

Approved by AICTE, New Delhi, Permanently Affiliated to VTU, Belagavi

Accredited at 'A+' Grade by NAAC & Programmes Accredited by NBA: CSE & ECE

Recognized under 2(f) &12B of UGC Act, 1956.

Mech. Engg. Dept.

Academic

Course Outcome

AY: 2023-24

Course Outcomes of all the courses of 3rd & 4th semester CBCS 2022 Scheme

III-SEM

Subject: Mechanics of Materials

Sub. Code: PCC - BME301

After successful completion of this course, the students will be able to;

СО	Description	
C201.1	Understand the concepts of stress and strain in simple and compound bars.	
C201.2	Explain the importance of principal stresses and principal planes & analyze cylindrical pressure vessels under various loadings	
C201.3	Apply the knowledge to understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.	
C201.4	Evaluate stresses induced in different cross-sectional members subjected to shear loads.	
C201.5	Apply basic equation of simple torsion in designing of circular shafts & Columns	

Subject: Manufacturing Process

Subject Code: IPCC- BME302

Inculcating Values, Promoting Prosperity

After successful completion of this course, the students will be able to;

СО	Description		
C202.1	Classify manufacturing process and elaborate the parts of casting process.		
C202.2	Summarize the different casting process and select the melting furnace based on ferrous and		
	non-ferrous alloys.		
C202.3	Understand the classification of various forming process like forging, rolling, extrusion,		
	wire drawing and sheet metal processes.		
C202.4	List and explain different types of conventional welding processes like Arc and Gas		
	welding processes		
C202.5	Explain different special types of advance welding processes, soldering, brazing and		
	adhesive bonding.		

Subject: Material Science and Engineering

Subject Code: IPCC- BME303

CO	Description		
C203.1	Understand the atomic arrangement in crystalline materials and describe the periodic		
	arrangement of atoms in terms of unit cell parameters.		
C203.2	Understand the importance of phase diagrams and the phase transformations.		
C203.3	Explain various heat treatment methods for controlling the microstructure.		
C203.4	Correlate between material properties with component design and identify various kinds of		
	defects.		
C203.5	Apply the method of materials selection, material data and knowledge sources for computer-		
	aided selection of materials.		





Subject: Basic Thermodynamics

Subject Code: PCC- BME304

After successful completion of this course, the students will be able to;

CO	Description		
C204.1	Explain fundamentals of thermodynamics and evaluate energy interactions across the		
	boundary of thermodynamic systems.		
C204.2	Apply 1st law of thermodynamics to closed and open systems and determine quantity of		
	energy transfers.		
C204.3	Evaluate the feasibility of cyclic and non-cyclic processes using 2nd law of thermodynamics		
C204 4	Apply the knowledge of entropy, reversibility and irreversibility to solve numerical problems		
C204.4	and Interpret the behaviour of pure substances and its application in practical problems.		
C204.5	Recognize differences between ideal and real gases and evaluate thermodynamic properties of		
	ideal and real gas mixtures using various relations.		

Subject: Introduction to Modelling and Design for Manufacturing Subject Code: PCCL - BMEL305

After successful completion of this course, the students will be able to;

СО	Description
C205.1	Create and modify a form-based design.
C205.2	Use design tools for moulded parts.
C205.3	Demonstrate proficiency in the setup and creation of a design.
C205.4	Simulate the assembly of machine components in 3D environment.

Subject: Smart Materials & Systems

Subject Code: ESC - BME306B

СО	Description
C207.1	Understand, and apply the smart materials structure, components, stimuli-response for various
	applications and select and justify appropriate materials for specific applications
C207.2	Understand and analyze the basic principles, properties and classifications of various
	electrically activated materials and their applications and evaluate based on the stimuli and
	actuation
C207.3	Understand and analyze the basic principles, properties and classifications of various thermally
	activated materials and their applications and evaluate based on the stimuli and actuation
C207.4	Understand and analyze the basic principles, properties and classifications of various smart
	polymers and their applications and evaluate based on the stimuli and actuation
C207.5	Understand and analyze the basic principles, properties and classifications of various
	chemically activated materials and their applications and evaluate based on the stimuli and
	actuation



