



# ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES

Piglipur, Batasingaram Panchayath, Hayath Nagar Mandal, Hyderabad, R.R. Dist. 501 512.  
(Approved by AICTE, Recognized by the GOVT. of T.S., Permanent Affiliation from JNTUH, Hyderabad.)  
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**BTech-CivilEngineering**  
**JNTUH-R16, R18Regulation**

Code	Course Name	CourseOutcomes
<b>IIB.TechISemester</b>		
CE301PC	Surveying and Geomatics	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1:. Choose the concepts of surveying. CO2: Appraise compass and theodolite surveying CO3: Maximize the concepts traversing and leveling CO4: Discuss the trigonometric principles in surveying and plot contour maps. CO5: Elaborate the concepts of tachometry.</p>
CE302PC	Engineering Geology	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Site characterization and how to collect, analyze, and report Geologic data using standards in engineering practice. CO2: The fundamentals of the engineering properties of Earth materials and fluids. CO3: Rock mass characterization and the mechanics of planar rock slides and topples.</p>
CE303PC	Strength of Materials – I	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, related to the strength of structured and mechanical components CO2: Recognize various types loads applied on structural components of simple framing geometries and understand the nature of internal stresses that will develop within the components CO3: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading CO4: Analyze various situations involving structural members subjected to plane stresses by application of Mohr's circle of stress. CO5: Frame an idea to design a system, component, or process</p>

  
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College Code : T8  
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MA304BS	Probability and Statistics	<b>At the end of this course, each student should be able to:</b> CO1: Formulate and interpret problems involving random variables CO2: Demonstrate Statistical methods for analyzing experimental data. CO3: Compose and Construct the data for applied Statistics.
CE305PC	Fluid Mechanics	<b>At the end of this course, each student should be able to</b> CO1: Understand the broad principles of fluid statics, kinematics and dynamics. CO2: Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow CO3: Understand classifications of fluid flow CO4: Be able to apply the continuity, momentum and energy principles
CE306PC	Surveying Lab	<b>At the end of this course, each student should be able to:</b> CO1: Apply the principle of surveying for civil Engineering Applications CO2: Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level CO3: Evaluate response in a given network by using theorems
CE307PC	Strength of Materials Lab	<b>At the end of this course, each student should be able to:</b> CO1: Configure & Operate a data acquisition system using various testing machines of solid materials CO2: Compute and Analyze engineering values (e.g. stress or strain) from laboratory measurements. CO3: Write a technical laboratory report
CE308PC	Engineering Geology Lab	<b>At the end of this course, each student should be able to:</b> CO1: Understands the method and ways of investigations required for Civil Engg projects CO2: Identify the various rocks, minerals depending on geological classifications CO3: Will be able to learn to couple geologic expertise with the engineering properties of rock and unconsolidated materials in the characterization of geologic sites for civil work projects and the quantification of processes such as rock slides and settlement. CO4: Write a technical laboratory report

  
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Code	Course Name	Course Outcomes
<b>IIB.Tech IISemester</b>		
EE401ES	Basic Electrical and Electronics Engineering	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: To analyze and solve electrical circuits using network laws and theorems CO2: To understand and analyze basic Electric and Magnetic circuits CO3: To study the working principles of Electrical Machines CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors</p>
CE402ES	Basic Mechanical Engineering for Civil Engineers	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: Design Cams and followers, riveted joints, gears and chain drives. CO2: Differentiate various engineering materials such as metals, ceramics and composites. CO3: Handle the material using belt conveyors, cranes, industrial trucks, bull dozers CO4: Apply basic principles and laws from the subjects of Heat transfer, Refrigeration, Internal &amp; external combustion engines CO5: Perform various manufacturing processes such as welding, casting, drilling, milling and grinding machines</p>
CE403PC	Building Materials, Construction and Planning	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: Understand the types, properties of stones, manufacturing process of bricks and types of bricks. CO2: Describe the different types of cements, admixtures, manufacturing process, properties of cement, ingredients of cement concrete and tests conducted on cement. CO3: Identify the components and service of building and differentiate types of materials depending on its function.. CO4: Describe the properties of lime and cement mortars and different types of bond and masonry used in buildings. CO5: Explain principles of building planning, building by laws, classification of buildings.</p>

  
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CE404PC	Strength of Materials – II	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of structures and mechanical components in particular to torsion and direct compression.</p> <p>CO2: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.</p> <p>CO3: Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses.</p> <p>CO4: Understand and evaluate the shear center and unsymmetrical bending.</p> <p>CO5: Frame an idea to design a system, component, or process.</p>
CE405PC	Hydraulics and Hydraulic Machinery	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Describe the concept of different types of flows, designing of most economical sections of the Open Channel and to understand the concept of specific energy.</p> <p>CO2: Analyze the non-uniform flow problems and hydraulic jump phenomenon in open channel flows.</p> <p>CO3: Describe the concept of dimensional quantities and application of similitude concept in designing model and prototype.</p> <p>CO4: Understand the concept, working applications of impact of jets with the importance of constructing velocity triangles.</p> <p>CO5: Identify the different hydraulic machines with their working principles.</p>
CE406PC	Structural Analysis – I	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Analyze the statically indeterminate bars and continuous beams</p> <p>CO2: Elaborate strength behavior of members for static and dynamic loading</p> <p>CO3: Justify the stiffness parameters in beams and pin joint trusses</p> <p>CO4: Image to Understand the indeterminacy aspects to consider for a total structural system</p> <p>CO5: Propose to identify , formulate, and solve engineering problems with real time loading</p>
CE407PC	Computer aided Civil Engineering Drawing	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Use the AutoCAD commands for drawing 2D &amp; 3D building drawings required for different civil eng applications</p> <p>CO2: Plan and draw Civil Engineering Buildings as per aspect and orientation</p> <p>CO3: Presenting drawings as per user requirements and preparation of technical report</p>
EE409ES	Basic Electrical and Electronics Engineering Lab	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: To analyze and solve electrical circuits using network laws and theorems.</p> <p>CO2: To understand and analyze basic Electric and Magnetic circuits</p> <p>CO3: To study the working principles of Electrical Machines</p> <p>CO4: To introduce components of Low Voltage Electrical Installations</p> <p>CO5: To identify and characterize diodes and various types of transistors.</p>
CE409PC	Hydraulics and Hydraulic Machinery Lab	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Describe the basic measurement techniques of fluid mechanics and its appropriate application.</p> <p>CO2: Interpret the results obtained in the laboratory for various experiments.</p> <p>CO3: Discover the practical working of Hydraulic machines- different types of Turbines,</p>



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		Pumps, and other miscellaneous hydraulics machines. CO4: Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.
*MC409	Gender Sensitization Lab	<b>At the end of this course, each student should be able to:</b>  CO1: Students will have developed a better understanding of important issues related to gender in contemporary India. CO2: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it. CO3: Students will acquire insight into the gendered division of labor and its relation to politics and economics. CO4: Men and women students and professionals will be better equipped to work and live together as equals

  
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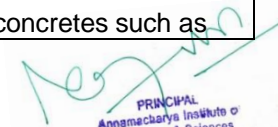
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<b>IIIB.Tech I Semester</b>		
CE501PC	Structural Analysis-II	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1. Analyze the two hinged arches. CO2. Solve statically indeterminate beams and portal frames using classical methods. CO3: Sketch the shear force and bending moment diagrams for indeterminate structures. CO4. Formulate the stiffness matrix and analyze the beams by matrix methods.</p>
CE502PC	Geotechnical Engineering	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Characterize and classify the soils. CO2: Able to estimate seepage, stresses under various loading conditions and compaction characteristics CO3: Able to analyze the compressibility of the soils CO4: Able to understand the strength of soils under various drainage conditions</p>
CE503PC	Structural Engineering –I (RCC)	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Design of singly reinforced, doubly reinforced, flanged sections, Shear, Bond, Torsion, Anchorage and Development length of reinforcement. CO2: Distinguish and Design the one-way, two-way slabs and Staircase. CO3:Design the axially, uniaxial and biaxial loaded bending columns CO4:Classify the footings and Design the isolated square, rectangular and circular footings</p>
CE504PC	Transportation Engineering	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Discuss the classification of roads and highway development plans. CO2: Design various geometric elements like curves,gradients,superelevation etc CO3: Understand basics principles of Traffic Engineering CO4: Design the At-grade and rotary intersections CO5: Design flexible and rigid pavement by CBR method as per IRC.</p>
CE511PE	Professional Elective-I (CONCRETE TECHNOLOGY)	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1: Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the theology and early age properties of concrete on its long-term behavior. CO2:Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties CO3: Use advanced laboratory techniques to characterize cement-based materials CO4: Perform mix design and engineering properties of special concretes such as</p>

  
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		high-performance concrete, self-compacting concrete, and fibre reinforced concrete.
CE507PC	Engineering Economics and Accountancy	<b>At the end of this course, each student should be able to:</b>  CO1: Understand the various forms of business and the impact of economic variables on the Business. CO2: Understand the macro economics concepts of national income and inflation CO3: Apply the concepts of Capital budgeting techniques and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF Methods. CO4: Ascertain Concept of Leverage- Types of Leverages: Operating Leverage- Financial Leverage and Composite Leverage. (Simple Problems) CO5: Ascertain financial performance and financial position of an organization
CE506PC	Highway Engineering and Concrete Technology Lab	<b>At the end of this course, each student should be able to:</b>  CO1: Categorize the test on materials used Civil Engineering Building & Pavement constructions CO2: To perform the tests on concrete for its characterization CO3: To Design Concrete Mix Proportioning by Using Indian Standard Method CO4: Examine the tests performed for Bitumen mixes
CE507PC	Geotechnical Engineering Lab	<b>At the end of this course, each student should be able to:</b>  CO1: At the end of the course, the student will be able to Classify and evaluate the behavior of the soils subjected to various loads.
EN508HS	Advanced Communication Skills Lab	<b>At the end of this course, each student should be able to:</b>  CO1: Simplify Understanding of nuances of Language through audio-visual experience and group activities CO2: To choose the Neutralization of accent for intelligibility CO3: Explain to Speaking with clarity and confidence thereby enhancing employability skills of the students

  
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*MC509	Intellectual Property Rights	<b>At the end of this course, each student should be able to:</b>  <b>CO1:</b> Students will be able to understand the different areas of Intellectual property rights <b>CO2:</b> Students will be able to compare the different forms of intellectual property protection in terms of their key differences and similarities. <b>CO3:</b> Students will be able to assess the intellectual property protection. <b>CO4:</b> Students will be able to analyze the effects of intellectual property rights on business and society as a whole <b>CO5:</b> Students will be able to understand the new developments in the areas of intellectual property rights
	CYBER SECURITY	<b>At the end of this course, each student should be able to:</b>  <b>CO1:</b> To familiarize various types of cyber-attacks and cyber-crimes <b>CO2:</b> To give an overview of the cyber laws <b>CO3:</b> To study the defensive techniques against these attacks

