
C409	SEMINAR & PROJECT PRELIMINARY	C409.1	Students will have the ability to effectively gather and interpret information from literature survey. And use this knowledge to identify, formulate, analyse and solve complex problems and to evaluate and interpret various solutions (Understand-Level 2)
		C409.2	Students will gain the ability to communicate effectively with written, oral, and visual means in a technical setting. (Apply-Level 3)
		C409.3	Students will have the ability to use modern design and analysis tools. (Evaluate-Level 5)
		C409.4	Students will be able to carry out calculations involved in design, consider and evaluate alternate assumptions, approaches, and procedures. Ability to fabricate system components related to engineering problems giving consideration to environment and society. (Apply-Level 3)

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		C409.5	Students will have the ability to serve as effective team member to plan and complete the project/task within a specified budget and time. (Analyse-Level 4)
C410	MECHANICAL ENGINEERING LAB	C410.1	Ability to apply the principle of heat transfer for quantitative measurement and to compare the results with theoretical values
		C410.2	Ability to compute natural frequency of simple vibrating systems
		C410.3	Understand the working of different governors, and can predict the stability of mechanical governors
		C410.4	Understand the theory behind gyroscopic effect and to predict the effect of gyroscopic couple in different mechanisms
		C410.5	To practice calibration of thermometer and pressure gauges
C411	DESIGN OF MACHINE ELEMENTS II	C411.1	To acquire knowledge and design of different types of clutches and brakes
		C411.2	To understand the basics of bearings, types of bearing, lubrication system of bearings
		C411.3	To understand the concept of gears and the basic procedure in design of spur gear helical, worm gear
		C411.4	To acquire knowledge and design of flat belt, v belt and chains.
		C411.5	To acquire basic knowledge in Connecting rod and Pressure
		C411.6	vessels.

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C412	INDUSTRIAL ENGINEERING	C412.1	Students will be able to acquire a sound knowledge in principles /application areas of Industrial Engineering.
		C412.2	Students will be able to use Industrial Engineering application area such as Facility Planning, Material Handling methods, maintenance planning, depreciation and replacement analysis etc.
		C412.3	Students will be able to select and use an appropriate principles/methods/ techniques/ modern concepts with reference to given application/situation in Facility Planning, Material Handling methods, maintenance planning, Methods engineering, Job Evaluation ,Merit Rating, Industrial relations, Production planning and control, Inventory Control, and Statistical quality control.
		C412.4	Students will be able to develop and implement new ideas/ modern concepts with reference to given application/situation in Industrial Engineering for best manufacturing practices
		C412.5	Students will be able to prepare and engage in independent and life-long learning in the context of technological change in Industrial Engineering.
C413	PROPULSION ENGINEERING	C413.1	Students will be able to perform thermodynamic analysis of aircraft engines
		C413.2	Students will be able to carry out performance analysis of aircraft systems and components
		C413.3	Students will be able to formulate and solve rocket engine problems
		C413.4	Students will be able to understand the working of aircraft and rocket engines in detail.
		C413.5	Students will be able to identify the different types of aircraft and rocket engines and their applications.

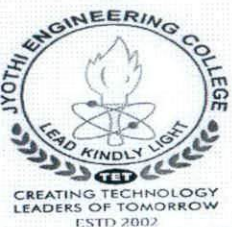
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C414	MATERIAL HANDLING & FACILITIES PLANNING	C414.1	Students will be able to assess the value of facility planning on the strategy of a firm.
		C414.2	Students will be able to design and develop a systematic plant layout .
		C414.3	Students will be able to analyse the safety and environmental and economic aspects in facilities planning and design.
		C414.4	Students will be able to understand various material handling systems and classification of material handling equipment.
		C414.5	Students will be able to identify the selection and maintenance of material handling equipment with safety and ergonomics aspects.
C415	ENVIRONMENTAL IMPACT ASSESSMENT	C415.1	The students will be able to study about source and effects of air pollution and different control measures
		C415.2	The students will be able to understand water pollution, its causes, and treatments
		C415.3	The students will be able to understand about water pollution, land pollution, its causes and abatement measures
		C415.4	The students will be able to understand about noise pollution, its effects and control measures
		C415.5	The students will be able to study the impact of pollutants on the environment and need of impact assessment techniques
		C415.6	The students will be able to understand about impact assessment procedure and analysis method.
C416	BIOMEDICAL ENGINEERING	C416.1	The students will be able to understand diagnosis and therapy related equipments.

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		C416.2	To understand the problem and identify the necessity of equipment for diagnosis and therapy.
		C416.3	To understand the importance of electronics engineering in medical field.
		C416.4	To understand the importance of telemetry in patient care
		C417.1	The students will be able to know the importance of psychology.
		C417.2	The students will be able to have insight into individual and group behaviour.
		C417.3	The students will be able to deal with people in better way.
C417	INDUSTRIAL PSYCHOLOGY & ORGANIZATIONAL BEHAVIOUR	C417.4	The students will be able to understand a social system.
		C417.5	The students will be able to motivate groups and build teams.
		C417.6	The students will be able to understand how to manage change and organizational development.
		C418.1	Students will have the ability to effectively gather and interpret information from literature survey and use this knowledge to identify, formulate, analyze and solve complex problems and to evaluate and interpret various solutions.
C418	PROJECT	C418.2	Students will gain the ability to communicate effectively with written, oral, and visual means in a technical setting.

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	C418.3	Students will have the ability to use modern design and analysis tools to analyse and evaluate complex problems.
	C418.4	Students will be able to carry out calculations involved in design, consider and evaluate alternate assumptions, approaches, and procedures . Ability to fabricate system components related to engineering problems giving consideration to environment and society.
	C418.5	Students will have the ability to serve as effective team member to plan and complete the project/task within a specified budget and time.

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