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Subject: Social Connect and Responsibility

Subject Code: UHV - BSCK307

After successful completion of this course, the students will be able to;

CO	Description		
C210.1	Develop an eco-friendly relationship for saving the natural resources and preservation of		
	nature.		
C210.2	Develop multicultural awareness and appreciation for Music and Drama by exposing		
	learners to various forms of Art.		
C210.3	Understand the concept of agricultural operations.		
C210.4	Develop an eco-friendly relationship for saving the natural resources and preservation of		
	nature.		
C210.5	Describe the regional culinary practices and its importance in day-to-day life		

Subject: Advanced Python Programming Subject Code: AEC/ SEC - BME358A

After successful completion of this course, the students will be able to;

CO	Description
C211.1	Develop algorithmic solutions to simple computational problems
C211.2	Develop and execute simple Python programs.
C211.3	Use functions to decompose a Python program.
C211.4	Process compound data using Python data structures
C211.5	Utilize Python packages in developing software applications

IV-SEM

Subject: Applied Thermodynamics

Sub. Code: PCC – BME401

After successful completion of this course, the students will be able to;

СО		Description	
C215.1	Analyse air	Analyse air standard cycle to evaluate the performance of I C engines	
C215.2	Analyze the gas power cycles to evaluate the overall efficiency of gas turbine plant.		
C215.3	Apply thermodynamic concepts to analyze the performance of vapour power cycles.		
C215.4	Analyze the	vapour compression and vapour absorption systems to improve refrigeration.	
C215.5	Determinati	on of various parameters of air compressors and steam nozzles.	

Subject: Machining Science and Metrology

Sub. Code: PCC – BME402

After successful completion of this course, the students will be able to;

CO	Description
C216.1	Analyse air standard cycle to evaluate the performance of I C engines
C216.2	Analyze the gas power cycles to evaluate the overall efficiency of gas turbine plant.
C216.3	Apply thermodynamic concepts to analyze the performance of vapour power cycles.
C216.4	Analyze the vapour compression and vapour absorption systems to improve refrigeration.
C216.5	Determination of various parameters of air compressors and steam nozzles.

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Academic

Course Outcome

AY: 2023-24



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Course Outcome

AY: 2023-24

Subject: Fluid Mechanics

Sub. Code: IPCC – BME403

After successful completion of this course, the students will be able to;

CO	Description		
C217.1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.		
C217.2	Understand and apply the principles of pressure, buoyancy and floatation		
C217.3	Apply the knowledge of fluid dynamics while addressing problems of mechanical and chemical engineering.		
C217.4	Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.		
C217.5	Understand the basic concept of compressible flow and CFD		
C217.6	Conduct basic experiments of fluid mechanics and understand the experimental uncertainties.		

Subject: Mechanical Measurements and Metrology lab After successful completion of this course, the students will be able to:

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CO	Description		
C218.1	Illustrate the	principle of operation and calibration of an instrument and Compare engineering	
	measuring in	struments for a particular application	
C218.2	Understand the concepts of limits, fits, tolerance and make use of measuring instruments.		
C218.3	Make use of concepts of interferometer and screw thread measurement methods.		
C218.4	Explain the	concepts of measurement, measurement systems and intermediate modifying	
	devices		
C218.5	5 Interpret the working of force, torque, pressure, strain and Temperature measuring devices		

Subject: Robotics and Automation

Sub. Code: ETC – BME405D

After successful completion of this course, the students will be able to;

CO	Description
C222.1	Explain various types of Robotics, automation, robotics motion, sensors and control, machine
	vision, robotic programming and roles of robots in industry.
C222.2	Understand the working methodology of robotics and automation, motion and control,
	machine vision and programming, application of robots in industry.
C222.3	Write the program for robot for various applications.
C222.4	Describe the different material handling and Identification technologies used in automation

Subject: Introduction to AI & ML

Sub. Code: AEC – BME456A

СО	Description
C223.1	Understand the implementation procedure for the machine learning algorithms
C223.2	Design Java/ python programs for various learning algorithms
C223.3	Apply appropriate data sets to the machine learning algorithms
C223.4	Identify & apply machine learning algorithms to solve real world problems
C223.5	Examine working of PDf & word file formats.