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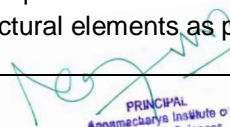
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<b>IIIB.Tech II Semester</b>		
CE601PC	HYDROLOGY & WATER RESOURCES	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1. Understand the different concepts and terms used in engineering hydrology gaseous insulating materials. CO2. To identify and explain various formulae used in estimation of surface and Ground water hydrology components CO3. Demonstrate their knowledge to connect hydrology to the field requirement CO4. Identify different types of canal system</p>
CE602PC	ENVIRONMENTAL ENGINEERING	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: Assess characteristics of water, quality testing &amp; Estimate quantities of water CO2: Design components of water treatment plants and Design of distribution systems CO3: Assess characteristics of Wastewater, Estimate quantities of Wastewater and plan conveyance components CO4: Design components of Wastewater treatment plants CO5: Be conversant with issues of air pollution and control</p>
CE603PC	FOUNDATION ENGINEERING	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: Understand the principles and methods of Geotechnical Exploration CO2: Decide the suitability of soils and check the stability of slopes. CO3: Calculate lateral earth pressures and check the stability of retaining walls CO4: Analyze and design the shallow and deep foundations</p>
CE604PC	STRUCTURAL ENGINEERING-II (STEEL)	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: Analyze the tension members, compression members. CO2: Design the tension members, compression members and column bases and joints and connections CO3: Analyze and Design the beams including built-up sections and beam and connections. CO4: Identify and Design the various components of welded plate girder including stiffeners CO5: analyze and Design the component parts of roof trusses</p>
CE611PE	PRESTRESSED CONCRETE	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: To understand the evolution of process of prestressing. CO2: To Acquire the knowledge of various prestressing techniques CO3: To Develop skills in analysis design of prestressed structural elements as per the IS codal provisions.</p>

  
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	OPEN ELECTIVE - I FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1:</b> To demonstrate basic functional areas and approaches to Management. <b>CO2:</b> To understand and analyze the strategic planning, decision making and Problem solving skills <b>CO3:</b> To understand organizational principles, frame work and various functional areas of HRM <b>CO4:</b> Apply Leadership and motivational concepts <b>CO5:</b> Students should be able to institute effective control system</p>
*MC609	ENVIRONMENTAL SCIENCE	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1:</b> To understand the concept of Ecosystem, Ecology and Biodiversity <b>CO2:</b> To understand the importance of ecological balance, conserving use of natural resources for sustainable development <b>CO3:</b> To understand the impacts of developmental activities on Biodiversity and mitigation measures <b>CO4:</b> To identify the sources of various pollutions and preventive measures <b>CO5:</b> To understand the environmental policies and regulations</p>
CE605PC	Environmental Engineering Lab	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1:</b> At the end of the course student will be able to discuss about importance of water and its quality analysis <b>CO2:</b> Analyze various physico-chemical and biological parameters of water in case of quality requirements. <b>CO3:</b> At the end of the course student will be able to assess complete water quality assessment for EIA and domestic supplies <b>CO4:</b> At the end of the course student will suggest various types of treatment methods required to purify raw water with different contaminants.</p>
CE606PC	Computer Aided Design Lab	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1:</b> Master the usage of AutoCAD commands for drawing 2D &amp; 3D building drawings required for different civil engg applications.</p>

  
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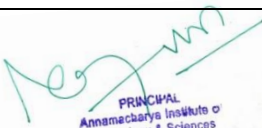
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<b>IVB.TechISemester</b>		
CE711PE	REMOTE SENSING & GIS	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1: Understand different concepts and terms used in Remote Sensing and its data CO2 : Understand data conversion and Process in different coordinate systems of GIS CO3. Understand the system of database management and data structures CO4. Evaluating the process of accuracy data and implementing GIS CO5: Understand the applicability of RS&GIS for various applications.
CE721PE	IRRIGATION AND HYDRAULIC STRUCTURE	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1: Analyze the Types of water retaining structures and its key parameters considered for planning and designing CO2: Understand the details in any irrigation system and its components CO3: Evaluate the concept of creep theories on permeable Foundations CO4: Design of a irrigation system components & its types
CE701PC	Estimation, Costing and Project Management	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1 Understand the principles of working out quantities for estimate of buildings CO2: Evaluate the estimates for roads and canals. CO3: Understand the significance of various filter structures and effects of round offerrors. CO4: Understand the concepts of contracts and valuation CO5: Understand the construction project planning

  
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SM702MS	PROFESSIONAL PRACTICE,LAW AND ETHICS	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1: Distinguish the personal , professional and engineering ethics CO2: Interpret the contract laws CO3: Determine the arbitration and conciliation mechanism CO4: Examine the application of the labour laws CO5: Apply the law relating to intellectual properties
CE703PC	Industrial Oriented Mini Project/ Summer Internship	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1: Generate a report based on the experiences and projects carried out with the ability to apply knowledge of mathematics, science and engineering fundamentals CO2: Compare to Demonstrate competency in relevant engineering fields through problems identificationformulation and solution CO3: Develop the ability to work as an individual and in group with capacity to be a leader or manager as well as an effective team member CO4: Explain the professional and ethical responsibilities of an engineer
CE704P C	Seminar	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1: To understand advanced skills of Technical Communication in English CO2:To Motive listening, speaking, reading and writing skills in societal and professional life. CO3: To develop the skills necessary to be a competent Interpersonal communicator. CO4: Analyze communication behaviors CO5: Adapt to multifarious socio-economical and professional arenas with the help of effective communication and interpersonal skills

  
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CE705P C	Project Stage – I	<p><b>At the end of this course, each student should be able to:</b></p> <p>After completion of course, student will be able to</p> <p>CO1: Work in a team and effectively communicate with team members</p> <p>CO2: Review and evaluate the literature available related to chosen problem</p> <p>CO3: Formulate new expressions, equations to solve that selected problem to enhance problem solving skill</p> <p>CO4: Validate theoretical and reported data with results obtained from numerical/ experimental/ analytical study Identify scope of future studies</p>
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## B.Tech-CivilEngineering:IVyear JNTUH-R16.R18Regulation

Code	Course Name	Course Outcomes
<b>IVB.Tech IISemester</b>		
CE812PE	Environmental impact assessment	<b>At the end of this course, each student should be able to:</b> C01: Identify the environmental attributes to be considered for the EIA study C02: Formulate objectives of the EIA studies C03: Identify the methodology to prepare rapid EIA C04: Prepare EIA reports and environmental management plans
CE821PE	AIRPORT, RAILWAYS, AND WATERWAYS	<b>At the end of this course, each student should be able to:</b> C01: An ability to design of runways and taxiways. C02: An ability to design the infrastructure for large and small airports C03: An ability to design various crossings and signals in Railway Projects C04: An ability plan the harbors and ports projects including the infrastructure required for new ports and harbors.
CS803OE	Database Management Systems	<b>At the end of this course, each student should be able to:</b> C01: To understand the basic concepts and the applications of database systems. C02: To master the basics of SQL and construct queries using SQL. C03: Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

  
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## B.Tech-Electrical & Electronics Engineering

### JNTUH-R16, R18 Regulation

Code	Course Name	Course Outcomes
<b>IIB. Tech I Semester</b>		
EE301ES	Engineering Mechanics	<b>At the end of this course, each student should be able to:</b> CO1: Determine resultant of forces acting on a body and analyze equilibrium of a body subjected to a system of forces. CO2: Solve problem of bodies subjected to friction. CO3: Find the location of centroid and calculate moment of inertia of a given section. CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion. CO5: Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.
EE302PC	Electrical Circuit Analysis	<b>At the end of this course, each student should be able to:</b> CO1: Apply network theorems for the analysis of electrical circuits. CO2: Obtain the transient and steady-state response of electrical circuits. CO3: Analyze circuits in the sinusoidal steady-state (single-phase and three-phase). CO4: Analyze two port circuit behavior.
EE304PC	Electrical Machines - I	<b>At the end of this course, each student should be able to:</b> CO1: Identify different parts of a DC machine & understand its operation CO2: Carry out different testing methods to predetermine the efficiency of DC machines CO3: Understand different excitation and starting methods of DC machines CO4: Control the voltage and speed of a DC machines CO5: Analyze single phase and three phase transformer circuits.
EE305PC	Electromagnetic Fields	<b>At the end of this course, each student should be able to:</b> CO1: To understand the basic laws of electromagnetism. CO2: To obtain the electric and magnetic fields for simple configurations under static conditions.

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		CO3: To analyze time varying electric and magnetic fields. CO4: To understand Maxwell's equation in different forms and different media. CO5: To understand the propagation of EM waves
EE306P C	Electrical Machines Lab - I	<b>At the end of this course, each student should be able to</b> CO1: Start and control the Different DC Machines. CO2: Assess the performance of different machines using different testing methods CO3: Identify different conditions required to be satisfied for self-excitation of DC Generators. CO4: Separate iron losses of DC machines into different component
EE308P C	Electrical Circuits Lab	<b>At the end of this course, each student should be able to</b> CO1: Analyze complex DC and AC linear circuits CO2: Apply concepts of electrical circuits across engineering CO3: Evaluate response in a given network by using theorems

  
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Code	Course Name	CourseOutcomes
<b>IIB.Tech IISemester</b>		
EE402PC	Electrical Machines – II	<p><b>At the end of this course, students will demonstrate the ability to</b></p> <p>CO1: Understand the concepts of rotating magnetic fields. CO2: Understand the operation of ac machines. CO3: Analyze performance characteristics of ac machines.</p>
EE404PC	Control Systems	<p><b>At the end of this course, students will demonstrate the ability to</b></p> <p>CO1: Understand the modeling of linear-time-invariant systems using transfer function and state- space representations. CO2: Understand the concept of stability and its assessment for linear-time invariant systems. CO3: Design simple feedback controllers.</p>
EE405PC	Power System - I	<p><b>At the end of this course, students will demonstrate the ability to</b></p> <p>CO1: Understand the concepts of power systems. CO2: Understand the operation of conventional generating stations and renewable sources of electrical power. CO3: Evaluate the power tariff methods. CO4: Determine the electrical circuit parameters of transmission lines CO5: Understand the layout of substation and underground cables and corona.</p>
EE407PC	Electrical Machines Lab - II	<p><b>After the completion of this laboratory course, the student will be able</b></p> <p>CO1: Assess the performance of different machines using different testing methods CO2: To convert the Phase from three phase to two phase and vice versa CO3: Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods CO4: Control the active and reactive power flows in synchronous machines CO5: Start different machines and control the speed and power factor</p>