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Course Outcome

AY: 2023-24

Subject: Biology For Engineers

Sub. Code: BSC - BBOK407

After successful completion of this course, the students will be able to;

CO	Description	
C227.1	Classify manufacturing process and elaborate the parts of casting process.	
C227.2	To provide in-depth knowledge on metallurgical aspects during solidification of metal and alloys, also to provide detailed information about the moulding processes.	
C227.3	To acquaint with the basic knowledge on fundamentals of metal forming processes and also to study various metal forming processes.	
C227.4	To impart knowledge of various joining process used in manufacturing.	
C227.5	To impart knowledge about behavior of materials during welding, and the effect of process parameters in Welding.	

Subject: Universal Human Values

Sub. Code: UHV – BBOK408

After successful completion of this course, the students will be able to;

CO	Description
C228.1	Understand and analyse the essentials of human values and skills, self exploration, happiness and prosperity.
C228.2	Evaluate coexistence of the "I" with the body.
C228.3	Identify and evaluate the role of harmony in family, society and universal order.
C228.4	Understand and associate the holistic perception of harmony at all levels of existence.
C228.5	Develop appropriate technologies and management patterns to create harmony in professional and personal lives.



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Course Outcome AY: 2023-24

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Course Outcomes of all the courses of 3rd semester to 6th semester CBCS 2021 Scheme

III-SEM

Subject: Transform calculus. Fourier series and Numerical techniques	Sub. Code: BSC-21MAT31
Subject. Italistorin calculus, rourier series and rumerical termiques	

After successful completion of this course, the students will be able to;

CO	Description
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation
	arising in network analysis, control systems and other fields of engineering.
C201.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications
C201.2	in system communications, digital signal processing and field theory.
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function
	arising in wave and heat propagation, signals and systems
C201.4	Solve first and second order ordinary differential equations arising in engineering problems
	using single step and multistep numerical methods.
C201.5	Determine the externals of functional using calculus of variations and solve problems arising
	in dynamics of rigid bodies and vibration analysis.

Subject: Metal casting, Forming and Joining Processes

Subject Code: IPCC- 21ME32

After successful completion of this course, the students will be able to;

CO	Description
C202.1	Classify manufacturing process and elaborate the parts of casting process.
C202.2	Summarize the different casting process and select the melting furnace based on ferrous and
	non-ferrous alloys.
C202.3	Understand the classification of various forming process like forging, rolling,
C202.5	extrusion, wire drawing and sheet metal processes.
C202.4	List and explain different types of conventional welding processes like Arc and Gas
	welding processes.
C202.5	Explain different special types of advance welding processes, soldering, brazing and
	adhesive bonding.

Subject: Material Science and Engineering

Subject Code: IPCC-21ME33

CO	Description
C203.1	Understand the atomic arrangement in crystalline materials and describe the periodic
	arrangement of atoms in terms of unit cell parameters.
C203.2	Understand the importance of phase diagrams and the phase transformations.
C203.3	Know various heat treatment methods for controlling the microstructure.
C203.4	Correlate between material properties with component design and identify various kinds of
	defects.
C203.5	Apply the method of materials selection, material data and knowledge sources for computer-
	aided selection of materials.



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Course Outcome

AY: 2023-24

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Subject: Thermodynamics

Subject Code: PCC-21ME34

After successful completion of this course, the students will be able to;

CO	Description
C204.1	Understand basic biological principles and organizational structure of living systems at
	molecular level.
C204.2	Elucidate the basic biological concepts via relevant industrial applications and case studies.
C204.3	Cause, symptoms, diagnosis and treatment of common diseases and evaluate the principles of
	design and development, for exploring novel bioengineering projects.
C204.4	Corroborate the concepts of biomimetics for specific requirements and biological problems
	that requires engineering expertise to solve them.
C204.5	Think critically towards exploring innovative bio based solutions for socially relevant
	problems.

Subject: Machine Drawing and GD & T

Subject Code: PCC-21MEL35

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

CO	Description
C205.1	Interpret the Machining and surface finish symbols on the component drawings.
C205.2	Draw true shape of sections of polyhedrons.
C205.3	Visualize and draw orthographic views of simple machine components, thread forms,
	fasteners, riveted, cotter, knuckle joints and couplings as per BIS.
C205.4	Visualize and prepare models of given detailed parts of machine component and its assembly
	with bill of materials and specifications.

Subject: Introduction to PYTHON

Subject Code: AEC-21ME381

CO	Description
C210.1	Demonstrate proficiency in handling of loops and creation of functions
C210.2	Identify the methods to create and manipulate lists, tuples and dictionaries
C210.3	Discover the commonly used operations involving regular expressions and file system
C210.4	Examine working of PDF and word file formats

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AY: 2023-24

IV-SEM

Subject: Complex Analysis, Probability and Linear Programming. Subject Code: BSC-21ME41 After successful completion of this course, the students will be able to:

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The successful completion of this course, the statemes will be use to,	
CO	Description
C213.1	Use the concepts of an analytic function and complex potentials to solve the problems arising in fluid flow.
C213.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
C213.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in the engineering field.
C213.4	Analyze and solve Linear Programming models of real life situations and solve LPP by the simplex method
C213.5	Learn techniques to solve Transportation and Assignment Problems

Subject: Machining Science and Jigs & Fixtures St

Subject Code: IPCC-21ME42

After successful completion of this course, the students will be able to;

CO	Description
C214.1	Explain the construction & amp; specification of various machine tools.
C214.2	Discuss different cutting tool materials, tool nomenclature & amp; surface finish.
C214.3	Apply mechanics of machining process to evaluate machining time.
C214.4	Understand the concepts of different advanced machining processes
C214.4	Discuss the importance of Jigs and Fixtures

Subject: Fluid Mechanics

Subject Code: IPCC-21ME43

After successful completion of this course, the students will be able to;

CO	Description
C215.1	Understand the basic principles of fluid mechanics and fluid kinematics
C215.2	Acquire the basic knowledge of fluid dynamics and flow measuring instruments
C215.3	Understand the nature of flow and flow over bodies and the dimensionless analysis
C215.4	Acquire the compressible flow fundamental and basics of CFD packages and the need for CFD analysis
C215.5	Conduct basic experiments of fluid mechanics and understand the experimental uncertainties

Subject: Mechanics of Materials

Subject Code: PCC-21ME44

CO	Description
C216.1	Understand simple, compound, thermal stresses and strains their relations and strain energy.
C216.2	Analyze structural members for stresses, strains and deformations.
C216.3	Analyze the structural members subjected to bending and shear loads
C216.4	Analyze shafts subjected to twisting loads.
C216.5	Analyze the short columns for stability.



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AY: 2023-24

Subject: Biology For Engineers

Subject Code: AEC-21BE45

After successful completion of this course, the students will be able to;

CO	Description
C217.1	Understand basic biological principles and organizational structure of living systems at
	molecular level.
C217.2	Elucidate the basic biological concepts via relevant industrial applications and case studies.
C217.3	Cause, symptoms, diagnosis and treatment of common diseases and evaluate the principles of
	design and development, for exploring novel bioengineering projects.
C217.4	Corroborate the concepts of biomimetics for specific requirements and biological problems
	that requires engineering expertise to solve them.
C217.5	Think critically towards exploring innovative biobased solutions for socially relevant
	problems.