  
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EE408PC	Control Systems Lab	<p><b>After completion of this lab the student is able to</b></p> <p>CO1:How to improve the system performance by selecting a suitable controller and/or a compensator for a specific application</p> <p>CO2:Apply various time domain and frequency domain techniques to assess the system performance</p> <p>CO3:Apply various control strategies to different applications(example: Power systems, electrical drivesetc)</p> <p>CO4:Test system controllability and observability using state space representation and applications of state space representation to various systems</p>
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Code	Course Name	CourseOutcomes
<b>IIIB.Tech I Semester</b>		
EE501PE	Power Electronics	<b>At the end of this course students will demonstrate the ability to</b> CO1.Understand the differences between signal level and power level devices. CO2.Analyze controlled rectifier circuits. CO3.Analyze the operation of DC-DC choppers. CO4.Analyze the operation of voltage source inverters.
EE502PE	Power System-II	<b>At the end of this course students will demonstrate the ability to</b> CO1: Analyze transmission line performance. CO2:Apply load compensation techniques to control reactive power CO3: Understand the application of per unit quantities. CO4:Design over voltage protection and insulation coordination CO5:Determine the fault currents for symmetrical and unbalanced faults
EE503PE	Measurements &Instrumentation	<b>At the end of this course students will demonstrate the ability to</b> CO1:Understand different types of measuring instruments, their construction, operation and characteristics CO2:Identify the instruments suitable for typical measurements CO3:Apply the knowledge about transducers and instrument transformers to use them effectively. CO4:Apply the knowledge of smart and digital metering for industrial applications
EE512PE	High Voltage Engineering	<b>At the end of this course students will demonstrate the ability to</b> CO1:Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials. CO2:Knowledge of generation and measurement of D. C., A.C., & Impulse voltages. CO3:Knowledge of tests on H. V. equipment and on insulating materials, as per the standards. CO4:Knowledge of how over-voltages arise in a power system, and protection against these over voltages.
EE505PC	Power System Simulation Lab	<b>At the end of this course students will demonstrate the ability to</b> CO1:Perform various transmission line calculations CO2:Understand Different circuits time constants CO3:Anlyze the experimental data and draw the conclusions

  
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EE506PC	Power Electronics Lab	<b>After completion of this course, the student is able to</b> CO1:Understand the operating principles of various power electronic converters. CO2:Use power electronic simulation packages& hardware to develop the power converters. CO3:Analyze and choose the appropriate converters for various applications
EE507PC	Measurements and Instrumentation Lab	<b>After completion of this lab the student is able to</b> CO1:To choose instruments CO2:Test any instrument CO3:Find the accuracy of any instrument by performing experiment CO4:Calibrate PMMC instrument using D.C potentiometer

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Code	Course Name	CourseOutcomes
<b>IIIB.Tech II Semester</b>		
EE512PE	High Voltage Engineering	<b>At the end of the course, the student will demonstrate</b> CO1.Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials. CO2.Knowledge of generation and measurement of D. C., A.C., & Impulse voltages. CO3.Knowledge of tests on H. V. equipment and on insulating materials, as per the standards. CO4.Knowledge of how over-voltages arise in a power system, and protection against these over voltages
EE612PE	Power Semiconductor Drives	<b>After completion of this course the student is able to</b> CO1:Identify the drawbacks of speed control of motor by conventional methods. CO2:Differentiate Phase controlled and chopper-controlled DC drives speed-torque characteristics merits and demerits CO3:Understand Ac motor drive speed–torque characteristics using different control strategies its merits and demerits CO4:Describe Slip power recovery schemes
EE603PC	Power System Protection	<b>At the end of the course the student will be able to</b> CO1:Compare and contrast electromagnetic, static and microprocessor-based relays CO2:Apply technology to protect power system components. CO3:Select relay settings of over current and distance relays. CO4:Analyze quenching mechanisms used in air, oil and vacuum circuit breakers
EE604PC	Power System Operation and Control	<b>At the end of the course the student will be able to:</b> CO1:Understand operation and control of power systems. CO2:Analyze various functions of Energy Management System (EMS) functions. CO3:Analyze whether the machine is in stable or unstable position. CO4:Understand power system deregulation and restructuring
EE605PC	Power System Lab	<b>After completion of this lab, the student will be able to</b> CO1:Perform various load flow techniques CO2:Understand Different protection methods CO3:Analyze the experimental data and draw the conclusions

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## B.Tech-Electrical& ElectronicsEngineering:IVyear JNTUH-R16,R18Regulation

Code	Course Name	CourseOutcomes
<b>IVB.TechISemester</b>		
EE701 PC	Power Semiconductor Drives	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1. Identify the drawbacks of speed control of motor by conventional methods.</p> <p>CO.2 Differentiate Phase controlled and chopper controlled DC drives speed-torque characteristics merits anddemerits</p> <p>CO3.Understand Ac motor drive speed–torque characteristics using different control strategies its merits anddemerits</p> <p>CO4. Describe Slip power recovery schemes</p>
EE702 PC	Power System Operation and control	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1:Analyze the optimal scheduling of powerplants</p> <p>CO2: Analyze the steady state behavior of the power system for voltage and frequency fluctuations</p> <p>CO3: Describe reactive power control of a powersystem</p> <p>CO4:Design suitable controller to dampen the frequency and voltage steady state oscillations.</p>
EE703 PC	Electrical Systems Simulation Lab	<p><b>Attheendofthis course,eachstudentshouldbeableto:</b></p> <p>CO1:Design and Analyze electrical systems in time and frequency domain</p> <p>CO2:Analyze various transmission lines and perform fault analysis</p> <p>CO3:Model Load frequency control of Power Systems</p> <p>CO4:Design various Power Electronic Converters and Drives</p>




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EE704 PC	Electrical Workshop	<p><b>At the end of this course, each student should be able to:</b></p> <p>After completion of course, student will be able to</p> <p>CO1: Get practical knowledge related to electrical</p> <p>CO2: Fabricate basic electrical circuit elements/networks</p> <p>CO3: Trouble shoot the electrical circuits</p> <p>CO4: Design filter circuit for application</p> <p>CO5: Get hardware skills such as soldering, winding etc.</p> <p>CO6: Get debugging skills.</p>
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## B.Tech-Electrical & Electronics Engineering: IV year JNTUH-R16, R18 Regulation

Code	Course Name	Course Outcomes
<b>IVB.Tech II Semester</b>		
EE812PE	Control system design	<p>C01: Understand various design specifications.</p> <p>C02: Design controllers to satisfy the desired design specifications using simple controller structures (P, PI, PID, compensators).</p> <p>C03: Design controllers using the state-space approach.</p>



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EE823PE	Advanced control of electric drives	C01: Understand the operation of power electronic converters and their control strategies. C02: Understand the vector control strategies for ac motor drives C03: Understand the implementation of the control strategies using digital signal processors.
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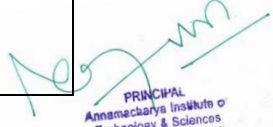
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## B.Tech-Computer & Science Engineering: II year JNTUH-R16,R18 Regulation

Code	CourseName	CourseOutcomes
<b>II Year B.Tech-I SEM</b>		
CS301ES	AnalogandDigitalElectronics	<b>Attheendof thiscourse,eachstudent should beableto:</b>  CO1.Knowthe characteristicsofvariouscomponents. CO2.Understandtheutilizationof components. CO3.Designandanalyzesmallsignalamplifiercircuits. CO4.LearnPostulatesofBooleanalgebraandtominimizecombinationalfunctions CO5.Designandanalyzecombinationalandsequentialcircuits CO6.Knowaboutthe logicfamiliesandrealizationoflogicgates.
CS302PC	DataStructures	<b>Attheendof thiscourse,eachstudent should beableto:</b>  CO1.Abilityto selectthe datastructuresthatefficientlymodelthe informationin aproblem. CO2.Abilitytoassessefficiencytrade-offsamongdifferentdatastructureimplementations combinations. CO3.Implementandknowtheapplicationofalgorithmsforsortingandpatternmatching. CO4.Design programs using a variety of data structures including hash tables, binary and generaltreestructures,search trees,tries,heaps,graphs,andAVL-trees.
MA303BS	ComputerOriented StatisticalMethods	<b>Attheendof thiscourse,eachstudent should beableto:</b>  CO1.Applytheconcepts ofprobabilityanddistributionstosomecase studies CO2.Correlatethematerial ofone unittothematerial in otherunits CO3.Resolve thepotentialmisconceptionsandhazardsineachtopicof study.

  
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CS304PC	Computer Organization and Architecture	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Understand the basics of instructions sets and their impact on processor design.</p> <p><b>CO2.</b> Demonstrate an understanding of the design of the functional units of a digital computer system.</p> <p><b>CO3.</b> Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.</p> <p><b>CO4.</b> Design a pipeline for consistent execution of instructions with minimum hazards.</p>
CS305PC	Object Oriented Programming using C++	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Able to develop programs with reusability</p> <p><b>CO2.</b> Develop programs for file handling</p> <p><b>CO3.</b> Handle exceptions in programming</p> <p><b>CO4.</b> Develop applications for a range of problems using object-oriented programming techniques</p>
CS306ES	Analog and Digital Electronics Lab	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Know the characteristics of various components.</p> <p><b>CO2.</b> Understand the utilization of components.</p> <p><b>CO3.</b> Design and analyze small signal amplifier circuits.</p> <p><b>CO4.</b> Postulates of Boolean algebra and to minimize combinational functions</p> <p><b>CO4.</b> Design and analyze combinational and sequential circuits</p>
CS307PC	Data Structures Lab	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.</p> <p><b>CO2.</b> Ability to Implement searching and sorting algorithms</p>



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## B.Tech-Computer & Science Engineering: II year JNTUH-R16,R18 Regulation

Code	CourseName	CourseOutcomes
<b>II Year B.Tech-II SEM</b>		
CS401 PC	Discrete Mathematics	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Ability to understand and construct precise mathematical proofs <b>CO2.</b> Ability to use logic and set theory to formulate precise statements <b>CO3.</b> Ability to analyze and solve counting problems on finite and discrete structures <b>CO4.</b> Ability to describe and manipulate sequences <b>CO5.</b> Ability to apply graph theory in solving computing problems
SM402 MS	Business Economics & Financial Analysis	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
CS403 PC	Operating Systems	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection) <b>CO2.</b> Introduce the issues to be considered in the design and development of operating system <b>CO3.</b> Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

  
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CS4 04P C	Database Management Systems	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Gain knowledge of fundamentals of DBMS, database design and normal forms</p> <p><b>CO2.</b> Master the basics of SQL for retrieval and management of data.</p> <p><b>CO3.</b> Be acquainted with the basics of transaction processing and concurrency control.</p> <p><b>CO4.</b> Familiarity with database storage structures and access techniques</p>
CS405 PC	Java Programming	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Able to solve real world problems using OOP techniques.</p> <p><b>CO2.</b> Able to understand the use of abstract classes.</p> <p><b>CO1.3.</b> Able to solve problems using java collection framework and I/O classes.</p> <p><b>CO4.</b> Able to develop multithreaded applications with synchronization.</p> <p><b>CO5.</b> Able to develop applets for web applications</p>
CS406 PC	Operating Systems Lab	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.</p> <p><b>CO2.</b> Able to implement C programs using Unix system calls</p>
CS408P C	Java Programming Lab	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Able to write programs for solving real world problems using java collection framework.</p> <p><b>CO2.</b> Able to write programs using abstract classes.</p> <p><b>CO3.</b> Able to write multithreaded programs.</p> <p><b>CO4.</b> Able to write GUI programs using swing controls in Java.</p>

  
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CS40 7PC	Database Management Systems Lab	<b>At the end of this course, each student should be able to:</b> <b>CO1.</b> Design database schema for a given application and apply normalization <b>CO2.</b> Acquire skills in using SQL commands for data definition and data manipulation. <b>CO3.</b> Develop solutions for database applications using procedures, cursors and triggers
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## B.Tech-Computer & Science Engineering: III year JNTUH-R16,R18 Regulation

Code	CourseName	CourseOutcomes
<b>III Year B.Tech-I SEM</b>		
CS501PC	Formal Languages & Automata Theory	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Able to understand the concept of abstract machines and their power to recognize the languages. <b>CO2.</b> Able to employ finite state machines for modeling and solving computing problems. <b>CO3.</b> Able to design context free grammars for formal languages. <b>CO4.</b> Able to distinguish between decidability and undecidability.
CS502PC	Software Engineering	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD). <b>CO2.</b> Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices. <b>CO3.</b> Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
CS503PC	Computer Networks	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks. <b>CO2.</b> Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.

  
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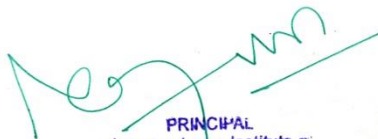
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CS504PC	WebTechnologies	<p><b>Attheendof thiscourse,eachstudent should beableto:</b></p> <p><b>CO1.</b>gainknowledgeofclient-sidescripting,validationofformsandAJAXprogramming <b>CO2.</b>understandserver-sidescriptingwithPHPLanguage <b>CO3.</b>understandwhatisXMLandhowtoparseanduseXMLDatawithJava <b>CO4.</b>Tointroduce Server-sideprogramming withJavaServletsand JSP</p>
CS505PC	SoftwareEngineeringLab	<p><b>Attheendof thiscourse,eachstudent should beableto:</b></p> <p><b>CO1.</b>Abilitytotranslateend-user requirementsintosystem andsoftwarerequirements <b>CO2.</b>Abilitytogenerateahigh-leveldesignofthesystemfromthesoftwarerequirements <b>CO3.</b>Willhaveexperienceand/orawarenessoftestingproblemsandwillbeabletodevelopasimpletestingreport</p>

  
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## B.Tech-Computer & Science Engineering: III year JNTUH-R16,R18 Regulation

Code	CourseName	CourseOutcomes
<b>III Year B.Tech-IISEM</b>		
CS60 1PC	Machine Learning	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Understand the concepts of computational intelligence like machine learning <b>CO2.</b> Ability to get the skill to apply machine learning techniques to address the real time problems in different areas <b>CO3.</b> Understand the Neural Networks and its usage in machine learning application.
CS602P C	Compiler Design	<b>At the end of this course, each student should be able to:</b> <b>CO1.</b> Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler. <b>CO2.</b> Topics include phases of compiler, parsing, syntax directed translation, type checking use of symbol tables, code optimization techniques, intermediate code generation, code generation and data flow analysis.
CS603P C	Design and Analysis of Algorithms	<b>At the end of this course, each student should be able to:</b> <b>CO1.</b> Introduce the notations for analysis of the performance of algorithms. <b>CO2.</b> Introduce the data structure disjoint sets. <b>CO3.</b> Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate; <b>CO4.</b> Describes how to evaluate and compare different algorithms using worst-, average-, and best-case analysis. <b>CO5.</b> Explains the difference between tractable and intractable problems, and introduce the problems that are P, NP and NP Completed.

  
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CS604P C	Machine Learning Lab	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> understand complexity of Machine Learning algorithms and their limitations; <b>CO2.</b> understand modern notions in data analysis-oriented computing; <b>CO3.</b> be capable of confidently applying common Machine Learning algorithms in practice and implementing their own; <b>CO4.</b> Be capable of performing experiments in Machine Learning using real-world data.
CS605P C	Compiler Design Lab	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML <b>CO2.</b> Apply client-server principles to develop scalable and enterprise web applications. <b>CO3.</b> Ability to design, develop, and implement a compiler for any language. <b>CO4.</b> Able to use lex and yacc tools for developing a scanner and a parser. <b>CO5.</b> Able to design and implement LL and LR parsers.
*MC60 9	Environmental Science	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Based on this course, the Engineering graduate will understand/evaluate/develop technologies on the basis of ecological principles.

  
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## B.Tech-Computer & Science Engineering: IV year JNTUH-R16, R18 Regulation

Code	CourseName	CourseOutcomes
<b>IV Year B.Tech-I SEM</b>		
CS701P C	Cryptography & Network Security	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues. <b>CO2.</b> Ability to identify information system requirements for both of them such as client and server. <b>CO3.</b> Ability to understand the current legal issues towards information security.
CS702P C	Data Mining	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Ability to understand the types of the data to be mined and present a general classification of tasks and primitive to integrate a data mining system. <b>CO2.</b> Apply preprocessing methods for any given raw data. <b>CO3.</b> Extract interesting patterns from large amounts of data. <b>CO4.</b> Discover the role played by data mining in various fields.
CS714P E	Cloud Computing	<b>At the end of this course, each student should be able to:</b>  <b>CO1.</b> Ability to understand various service delivery models of a cloud computing architecture. <b>CO2.</b> Ability to understand the ways in which the cloud can be programmed and deployed. <b>CO3.</b> Understanding cloud service providers.

  
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CS724P E	Internet of Things	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Interpret the impact and challenges posed by IoT networks leading to new architectural models.</p> <p><b>CO2.</b> Compare and contrast the deployment of smart objects and the technologies to connect them to a network.</p> <p><b>CO3.</b> Appraise the role of IoT protocols for efficient network communication.</p> <p><b>CO4.</b> Elaborate the need for Data Analytics and Security in IoT.</p>
CS7 25P E	SOFTWARE PROCESS & PROJECT MANAGEMENT	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> Gain knowledge of software economics, phases in the lifecycle of software development, project organization, project control and process instrumentation</p> <p><b>CO2.</b> Analyze the major and minor milestones, artifacts and metrics from management and technical perspectives</p> <p><b>CO3.</b> Design and develop software products using conventional and modern principles of software project management</p>
CS7 13P E	ARTIFICIAL INTELLIGENCE	<p><b>At the end of this course, each student should be able to:</b></p> <p><b>CO1.</b> To learn the distinction between optimal reasoning Vs. human like reasoning</p> <p><b>CO2.</b> To understand the concepts of state space representation, exhaustive search, heuristic search together with their time and space complexities.</p> <p><b>CO3.</b> To learn different knowledge representation techniques</p>

  
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CS706P C	Project Stage-I	<p><b>At the end of this course, each student should be able to:</b></p> <ul style="list-style-type: none"><li>CO1. Select the domain of interest.</li><li>CO2. Identify a problem in the domain of interest.</li><li>CO3. Perform literature survey in the domain of interest.</li><li>CO4. Identify various issues faced in the domain.</li><li>CO5. Identify the existing issues in the domain of interest.</li><li>CO6. Analyze the proper methodology to overcome the issues.</li><li>CO7. Identify the possible solutions.</li><li>CO8. Identify tools to implement the project.</li><li>CO9. Identify technique tools to implement the project.</li><li>CO10. Prepare technical report.</li></ul>
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## B.Tech-Computer & Science Engineering: IV year JNTUH-R16, R18 Regulation

Code	CourseName	CourseOutcomes
<b>IV Year B.Tech-II SEM</b>		
CS812PE	DISTRIBUTEDSYSTEMS	<b>At the end of this course, each student should be able to:</b>  CO1. Ability to understand Transactions and Concurrency control. CO1. Ability to understand Security issues. CO1. Understanding Distributed shared memory. CO1. Ability to design distributed systems for basic level applications.
CS802PC	Project Stage-II	<b>At the end of this course, each student should be able to:</b>  CO1. Demonstrate sound technical knowledge of their selected project topic. CO2. Undertake problem identification, formulation and solution. CO3. Design engineering solution to complex problems utilizing a systems approach. CO4. Conduct an engineering project. Design modules of the project. ICO5. Integrate the modules and arrive at the final output. CO6. Demonstrate the outcome of the project and verify. CO7. Prepare technical report

  
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## MASTER OF BUSINESS ADMINISTRATION

### JNTUH

Code	Course Name	CourseOutcomes
<b>MBA I Semester</b>		
22MBA01	<b>MANAGEMENT AND ORGANIZATIONAL BEHAVIOR</b>	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: Gain understanding of the Concepts of Management, its Evolution, Functions and the Theories Contributed by various Management Thinkers.</p> <p>CO2: Learn the process of planning, goal setting and the process of decision making with the help of various models.</p> <p>CO3: Learn the processes of Organizing and Controlling with the help of various Organizational Structures.</p> <p>CO4: appreciate the relevance of Individual and group behavior in an organization and the role of Culture and dynamics</p> <p>CO5: Identify different Leadership Styles, Skills and the Theories of Motivation.</p>
22MBA02	<b>BUSINESS ECONOMICS</b>	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1 Understand the Concepts and Principles of Business Economics.</p> <p>CO2: learn various concepts and practical applications of Demand and Supply viz. Laws, Types, Elasticity, Forecasting and Equilibrium.</p> <p>CO3: Learn concepts and applications related to Production and Cost of a firm.</p> <p>CO4: Learn the features of various Market Structures along with the Decision-making with regards to Price and Output in Short and Long Terms.</p> <p>CO5: Understand the concepts of Pricing Practices, Theory of Firm and Managerial &amp; Behavioral Theories of a Firm</p>
22MBA03	<b>FINANCIAL REPORTING AND ANALYSIS</b>	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: Understand the Concepts and Principles of Accounting.</p> <p>CO2: Understand the Accounting Process in detail.</p> <p>CO3: Learn various aspects in depreciation, Inventory and Goodwill</p> <p>CO4: Analyze the Working Capital and Flow of Funds and Cash into the Business</p> <p>CO5: Prepare, analyze and Interpret Financial Statements.</p>