Subject: Mechanical Measurements and Metrology Lab Subject Code: PCC -21MEL46

After successful completion of this course, the students will be able to;

CO	Description
C218.1	To calibrate pressure gauge, thermocouple, LVDT, load cell, micrometer.
C218.2	To measure angle using Sine Center/ Sine Bar/ Bevel Protractor, alignment using
	Autocollimator/ Roller set.
C218.3	To demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.
C218.4	To measure cutting tool forces using Lathe/Drill tool dynamometer.
C218.5	To measure Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using
	gear tooth vernier/Gear tooth micrometer
C218.6	To measure surface roughness using Tally Surf/ Mechanical Comparator

Subject: Introduction to AI and ML

Subject Code: AEC-21ME482

СО	Description
C220.1	To familiarize basic principles, and applications of AI
C220.2	To guide the students on generalization as a means to capturing patterns in the data
C220.3	To demonstrate the reasoning to internal representations of knowledge.
C220.4	To make to understand the of challenges in Artificial Intelligence domain
C220.5	To acquaint with the future trends of Artificial Intelligence.

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AY: 2023-24

V-SEM

Subject: Theory of Machines

Subject Code: BSC -21ME51

After successful completion of this course, the students will be able to;

CO	Description
C301.1	Knowledge of mechanisms and their motion and the inversions of mechanisms
C301.2	Analyse the velocity, acceleration of links and joints of mechanisms
C301.3	Analyse the mechanisms for static and dynamic equilibrium.
C301.4	Carry out the balancing of rotating and reciprocating masses and also analyse different types
	of governors used in real life situation.
C301.5	Analyze the free and forced vibration phenomenon.

Subject: Thermo-fluids Engineering

Subject Code: IPCC -21ME52

After successful completion of this course, the students will be able to;

CO	Description
C302.1	Apply the concepts of testing of I. C. Engines and evaluate their performance, and evaluate
	the performance of Reciprocating compressor.
C202.2	Apply and analyse the concepts related to Refrigeration and Air conditioning, and get
C302.2	conversant with Psychrometric Charts, Psychrometric processes, human comfort conditions.
	Explain the construction, classification and working principle of the Turbo machines and
C302.3	apply of Euler's turbine equation to evaluate the energy transfer and other related parameters.
	Compare and evaluate the performance of positive displacement pumps.
C302.4	Classify, explain and analyse the various types of hydraulic turbines and centrifugal pumps.
C302.5	Classify, explain and analyse various types of steam turbines and centrifugal compressor.

Subject: Finite Element Analysis

Subject Code: IPCC -21ME53

After successful completion of this course, the students will be able to;

СО	Description
C303.1	Understand the concepts behind formulation methods in FEM and Choose interpolation polynomial
	equation for simplex elements
C303 2	Develop element characteristic equation and solve the global equation of FEA elements such as bars
C303.2	and trusses.
C303.3	Develop element characteristic equation and solve the global equation of FEA for beams and
	circular shafts
C303.4	Develop element characteristic equation and solve the global equation of FEA for 1D heat transfer
	and fluid flow
C303.5	Develop element characteristic equation and solve the global equation of FEA for axi symmetric and
	dynamic problems

Subject: Modern Mobility and Automotive Mechanics Subject Code: PCC -21ME54

CO	Description
C304.1	To identify the different parts of an automobile and it's working
C304.2	Understand the working of different systems employed in automobile
C304.3	Analyse the limitation of present day automobiles
C304.4	Evaluate the energy sources suitability
C304.5	Apply the knowledge for selection of automobiles based on their suitability

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AY: 2023-24

Subject: Design lab

Subject Code: PCC -21MEL55

After successful completion of this course, the students will be able to;

CO	Description
C205 1	Compute the natural frequency of the free and forced vibration of single degree freedom
C305.1	systems, criticalspeed of shafts.
C305.2	Carry out balancing of rotating masses.
C305.3	Analyse the governor characteristics.
C305.4	Study the effect of gyroscopic couple on plane disc
C305.5	Determine stresses in disk, beams, plates and hook using photo elastic bench
C305.6	Determination of Pressure distribution in Journal bearing
C305.7	Analyze the stress and strains using strain gauges in compression and bending test and
	stress distribution in curved beams.
C305.8	To realize different mechanisms and cam motions

Subject: Research Methodology & Intellectual Property Rights Subject Code: AEC -21RMI56 After successful completion of this course, the students will be able to;

СО	Description
C306.1	To know the meaning of engineering research.
C306.2	To know the procedure of Literature Review and Technical Reading.
C306.3	To know the fundamentals of patent laws and drafting procedure.
C306.4	Understanding the copyright laws and subject matters of copyrights and designs.
C306.5	Understanding the basic principles of design rights.
Subject: Environmental Studies Subject Code: HSMC -21CIV57	
After successful completion of this course, the students will be able to;	
CO	Description
C307.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues
	on a global scale.
C307 2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or

C307.2	question related to the environment.
C307.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.
C307.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.
C307.5	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.