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22MBA04	<b>RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS</b>	<p><b>At the end of this course, each student should be able to:</b></p> <p>CO1: Gain a conceptual overview of Research and the relevant concepts to Research.</p> <p>CO2: Learn the different types of Research Designs, Data Collection Tools and Procedures.</p> <p>CO3: Use different methods of representing data through Graphs and Tables; gain an overview of Statistics and relevant concepts and conduct Small Sample Tests.</p> <p>CO4: Learn to solve mathematical problems related to ANOVA (One-way and Two-way), Correlation and Regression.</p> <p>CO5: learn the application of Time Series and Index Numbers; appreciate the need for preparing and presenting a structured Research Report.</p>
22MBA05	<b>LEGAL AND BUSINESS ENVIRONMENT</b>	<p><b>At the end of this course, each student should be able to</b></p> <p>CO1: Understand the Business Laws related to Incorporation of a company.</p> <p>CO2: Learn the Law of Contract &amp; Sale of Goods</p> <p>CO3: Learn the salient features of Negotiable Instruments Act 1881</p> <p>CO4: Learn the Reforms Undertaken by the Government with respect to the challenging business environments.</p> <p>CO5: Gain insights of the Regulatory Framework in India.</p>
22MBA06 A	<b>BUSINESS ETHICS AND CORPORATE GOVERNANCE (OPEN ELECTIVE - I)</b>	<p><b>At the end of this course, each student should be able to</b></p> <p>CO1: Understand the Need for Business Ethics and Corporate Governance in India.</p> <p>CO2: Apply Knowledge of Established Methodologies of Solving Professional Ethical Issues.</p> <p>CO3: Learn Codes and Committees in Corporate Governance.</p> <p>CO4: Understand the Role of Board in Corporate Governance.</p>
22MBA06 B	<b>PROJECT MANAGEMENT (OPEN ELECTIVE - I)</b>	<p><b>At the end of this course, each student should be able to</b></p> <p>CO1: Understand and appreciate the importance of Project Management.</p> <p>CO2: Learn Project Planning, Execution and implementation.</p> <p>CO3: Apply Project Appraisal Methods to Cash Flows and Corporate Practices of Dividend Payment</p> <p>CO4: Understand intricacies of Project Evaluation techniques for better decision making.</p> <p>CO5: Appreciate the significance of Organizational &amp; Team Behaviors in projects.</p>

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22MBA06 C	SUSTAINABILITY MANAGEMENT (OPEN ELECTIVE – I)	<b>At the end of this course, each student should be able to</b> CO1: Understand the importance of Climate change and global warming. CO2: Learn about environment pollution and sustainability, economic approaches to sustainable development. CO3: Assess the steps in sustainable planning for competitive advantage. CO4: Understand sustainable and circular value chain, sustainability marketing. CO5: Appreciate the relevance of Market Sustainability
22MBA6 D	CROSS CULTURAL MANAGEMENT (OPEN ELECTIVE - I)	<b>At the end of this course, each student should be able to</b> CO1: Understand the importance of the influence of national culture on business culture. Co2: Learn about value orientations and dimensions. Co3: Assess culture and leadership, culture and strategy, cultural change in organizations. Co4: Understand cross cultural team management. Co5: Learn the aspects of working with international teams and multiple cultures and management of conflicts
22MBA08	STATISTICAL DATA ANALYSIS LAB	<b>At the end of this course, each student should be able to</b> Co1: Understand the importance of the main functions of MS- Excel /SPSS. Co2: Practice advance Excel Tools for conduction of Data Analysis Co3: Evaluate Data Analysis using Pivot Tables and Pivot Charts Co4: Analyze the Data using Descriptive Statistics CO5: Conduct various Parametric and Non-parametric Tests using MS Excel / SPSS.

  
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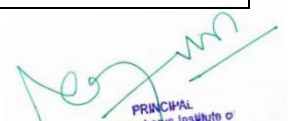
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Code	Course Name	Course Outcomes
<b>MBA IISemester</b>		
22MBA09	HUMAN RESOURCE MANAGEMENT	<p><b>At the end of this course, students will demonstrate the ability to</b></p> <p>CO1: understand the concepts, role and functions of HRM and appreciate the need of HR to act as a Strategic Business Partner of the Organization.</p> <p>CO2: Learn the methods of conducting Job Analysis, process of writing Job Descriptions &amp; Specifications and the processes of recruitment and selection.</p> <p>CO3: Gain an understanding of various concepts and practices of Employee Training &amp; Development and Performance Management &amp; Appraisals</p> <p>CO4: Learn the principles and practices of Employee Compensation and Rewards, with the help of Job Evaluation &amp; Broad-banding etc. and the salient features of Workmen Compensation Act and Minimum Wages Act.</p> <p>CO5: appreciate the need for effective Employee Relations and learn the salient features of Industrial Disputes Act and Factories Act.</p>
22MBA10	MARKETING MANAGEMENT	<p><b>At the end of this course, students will demonstrate the ability to</b></p> <p>CO1: Understand the important concepts and principles of Marketing Management and Marketing Research.</p> <p>CO2: Learn about the analysis of Market Opportunities and Customer Value with the help of Marketing Mix Elements.</p> <p>CO3: Learn the significance of designing a customer driven strategy through Marketing Segmentation, Targeting and Positioning.</p> <p>CO4: Assess Global marketing, green marketing strategies for sustainable development.</p> <p>CO5: Gain insights of the key aspects of pricing decisions and the role of communication.</p>
22MBA12	QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS	<p><b>After the completion of this laboratory course, the student will be able</b></p> <p>CO1: Understand the origin and application of operations research.</p> <p>CO2: Learn about the Formulation of Linear Programming Problem for different areas.</p> <p>CO3: appreciate the significance of variations of assignment problem, methods for finding Initial feasible solution.</p> <p>CO4: Learn the aspects of Decision Theory and Network Analysis</p> <p>CO5: Gain insights of the theoretical principles and practical applications of different queuing models.</p>

  
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22MBA13	<b>ENTREPRENEURSHIP AND DESIGN THINKING</b>	<p><b>After completion of this lab the student is able to</b></p> <p>CO1: Understand the approaches to entrepreneurship. CO2: Learn about the individual entrepreneurial mind-set and Personality. CO3: Learn the significance of Feasibility Analysis, Industry, competitor analysis, new venture development. CO4: Understand the principles of implementation of Design Thinking. CO5: Appreciate the relevance of Creativity in the process of implementation of Design Thinking</p>
22MBA14	<b>LOGISTICS AND SUPPLY CHAIN MANAGEMENT</b>	<p><b>After completion of this lab the student is able to</b></p> <p>CO1: understand the cyclical perspective of logistics and supply chain process. CO2: Learn about the distribution, transportation, warehousing related issues and challenges in supply chain. CO3: Appreciate the significance of network design in the supply chain. CO4: Gain knowledge of various models / tools of measuring the Supply Chain Performance. CO5: Appreciate the role of coordination and technology in supply chain management.</p>
22MBA15A	<b>TOTAL QUALITY MANAGEMENT (OPEN ELECTIVE-II)</b>	<p><b>After completion of this lab the student is able to</b></p> <p>CO1: Understand the need for Quality. CO2: Learn the relevant TQM models like PDCA Cycle, 5S, Kaizen, Quality Circles CO3: Learn statistical aspects relevant for process control. CO4: Assess the relevance of Total Productive Maintenance, FMEA, Six Sigma. CO5: Learn different Quality Management Systems.</p>
22MBA15B	<b>MARKETING RESEARCH (OPEN ELECTIVE-II)</b>	<p><b>After completion of this lab the student is able to</b></p> <p>CO1: Understand the importance of marketing research. CO2: Learn various aspects in research design. CO3: Learn sampling design process. CO4: Understand the characteristics of a good measurement, scaling and sampling methodology CO5: Learn hypothesis testing and data presentation.</p>
22MBA15C	<b>INTERNATIONAL BUSINESS (OPEN ELECTIVE - II)</b>	<p><b>After completion of this lab the student is able to</b></p> <p>CO1: Understand the Concepts, Principles and Approaches of International Business. CO2: Learn the evolution of International Trade thought process with the help of classical and modern theories of International Trade CO3: Gain insights of the aspects of Business and Economic Integration with the help of various Regional Economic Integrations and Multilateral Trade</p>

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		<p>Agreements.</p> <p>CO4: Understand the Strategy and Structure of International Business with the help of Value Chain Analysis, Environmental Scanning, Strategic Alliances.</p> <p>CO5: Gain knowledge of the contribution of major functional areas of business viz. Production, Finance, Marketing and HRM in International Business Operations.</p>
22MBA015 D	<b>RURAL MARKETING (OPEN ELECTIVE – II)</b>	<p><b>After completion of this lab the student is able to</b></p> <p>CO1: Understand the importance of Indian Rural Economy</p> <p>CO2: Learn various rural marketing strategies.</p> <p>CO3: Learn challenges of Retail Channel Management.</p> <p>CO4: Understand the aspects of rural business research.</p> <p>CO5: Learn e- rural marketing, CSR, IT for rural development, e- Governance for Rural India</p>
	<b>SUMMER INTERNSHIP</b>	<p>Students will be able to understand</p> <p>a) Management Functions and Organizational Structure</p> <p>b) Organizational Dynamics in terms of Organizational Behavior, Culture and Climate</p> <p>c) Functional Domain Knowledge</p> <p>d) Processes and Systems</p> <p>e) External and Internal Environment Impact on the Organization</p>

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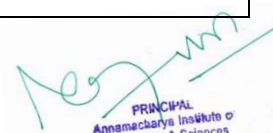
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Code	Course Name	CourseOutcomes
<b>II MBA I Semester</b>		
22MBA16	<b>PRODUCTION AND OPERATIONS MANAGEMENT</b>	<b>At the end of this course students will demonstrate the ability to</b> CO1. Understand the importance concepts of operations management. CO2. Learn various strategies in product and process design, analysis. CO3. Learn examine the various aspects of plant location and product layout. CO4. Understand the aspects of scheduling. CO5: Gain insights of integrated materials management, e-procurement, materials planning.
22MBA17	<b>MANAGEMENT INFORMATION SYSTEMS</b>	<b>At the end of this course students will demonstrate the ability to</b> CO1 Understand the importance of MIS for strategic advantages. CO2: Learn various business applications of information systems like e-business, BPR, DSS. CO3:Learn examine the information system planning. CO4: Understand alternative methods for building information system. CO5: Learn cyber security with inter networks security defenses.
22MBA18	<b>BUSINESS ANALYTICS</b>	<b>At the end of this course students will demonstrate the ability to</b> CO1: Understand the importance of business analytics in practice CO2: Learn various rural marketing strategies CO3:Learn challenges of data modeling. CO4:Understand the aspects data mining. CO5: Learn Monte Carlo simulation, risk analysis and decision tree analysis
22MBA19 M1	<b>DIGITAL MARKETING</b>	<b>At the end of this course students will demonstrate the ability to</b> CO1: Understand Evolution of digital marketing, its strategies and platforms. CO2: Learn the relevance of digital marketing channels. CO3: Learn the significance of digital marketing. CO4:understand the relevance of online advertising. CO5: Understand the methods of measuring the digital media performance
22MBA20 M2	<b>SALES AND PROMOTION MANAGEMENT</b>	<b>At the end of this course students will demonstrate the ability to</b> CO1: Understand Evolution of Sales and Promotion Management. CO2:Learn the relevance of various types of Advertising. CO3: Appreciate the significance of sales management. CO4: Assess the relevance of sales promotion strategies. CO5: Appreciate the need for the distribution channels.

  
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22MBA21 M3	CONSUMER BEHAVIOR	<b>After completion of this course, the student is able to</b> CO1: Understand Evolution of consumer behavior. CO2: Learn the relevance various influences on consumer behavior. CO3: Learn the significance of personality, attitudes of the consumer. CO4: Assess the relevance of the different models of Consumer decision making. CO5: Identify the need for the marketing ethics towards consumers.
22MBA19 F1	SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT	<b>After completion of this lab the student is able to</b> CO1: Understand the Indian financial system and also about Investment. CO2: Learn the relevance of risk and returns. CO3: Learn various influences bond valuation and management CO4: Understand the relevance of equity valuation of cash market and derivatives. CO5: Identify the need for mutual funds in India.
22MBA20 F2	RISK MANAGEMENT AND FINANCIAL DERIVATIVES	<b>After completion of this lab the student is able to</b> CO1: Understand risk management and derivatives. CO2: Learn the relevance of Basel norms, types of risks. CO3: Learn various aspects about Derivatives Market in India. CO4: Understand the uses of options strategies. Co5: Examine the importance of SWAP Market.
22MBA21 F3	STRATEGIC COST AND MANAGEMENT ACCOUNTING	<b>After completion of this lab the student is able to</b> CO1: Understand the cost analysis and control. CO2: Learn the relevance of unit, job, process costing for strategic decisions. CO3: Learn various aspects of activity-based management. CO4: Understand the role of types of budgets and the budgeting process in non-profit organizations. CO5: Identify the need for establishing cost standards
22MBA19 H1	TALENT AND PERFORMANCE MANAGEMENT SYSTEMS	<b>After completion of this lab the student is able to</b> CO1: Understand Talent Management Process along with its key components. CO2: Learn the significance of performance management and employee development in organizations CO3: Learn different approaches to Performance Management System. CO4: Understand KRA's and KPI's and performance metrics. CO5: Identify the importance of reward systems in organizations.

  
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22MBA20 H2	LEARNING AND DEVELOPMENT	<p><b>After completion of this lab the student is able to</b> CO1: Understand Learning theories with the emphasis on learning outcomes. CO2: Learn the significance of Training in organization. CO3: Learn different training methods. CO4: Understand essentials of management development. CO5: Identify the Training needs, Training methods for different sectors.</p>
22MBA21 H3	EMPLOYEE RELATIONS	<p><b>After completion of this lab the student is able to</b> CO1: understand the changing nature of Labor/Workforce in India and appreciate the need for knowing and maintaining good relations with Industry and Trade Unions. CO2: Learn the legal framework/process of Collective Bargaining and the aspects of Negotiation, Social Security and Drafting of Agreements. CO3: Learn various aspects of Tripartism, Social Dialogue and the role of Government in Industrial Relations CO4: Understand the salient features of various Acts such as Factories Act, Minimum Wages Act, ESI Act etc. and the need for maintenance of good Employee Relations CO5: Understand the salient features of Acts such as Industrial Disputes Act, Occupational Safety, Health and Working Conditions Code etc.</p>
22MBA19 E1	STARTUP AND MSME MANAGEMENT	<p><b>After completion of this lab the student is able to</b> Co1: Understand various Startup opportunities. Co2: Learn Business Startup, Ideation, and Venture Choices. Co3: Learn Legal and other requirements for new ventures. Co4: Learn Problems of entrepreneurs. Co5: Understand the Forms of Financial support.</p>
22MBA20 E2	TECHNOLOGY BUSINESS INCUBATION	<p><b>After completion of this lab the student is able to</b> Co1: Understand various Startup opportunities. Co2: Learn Business Startup, Ideation, and Venture Choices. Co3: Learn Legal and other requirements for new ventures. Co4: Learn Problems of entrepreneurs. Co5: Understand Forms of Financial support.</p>

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22MBA21 E3	INNOVATION AND ENTREPRENEU RSHIP	<b>After completion of this lab the student is able to</b> Co1: Gain an understanding of the concepts and processes of creativity and appreciate the need for improving the quality of creativity. Co2: Learn the methods of creative problem solving. Co3: Orient themselves on developing creative intelligence and unblock their creative energies Co4: Learn the concepts and methods of innovation and ideation and the theories of outsourcing new product development. Co5: Develop a perspective of micro and macro level innovation
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Code	Course Name	CourseOutcomes
<b>II MBA II Semester</b>		
22MBA23	<b>STRATEGIC MANAGEMENT</b>	<b>At the end of the course, the student will demonstrate</b> CO1: Understand the importance of strategic management process. CO2: Learn various market life cycle models for strategic analysis. CO3: Learn Strategies for competing in global markets and internet economy. CO4: Appreciate the need for having appropriate Turnaround and Diversification Strategies. CO5: Understand the aspects of strategy evaluation and control.
22MBA24 M4	<b>INTERNATIONAL MARKETING</b>	<b>After completion of this lab the student is able to</b> CO1: Understand the Global Marketing Management CO2: Learn the relevance of WTO, EXIM Policy CO3: Learn various influences of the Global Consumer CO4: Understand the relevance of International Marketing Mix, distribution promotion strategies. CO5: Identify the need for E-Marketing channels.
22MBA25 M5	<b>SERVICES MARKETING</b>	<b>After completion of this lab the student is able to</b> CO1: Understand Marketing Management of companies offering Services. CO2: Learn the relevance of services. CO3: Learn various influences of the consumer behavior in services. CO4: Understand the relevance of service operations. CO5: Identify the need for promotion strategies for services.
22MBA26 M6	<b>MARKETING ANALYTICS</b>	<b>After completion of this lab the student is able to</b> CO1: Learn the Concepts of Marketing Analytics and their relevance in business CO2: Use MS Excel to deal with Marketing Data at basic level, CO3: Appreciate Customer's journey through Product Selection Process and Customer Lifetime Value, CO4: Conduct Analysis in Determining the Pricing Strategies and CO5: Understand the Process of Optimizing Clusters and Measure the Effectiveness of Promotion.
22MBA24 F4	<b>INTERNATIONAL FINANCIAL MANAGEMENT</b>	<b>After completion of this lab the student is able to</b> CO1: Understand recent changes and challenges in International Financial Management. CO2: Learn Factors affecting International Trade flows CO3: Learn various aspects about International Stock market. CO4: Understand the uses of exchange rates.

  
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		CO5: Examine the importance of International Financing.
22MBA25 F5	STRATEGIC FINANCIAL MANAGEMENT	<b>After completion of this lab the student is able to</b> CO1: Understand financial strategy and control of a company. CO2: Learn the relevance of risk and uncertainty in making strategic decisions. CO3: Learn various aspects of capital budgeting. CO4: Understand the capital structure, dividend policy, financial distress, restructuring. CO5: Identify the different diversification strategies and mergers and acquisitions.
22MBA26 F6	FINANCIAL ANALYTICS	<b>After completion of this lab the student is able to</b> CO1: Understand techniques of financial statements. CO2: Learn the relevance of time value money. CO3: Learn various aspects of capital budgeting. CO4: Understand industry, technical and economic analysis. CO5: Learn duration of bond and immunization strategies.
22MBA24 H4	INTERNATIONAL HUMAN RESOURCE MANAGEMENT	<b>After completion of this lab the student is able to</b> CO1: Gain an overview of the nature, scope and importance of International Human Resource Management CO2: Understand and appreciate the role of International Human Resource Management in development and execution of strategies for success of multinational corporations. CO3: Learn the role of International Human Resource Management in long-term planning and staffing of manpower globally CO4: Gain insights of the strategic role of Training and Development of Expatriates in management of international assignments. Co5: acquaint themselves with the process of global performance management and understand the complexities of global compensation
22MBA25 H5	LEADERSHIP AND CHANGE MANAGEMENT	<b>After completion of this lab the student is able to</b> CO1: Gain an understanding of the concepts and principles of leadership by studying the contributions made by various philosophers and Universities. CO2: Learn from the various theories and styles of leadership and their contribution the subject matter of leadership from time to time. CO3: Appreciate the role of leader in the ever-changing business scenario and gain knowledge of various models of change CO4: Understand the role of power, politics and conflicts in times of change, management of resistance to change in the process of implementing

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		organizational change. CO5: Gain insights of the process organizational development from a consultative perspective.
22MBA26 H6	HR ANALYTICS	<b>After completion of this lab the student is able to</b> CO1: Gain an understanding of the relevance of HR Analytics in the current business scenario. CO2: Have an understanding of the models of conducting HR Analytics and understanding of the methods of capturing, examining & purifying data for conduction of HR Analytics. CO3: Use MS Excel for conduction of HR Analytics for key HR Processes CO4: Have an overview of various tools and software technologies used for conduction of Descriptive HR Analytics and Visualization of HR Data. CO5: Appreciate the significance of Predictive and Prescriptive Analytics.
22MBA24 E4	ENTREPRENEURIAL FINANCE	<b>After completion of this lab the student is able to</b> Co1: Understand Financing through venture lifecycle in a company. Co2: Learn Startup and First Round Financing Sources. Co3: Learn the significance of Financial Planning throughout the Venture's life cycle. Co4: Understand Mechanics of venture valuation. Co5: Understand the importance of venture capital financing.
22MBA25 E5	ENTREPRENEURIAL MARKETING	<b>After completion of this lab the student is able to</b> Co1: Understand Marketing mix of an enterprise. Co2: Learn the Growth and marketing strategies. Co3: Learn Market Development strategies. Co4: Understand entrepreneurial communication. Co5: Understand the importance of entrepreneurial marketing.
22MBA26 E6	FAMILY BUSINESS MANAGEMENT	<b>After completion of this lab the student is able to</b> Co1: Understand various Startup opportunities. Co2: Learn Business Startup, Ideation, and Venture Choices. Co3: Learn Legal and other requirements for new ventures. CO4: Learn Problems of entrepreneurs. CO5: Understand Forms of Financial support.

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## B.Tech- Electronics Communication Engineering

### JNTUH-R16, R18Regulation

Code	Course Name	CourseOutcomes
<b>IIB.TechISemester</b>		
EC301PC	ELECTRONIC DEVICES AND CIRCUITS	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1:. Know the characteristics of various components CO2 Understand the utilization of components CO3 Understand the biasing techniques CO4: Design and analyze small signal amplifier circuits
EC302PC	NETWORK ANALYSIS AND TRANSMISSION LINES	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1: Gain the knowledge on basic RLC circuits behavior. CO2: Analyze the Steady state and transient analysis of RLC Circuits CO3: Know the characteristics of two port network parameters CO4: Analyze the transmission line parameters and configurations.
EC303PC	DIGITAL SYSTEM DESIGN	<b>Attheendofthis course,eachstudentshouldbeableto:</b> CO1: Understand the numerical information in different forms and Boolean Algebra theorems. CO2: Postulates of Boolean algebra and to minimize combinational functions. CO3: Design and analyze combinational and sequential circuits. CO4: Known about the logic families and realization of logic gates
EC305ES	PROBABILITY THEORY AND STOCHASTIC PROCESSES	<b>Attheendofthis course,eachstudentshouldbeableto</b> CO1: Understand the concepts of Random Process and its Characteristics. CO2: Understand the response of linear time Invariant system for a Random Processes CO3: Determine the Spectral and temporal characteristics of Random Signals. CO4: Understand the concepts of Noise in Communication systems

  
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Code	Course Name	CourseOutcomes
<b>IIB.Tech IISemester</b>		
MA401BS	Laplace Transforms, Numerical Methods & Complex Variables	<b>At the end of this course, students will demonstrate the ability to</b> CO1: Use the Laplace transforms techniques for solving ODE's CO2 Find the root of a given equation CO3: Estimate the value for the given data using interpolation CO4: Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems CO5: Taylor's and Laurent's series expansions of complex Function
EC402PC	Electromagnetic Fields and Waves	<b>At the end of this course, students will demonstrate the ability to</b> CO1: Get the knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields and Magneto static Fields CO2: Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.. CO3: Analyze the Wave Equations for good conductors, good dielectrics and evaluate the UPW Characteristics for several practical media of interest CO4: To analyze completely the rectangular waveguides, their mode characteristics, and Design waveguides for solving practical problems..
EC403PC	Analog and Digital Communications	<b>At the end of this course, students will demonstrate the ability to</b> CO1 Analyze and design of various continuous wave and angle modulation and demodulation techniques. CO2: Understand the effect of noise present in continuous wave and angle modulation techniques.. CO3: Attain the knowledge about AM , FM Transmitters and Receivers. CO4: Analyze and design the various Pulse Modulation Techniques CO5: Understand the concepts of Digital Modulation Techniques and Baseband transmission.