Subject: Basics of MATLAB

Subject Code: AEC -21ME581

СО	Description
C308.1	Able to implement loops, branching, control instruction and functions in MATLAB
	programming environment.
C308.2	Able to program curve fitting, numerical differentiation and integration, solution of linear
	equations in MATLAB and solve electrical engineering problems.
C308.3	Able to understand implementation of ODE using ode 45 and execute Solutions of nonlinear
	equations and DFT in MATLAB.
C308.4	Able to simulate MATLAB Simulink examples

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Academic

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AY: 2023-24

VI-SEM

Subject Code: HSMC -21ME61

Subject:	Production	and	Operations	Management
	- ·			

СО	Description	
C311.1	Apply the necessary tools for decision making in operations management.	
C311.2	Examine various approaches for forecasting the sales demand for an organization.	
C311.3	List various capacity and location plans to determine the suitable capacity required for meeting the forecast demand of an organization	
C311.4	Analyze the aggregate plan and master production schedule for an organization, given its periodic demand.	
C311.5	Apply MRP, purchasing and SCM techniques into practice.	
Subject: Heat TransferSubject Code: IPCC -21ME62		
After successful completion of this course, the students will be able to;		
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CO	Description
C312.1	Solve steady state heat transfer problems in conduction
C312.2	Solve transient heat transfer problems
C312.3	solve convection heat transfer problems using correlations
C312.4	Solve radiation heat transfer problems
C312.5	Explain the mechanisms of boiling and condensation and Determine performance parameters
	of heat exchangers.

Subject: Machine design

Subject Code: PCC -21ME63

After successful completion of this course, the students will be able to;

CO	Description
C313.1	Apply codes and standards in the design of machine elements and select an element based on
	the Manufacturer's catalogue
C313.2	Analyze the performance and failure modes of mechanical components subjected to
	combined loading and fatigue loading using the concepts of theories of failure.
C313.3	Demonstrate the application of engineering design tools to the design of machine components
	like shafts, springs, couplings, fasteners, welded and riveted joints, brakes and clutches
C313.4	Design different types of gears and simple gear boxes for relevant applications.
C313.5	Apply design concepts of hydrodynamic bearings for different applications and select Anti
	friction bearings for different applications using the manufacturers, catalogue.

Subject: Supply Chain Management & Introduction to SAPSubject Code: PEC -21ME641After successful completion of this course, the students will be able to;

The successful completion of this course, the students will be use to,		
CO	Description	
C314.1	Understand the framework and scope of supply chain management.	
C314.2	Build and manage a competitive supply chain using strategies, models, techniques and	
	information technology.	
C314.3	Plan the demand, inventory and supply and optimize supply chain network.	
C314.4	Understand the emerging trends and impact of IT on Supply chain.	
C314.5	Understand the basics of SAP material management system	



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Academic **Course Outcome**

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AY: 2023-24

Accredited at 'A' Grade by NAAC & Programmes Accredited by NBA: CSE & ECE Subject: Project Management

Subject Code: OEC -21ME651

After successful completion of this course, the students will be able to;

CO	Description	
C318.1	Understand the selection, prioritization and initiation of individual projects and strategic role of project management	and a second second
C318.2	Understand the work breakdown structure by integrating it with organization.	
C318.3	Understand the scheduling and uncertainty in projects.	-
C318.4	Understand risk management planning using project quality tools.	1
C318.5	Understand the activities like purchasing, acquisitions, contracting, partnering and collaborations related to performing	Martin
C318.6	Determine project progress and results through balanced scorecard approach	
C318.7	Draw the network diagram to calculate the duration of the project and reduce it using crashing.	
Subject	: CNC Programming and 3-D Printing Lab Subject Code: PCC -21MEL66	-

Subject: CNC Programming and 3-D Printing Lab

After successful completion of this course, the students will be able to;		
CO	Description	
C322.1	Students will have knowledge of G-code and M-code for machining operations.	
C322.2	Perform CNC programming for turning, drilling, milling and threading operation.	
C322.3	Visualize the 3D models using CAD software's	
C322.4	Use 3D printing technology	
C322.5	Understand robotic programming and FMS	

Subject: Mini Project

Subject Code: MP -21MEMP67

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

CO	Description
C323.1	Practice acquired knowledge within the chosen area of technology for project development.
C323.2	Identify the technical aspects of the chosen project
C323.3	Work as an individual or in a team in development of technical projects.
C323.4	Communicate and report effectively project related activities and findings.



Head of the Dept. Mechanical Engg. **HSIT Nidasoshi**

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Hirasugar Institute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

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Course Outcome

AY: 2023-24

Course Outcomes of all the courses of 3rd semester to 8th semester

CBCS 2018 Scheme

III-SEM

Subject: Transform calculus, Fourier series and Numerical techniques Sub. Code: 18MAT31

After successful completion of this course, the students will be able to;

CO	Description
C201.1	Know the use of periodic signals and Fourier series to analyze circuits and system communications.
C201.2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform
C201.3	Employ appropriate numerical methods to solve algebraic and transcendental equations.
C201.4	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
C201.5	Determine the external of functional and solve the simple problems of the calculus of variations.

Subject: Mechanics of Materials

Subject Code: 18ME32

After successful completion of this course, the students will be able to;

СО	Description
C202.1	Appreciate the concepts of stress, strain, Hooks law, evaluation of deformations in axially
	loaded bars, Elastic constants and thermal stresses
C202.2	Determine components of stresses on inclined plane at a point subjected to plane stress system
	by analytically and graphically and stresses induced in pressure vessels.
C202.3	Determine shear forces, bending moments, bending stresses and deflections at all sections of
	beam subjected to transverse load and couples.
C202.4	Determine the dimensions of shafts based on torsional strength, rigidity and flexibility and also
	elastic stability of columns using Euler's and Rankin's theory.
C202.5	Explain the concept of strain energy, Castiglione's theorem, Theories of failures and evaluate
	lateral deflections in beams using strain energy theory.

Subject: Basic Thermodynamics

Subject Code: 18ME33

CO	Description
C203.1	Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary
	of thermodynamic systems.
C203.2	Evaluate the feasibility of cyclic and non-cyclic processes using 2nd law of thermodynamics.
C203.3	Apply the knowledge of entropy, reversibility and irreversibility to solve numerical problems
	and apply 1st law of thermodynamics to closed and open systems and determine quantity of
	energy transfers and change in properties.
C203.4	Interpret the behavior of pure substances and its application in practical problems.
C203.5	Recognize differences between ideal and real gases and evaluate thermodynamic properties of
	ideal and real gas mixtures using various relations.





Mech. Engg. Dept.

Academic

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AY: 2023-24

Subject: Material Science

Subject Code: 18ME34

Inculcating Values, Promoting Prosperity

After successful completion of this course, the students will be able to;

CO	Description
C204.1	Describe the mechanical properties of metals, their alloys and various modes of failure.
C204.2	Understand the microstructures of ferrous and non-ferrous materials to mechanical properties.
C204.3	Explain the processes of heat treatment of various alloys.
C204.4	Understand the properties and potentialities of various materials available and material selection procedures.
C204.5	Understand composite materials and their processing as well as applications.