  
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EC404PC	Linear IC Applications	<p><b>After the completion of this laboratory course, the student will be able</b></p> <p>CO1: A thorough understanding of operational amplifiers with linear integrated circuits</p> <p>CO2: Attain the knowledge of functional diagrams and applications of IC 555 and IC 565</p> <p>CO3: Acquire the knowledge about the Data converters</p>
EC405PC	Electronic Circuit Analysis	<p><b>After completion of this lab the student is able to</b></p> <p>CO1: Design the multistage amplifiers and understand the concepts of High Frequency Analysis of Transistors.</p> <p>CO2: Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations</p> <p>CO3: Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications</p> <p>CO4: Design Multivibrators and sweep circuits for various applications</p>

  
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Code	Course Name	CourseOutcomes
<b>IIIB.Tech I Semester</b>		
EC501PC	Microprocessors & Microcontrollers	<b>At the end of this course students will demonstrate the ability to</b> CO1.Understands the internal architecture, organization and assembly language programming of 8086 processors. CO2. Understands the internal architecture, organization and assembly language programming of 8051/controllers. CO3. Understands the interfacing techniques to 8086 and 8051 based systems CO4. Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors
EC502PC	Data Communications and Networks	<b>At the end of this course students will demonstrate the ability to</b> CO1:Know the Categories and functions of various Data communication Networks. CO2: Design and analyze various error detection techniques CO3:Demonstrate the mechanism of routing the data in network layer. CO4: Know the significance of various Flow control and Congestion control Mechanisms CO5: Know the Functioning of various Application layer Protocols
EC503PC	Control Systems	<b>At the end of this course students will demonstrate the ability to</b> CO1: Understand the modeling of linear-time-invariant systems using transfer function and state space representations CO2: Understand the concept of stability and its assessment for linear-time invariant systems CO3:Design simple feedback controllers.
SM504MS	Business Economics & Financial Analysis	<b>At the end of this course students will demonstrate the ability to</b> CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analyzing the Financial Statements of a Company

  
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EC513PE	Electronic Measurements and Instrumentation	<b>At the end of the course, the student will demonstrate</b> CO1. Measure electrical parameters with different meters and understand the basic definition of measuring parameters CO2. Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals CO3. Operate an Oscilloscope to measure various signals CO4: Measure various physical parameters by appropriately selecting the transducers.
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Code	Course Name	CourseOutcomes
<b>IIIB.Tech II Semester</b>		
EC601PC	Antennas and Propagation	<p><b>At the end of the course, the student will demonstrate</b></p> <p>CO1. Characterize the antennas based on frequency, configure the geometry and establish the radiation patterns of VHF, UHF and Microwave antennas and also antenna arrays</p> <p>CO2. Specify the requirements for microwave measurements and arrange a setup to carry out the antenna far zone pattern and gain measurements in the laboratory</p> <p>CO3. Classify the different wave propagation mechanisms, determine the characteristic features of different wave propagations, and estimate the parameters involved..</p>
EC602PC	Digital Signal Processing	<p><b>After completion of this course the student is able to</b></p> <p>CO1: Understand the LTI system characteristics and Multirate signal processing</p> <p>CO2: Understand the inter-relationship between DFT and various transforms</p> <p>CO3: Design a digital filter for a given specification</p> <p>CO4: Understand the significance of various filter structures and effects of round off errors.</p>
EC603PC	VLSI Design	<p><b>At the end of the course the student will be able to</b></p> <p>CO1:Acquire qualitative knowledge about the fabrication process of integrated circuits using MOS transistors</p> <p>CO2: Draw the layout of any logic circuit which helps to understand and estimate parasitic effect of any logic circuit.</p> <p>CO3: Design building blocks of data path systems, memories and simple logic circuits using PLA, PAL, FPGA and CPLD.</p> <p>CO4: Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve testability of system</p>
EC613PE	Embedded System Design	<p><b>At the end of the course the student will be able to:</b></p> <p>CO1: To understand the selection procedure of Processors in the embedded domain</p> <p>CO2: Design Procedure for Embedded Firmware</p> <p>CO3: To visualize the role of Real time Operating Systems in Embedded Systems</p> <p>CO4: To evaluate the Correlation between task synchronization and latency issues</p>

  
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## B.Tech- Electronics& Communication Engineering:IVyear JNTUH-R16, R18Regulation

Code	Course Name	CourseOutcomes
<b>IVB.Tech I Semester</b>		
EC701PC	Microwave and Optical Communications	<b>At the end of this course, each student should be able to:</b> CO1. Known power generation at microwave frequencies and derive the performance characteristics CO.2 Understand the enhancement, segmentation and restoration processes on an image. CO3. Implement the various Morphological operations on an image CO4. Understand the need of compression and evaluation of basic compression algorithms
EC722PE	Database Management Systems	<b>At the end of this course, each student should be able to:</b> CO1: Gain knowledge of fundamentals of DBMS, database design and normal forms CO2: Master the basics of SQL for retrieval and management of data. CO3: Be acquainted with the basics of transaction processing and concurrency control CO4: Familiarity with database storage structures and access techniques.
SM702MS	Professional Practice, Law & Ethics	<b>At the end of this course, each student should be able to:</b> CO1: The students will understand the importance of professional practice, Law and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen .

  
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## B.Tech Electronics & Communication Engineering: IV year JNTUH- R16, R18 Regulation

Code	Course Name	Course Outcomes
<b>IVB.Tech IISemester</b>		
EC812PE	Radar Systems	CO1: Derive the complete radar range equation. CO2: Understand the need and functioning of CW, FM-CW and MTI radars CO3: Known various Tracking methods CO4: Derive the matched filter response characteristics for radar receivers
EC821PE	System on Chip Architecture	CO1: Expected to understand SOC Architectural features CO2: To acquire the knowledge on processor selection criteria and limitation CO3: To acquires the knowledge of memory architectures on SOC CO4: To understands the interconnection strategies and their customization on SOC

  
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## B. Tech-Mechanical Engineering

### JNTUH-R16, R18 Regulation

Code	Course Name	Course Outcomes
<b>II B. TechI Semester</b>		
MA301B S:	PROBABILITY AND STATISTICS & COMPLEX VARIABLES	CO1: Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data. CO2: Analyse the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems. CO3: Taylor's and Laurent's series expansions of complex function.
ME302P C:	MECHANICS OF SOLIDS	CO1: Apply knowledge of materials and structural elements to the analysis of simple structures; CO2: Undertake problem identification, formulation and solution using a range of analytical methods; CO3: Analyze and interpret laboratory data relating to behavior of structures and the materials they are made of, and undertake associated laboratory work individually and in teams. CO4: Expectation and capacity to undertake lifelong learning
ME304P C:	PRODUCTION TECHNOLOGY	CO1: Understand the idea for selecting materials for patterns. CO2: Know Types and allowances of patterns used in casting and analyze the components of moulds. CO3: Design core, core print and gating system in metal casting processes CO4: Understand the arc, gas, solid state and resistance welding processes. CO5: Develop process-maps for metal forming processes using plasticity principles. CO6: Identify the effect of process variables to manufacture defect free products

  
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ME305P C:	THERMODYN AMICS	CO1.At the end of the course, the student should be able to Understand and differentiate CO2.different thermodynamic systems and processes. Understand and apply the laws of CO3.Thermodynamics to different types of systems undergoing various processes and to perform CO4.Thermodynamic analysis. Understand and analyze the Thermodynamic cycles and evaluate CO5.performance parameters.
ME306P C:	PRODUCTION TECHNOLOGY LAB	CO1:Understanding the properties of moulding sands and pattern making. Fabricate joints using gas welding and arc welding. CO2:Evaluate the quality of welded joints. Basic idea of press working tools CO3:performs moulding studies on plastics
ME307P C:	MACHINE DRAWING PRACTICE	CO1:Preparation of engineering and working drawings with dimensions and bill of material during design and development. Developing assembly drawings using part drawings of machine Components. CO2:Conventional representation of materials, common machine elements and parts such as Screws, nuts, bolts, keys, gears, webs, ribs. CO3:Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned. CO4:Methods of dimensioning, general rules for sizes and placement of dimensions for holes, Centers curved and tapered features. CO5: Title boxes, their size, location and details - common abbreviations and their liberal usage CO6:Types of Drawings – working drawings for machine parts.

  
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Code	Course Name	Course Outcomes
<b>II B. Tech II Semester</b>		
ME402P C:	KINEMATICS OF MACHINERY	CO1: The main purpose is to give an idea about the relative motions obtained in all the above type of components used in mechanical Engineering.
ME403P C:	THERMAL ENGINEERING- 1	CO1: At the end of the course, the student should be able to evaluate the performance of IC engines and compressors under the given operating conditions. CO2: Apply the laws of Thermodynamics to evaluate the performance of Refrigeration and air-conditioning cycles. CO3: Understand the functionality of the major components of the IC Engines and effects of operating conditions on their performance
ME404P C:	FLUID MECHANICS AND HYDRAULIC MACHINES	CO1. Able to explain the effect of fluid properties on a flow system. CO2. Able to identify type of fluid flow patterns and describe continuity equation. CO3. To analyze a variety of practical fluid flow and measuring devices and utilize Fluid Mechanics principles in design. CO4. To select and analyze an appropriate turbine with reference to given situation in power plants. CO5. To estimate performance parameters of a given Centrifugal and Reciprocating pump. CO6. Able to demonstrate boundary layer concepts.
ME405P C:	INSTRUMENTA TION AND CONTROL SYSTEMS	CO1. To identify various elements and their purpose in typical instruments, to identify various errors that would occur in instruments. CO2. Analysis of errors so as to determine correction factors for each instrument. CO3. To understand static and dynamic characteristics of instrument and should be able to determine loading response time. CO4. For given range of displacement should be able to specify transducer, its accurate and loading time of that transducer
EE409ES :	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB	CO1. To analyze and solve electrical circuits using network laws and theorems. CO2. To understand and analyze basic Electric and Magnetic circuits CO3. To study the working principles of Electrical Machines CO4. To introduce components of Low Voltage Electrical Installations CO5. To identify and characterize diodes and various types of transistors



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ME407P C:	FLUID MECHANICS AND HYDRAULIC MACHINES LAB	CO1.Able to explain the effect of fluid properties on a flow system. CO2. Able to identify type of fluid flow patterns and describe continuity equation. CO3.To analyze a variety of practical fluid flow and measuring devices and utilize fluid mechanics principles in design. CO4.To select and analyze an appropriate turbine with reference to given situation in power plants. CO5.To estimate performance parameters of a given Centrifugal and Reciprocating pump. CO6.Able to demonstrate boundary layer concept
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Code	Course Name	Course Outcomes
<b>III B. Tech I Semester</b>		
ME501P C:	DYNAMICS OF MACHINERY	CO1.the study of KOM & DOM are necessary to have an idea while designing the various CO2.machine members like shafts, bearings, gears, belts & chains and various CO3.I.C. Engine Components & Machine tool parts
ME502P C:	DESIGN OF MACHINE MEMBERS - I	CO1.The student acquires the knowledge about the principles of design, material selection, component behavior subjected to loads, and criteria of failure. CO2.Understands the concepts of principal stresses, stress concentration in machine members and fatigue loading. CO3.Design on the basis of strength and rigidity and analyze the stresses and strains induced in a machine element.
ME503P C:	METROLOGY AND MACHINE TOOLS	CO1.Identify techniques to minimize the errors in measurement. CO2.Identify methods and devices for measurement of length, angle, gear & thread parameters, surface roughness and geometric features of parts. CO3.Understand working of lathe, shaper, planer, drilling, milling and grinding machines. CO4.Comprehend speed and feed mechanisms of machine tools. CO5. Estimate machining times for machining operations on machine tools

  
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ME505P C:	THERMAL ENGINEERING- II	CO1.Develop state – space diagrams based on the schematic diagrams of process flow of steam and gas turbine plants CO2. Apply the laws of Thermodynamics to analyze thermodynamic cycles CO3. Differentiate between vapour power cycles and gas power cycles CO4. Infer from property charts and tables and to apply the data for the evaluation of performance parameters of the steam and gas turbine plants CO5.Understand the functionality of major components of steam and gas turbine plants and to do the analysis of these components
ME506P C:	OPERATIONS RESEARCH	CO1.Understanding the problem, identifying variables & constants, Formulation of optimization model CO2. applying appropriate optimization technique
ME508P C:	METROLOGY AND MACHINE TOOLS LAB	CO1.To impart practical exposure to the metrology equipment & Machine Tools CO2.To conduct experiments and understand the working of the same
ME509P C:	KINEMATICS AND DYNAMICS LAB	CO1.The objective of the lab is to understand the kinematics CO2.dynamics of mechanical elements such as linkages, gears, cams and learn to design such elements to accomplish desired motions or tasks

  
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Code	Course Name	Course Outcomes
<b>III B. Tech II Semester</b>		
ME601P C:	DESIGN OF MACHINE MEMBERS - II	CO1.Knowledge about journal bearing design using different empirical relations. CO2.Estimation of life of rolling element bearings and their selection for given service conditions. CO3.Acquaintance with design of the components as per the standard, recommended procedures CO4.which is essential in design and development of machinery in industry.
ME602P C:	HEAT TRANSFER	CO1.Understand the basic modes of heat transfer CO2. Compute one dimensional steady state heat transfer with and without heat generation CO3.Understand and analyze heat transfer through extended surfaces CO4. Understand one dimensional transient conduction heat transfer CO5. Understand concepts of continuity, momentum and energy equations CO6. Interpret and analyze forced and free convective heat transfer CO7 Understand the principles of boiling, condensation and radiation heat transfer CO8.Design of heat exchangers using LMTD and NTU methods
ME603P C:	CAD & CAM	CO1.Understand geometric transformation techniques in CAD. Develop mathematical CO2.models to represent curves and surfaces. Model engineering components using solid modeling CO3.techniques. Develop programs for CNC to manufacture industrial components. CO4.To understand the application of computers in various aspects of Manufacturing viz., Design, Proper planning, CO5.Manufacturing cost, Layout & Material Handling system.
ME611P E:	UNCONVENTIO NAL MACHINING PROCESSES (Professional Elective - I)	CO1.Understand the basic techniques of Unconventional Machining processes modeling CO2. Estimate the material removal rate and cutting force, in an industrially useful manner, for Unconventional Machining processes.
ME612P E:	MACHINE TOOL DESIGN (Professional Elective – I)	CO1.At the end of the course, the student will be able to, understand basic motions CO2.involved in a machine tool, design machine tool structures, design and analyze systems for specified speeds and feeds, select subsystems for achieving high accuracy in machining, CO3.understand control strategies for machine tool operations and apply appropriate quality tests for quality assurance

  
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College Code : T8  
ESTD: 2005

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ME613P E:	PRODUCTION PLANNING AND CONTROL (Professional Elective – I)	CO1.At the end of the course, the student will be able to understand production systems and their characteristics. CO2.Evaluate MRP and JIT systems against traditional inventory control systems. CO3.Understand basics of variability and its role in the performance of a production system. CO4.Analyze aggregate planning strategies. Apply forecasting and scheduling techniques to production systems. CO5.Understand theory of constraints for effective management of production systems
ME604 PC:	FINITE ELEMENT METHODS	CO1.At the end of the course, the student will be able to, Apply finite element method CO2.to solve problems in solid mechanics, fluid mechanics and heat transfer. CO3.Formulate and solve problems in one dimensional structures including trusses, beams and frames. CO4.Formulate FE characteristic equations for two dimensional elements and analyze plain stress, plain strain, axi-symmetric and plate bending problems. ANSYS, ABAQUS, NASTRAN, etc

  
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Code	Course Name	Course Outcomes
<b>IV B. TechI Semester</b>		
ME701 PC:	REFRIGERATION AND AIR CONDITIONING	<p>CO1.At the end of the course, the student should be able to Differentiate between different types of refrigeration systems with respect to application as well as conventional CO2.unconventional refrigeration systems. Thermodynamically analyse refrigeration and air conditioning systems and evaluate performance parameters.</p> <p>CO3.Apply the principles of Psychometrics to design the air conditioning loads for the industrial applications</p>
ME711 PE:	ADDITIVE MANUFACTURING (PE - II)	<p>CO1.Describe various CAD issues for 3D printing and rapid prototyping and related operations for STL model manipulation.</p> <p>CO2. Formulate and solve typical problems on reverse engineering for surface reconstruction from physical prototype models through digitizing and spline-based surface fitting.</p> <p>CO3.Formulate and solve typical problems on reverse engineering for surface reconstruction from digitized mesh models through topological modelling and subdivision surface fitting.</p> <p>CO4.Explain and summarize the principles and key characteristics of additive manufacturing technologies and commonly used 3D printing and additive manufacturing systems.</p> <p>CO5.Explain and summarize typical rapid tooling processes for quick batch production of plastic and metal parts.</p>
ME713PE:	ME713PE: MEMS (PE – II)	<p>CO1.Students will be able to understand working principles of currently available micro sensors, actuators, and motors, valves, pumps, and fluidics used in Microsystems.</p> <p>CO2.Students will be able to apply scaling laws that are used extensively in the conceptual design of micro devices and systems. Students will be able to differentiate between the positive CO3.negative consequences of scaling down certain physical quantities that are pertinent to Microsystems.</p> <p>CO4. Students will be able to use materials for common micro components and devices.</p> <p>CO5.Students will be able to choose a micromachining technique, such as bulk micromachining surface micromachining for a specific MEMS fabrication process.</p> <p>CO6. Students will be able to understand the basic principles and applications of micro-fabrication processes, such as photolithography, ion implantation, diffusion, oxidation, CVD, PVD, and etching.</p>



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		<p>CO7.Students will be able to consider recent advancements in the field of MEMS and devices.</p> <p>CO8. Students will be able communicate their results and findings orally via formal presentations and in writing through reports</p>
ME721PE:	POWER PLANT ENGINEERING (PE – III)	<p>CO1.Understand the concept of Rankine cycle.</p> <p>CO2.Understand working of boilers including water tube, fire tube and high pressure boilers and determine efficiencies.</p> <p>CO3.Analyze the flow of steam through nozzles</p> <p>CO4. Evaluate the performance of condensers and steam turbines</p> <p>CO5. Evaluate the performance of gas turbines</p>
ME723PE:	RENEWABLE ENERGY SOURCES (PE – III)	<p>CO1.Understanding of renewable energy sources</p> <p>CO2. Knowledge of working principle of various energy systems</p> <p>CO3.Capability to carry out basic design of renewable energy systems</p>
ME731 PE:	COMPUTATIONAL FLUID DYNAMICS (PE – IVCO1.	<p>CO1.Differentiate between different types of Partial Differential Equations and to know and</p> <p>CO2.understand appropriate numerical techniques.</p> <p>CO3.Solve the simple heat transfer and fluid flow problems using different numerical techniques,viz., FDM.</p> <p>CO4. Understand and to appreciate the need for validation of numerical solution.</p>



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ME732 PE:	TURBO MACHINERY (PE – IV)	CO1.Ability to design and calculate different parameters for turbo machines  CO2.Prerequisite to CFD and Industrial fluid power courses  CO3.Ability to formulate design criteria  CO4.Ability to understand thermodynamics and kinematics behind turbo machines
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Code	Course Name	Course Outcomes
<b>IV B. TechII Semester</b>		
ME811PE:	INDUSTRIAL ROBOTICS (PE – V)	CO1.At the end of the course, the student will be able to understand the basic components of robots. Differentiate types of robots and robot grippers. CO2. Model forward and inverse kinematics of robot manipulators. Analyze forces in links and joints of a robot. Programme a robot to perform CO3.tasks in industrial applications. Design intelligent robots using sensors.
ME812PE:	MECHANICAL VIBRATIONS (PE – V)	CO1.At the end of the course, the student will be able to, Understand the causes and effects of vibration in mechanical systems. CO2. Develop schematic models for physical systems and formulate governing equations of motion. CO3.Understand the role of damping, stiffness and inertia in mechanical systems Analyze rotating and reciprocating systems and compute critical speeds. CO4.Analyze and design machine supporting structures, vibration isolators and absorbers.
MM813PE:	COMPOSITE MATERIALS (PE – V)	CO1.Knowledge of the crystal structures of a wide range of ceramic materials and glasses. CO2.Able to explain how common fibers are produced and how the properties of the fibers are related to the internal structure. CO3. Able to select matrices for composite materials in different applications. CO4. Able to describe key processing methods for fabricating composites.

  
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