Subject: Metal casting and welding

Subject Code: 18ME35A/18ME45A

After successful completion of this course, the students will be able to;

CO	Description
C205.1	Classify manufacturing process and elaborate the parts of casting process.
C205.2	Categorize the different casting process and select the melting furnace based on ferrous and
	non-ferrous alloys.
C205.3	Explain the solidification, gasification, casting defects and different methods to achieve
	directional solidification.
C205.4	Understand and make use of different conventional welding processes.
C205.5	Analyze structure of weld and explain soldering, brazing and NDT.

Subject: Machine Tools Operations

Subject Code: 18ME35B/18ME45B

After successful completion of this course, the students will be able to;

CO	Description
C206.1	Classify and demonstrate basic working of all the machine tools.
C206.2	Explain the different types of relative motions in machining process
C206.3	Explain cutting tool materials, tool geometry, and surface finish and make use of machining equations for cutting operations.
C206.4	Analyze the different mechanics of machining process.
C206.5	Appreciate the concept of tool wear, tool life and economics of machining processes with simple numerical

Subject: Computer Aided Machine Drawing

Subject Code: 18ME36A/18ME46A

After successful completion of this course, the students will be able to;

СО	Description
C207.1	Have hands on experience on mechanical modeling software.
C207.2	Draw true shape of sections of polyhedrons.
C207.3	Visualize and draw orthographic views of simple machine components, thread forms,
	fasteners, riveted, cotter, knuckle joints and couplings as per BIS.
C207.4	Visualize and prepare models of given detailed parts of machine component and its assembly
	with bill of materials and specifications.

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Academic

Course Outcome

AY: 2023-24

Subject: Mechanical measurements and metrology Subject Code: 18ME36B/18ME46B

Accredited at 'A+' Grade by NAAC & Programmes Accredited by NBA: CSE &ECE

After successful completion of this course, the students will be able to;

СО	Description
C208.1	Illustrate the principle of operation and calibration of an instrument and Compare
	engineering measuring instruments for a particular application
C208.2	Understand the concepts of limits, fits, tolerance and make use of measuring instruments.
C208.3	Make use of concepts of interferometer and screw thread measurement methods.
C208.4	Explain the concepts of measurement, measurement systems and intermediate modifying
	devices
C208.5	Interpret the working of force, torque, pressure, strain and Temperature measuring devices

Subject: Material Testing Lab

Subject Code: 18MEL37A/18MEL47A

After successful completion of this course, the students will be able to;

СО	Description
C209.1	Demonstrate the applications of metallography and material science.
C209.2	Select the standard experiments to determine the mechanical properties of different materials using UTM, torsion test, fatigue test, hardness test, wear test and impact test.
C209.3	Identify and compare the structure of the materials using metallurgical microscope.
C209.4	Identify the flaws or defects of materials using NDT methods.
C209 .5	Modify the properties of metal specimens by heat treatment processes.

Subject: Mechanical Measurements and Metrology Lab Subject Code: 18MEL37B/47B

After successful completion of this course, the students will be able to;

СО	Description
C210.1	Select the set of combination of slip gauge height based on given dimensions.
C210.2	Calibrate the Thermocouple, Load cell and LVDT to measure physical quantities.
C210.3	Find major and minor diameters using Two or Three wire method and Angle of screw thread using Toolmaker's microscope.
C210.4	Measure slope or angle of the given work piece using Sine bar, Sine center and Bevel protractor.
C210.5	Measure width and height of gear tooth at pitch circle diameter using Gear tooth vernier calipers

Subject: Workshop and Machine Shop PracticeSubject Code: 18MEL38A/18MEL48AAfter successful completion of this course, the students will be able to;

CO	Description
C211.1	Able to prepare fitting models according to drawings using fitting tools
C211.2	Able to carry out any kind of operation on Machine tools (Lathe)
C211.3	Capable of preparing various types of jobs accurately to the given dimensions.
C211.4	Able to perform groove cutting and gear cutting operations.



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Mech. Engg. Dept.

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AY: 2023-24

Subject: Foundry, Forging and Welding lab

Subject Code: 18MEL38B/18MEL48B

After successful completion of this course, the students will be able to;

CO	Description
C212. 1	Demonstrate the applications of basic of Foundry and Forging processes.
C212. 2	Experiment with molding sand to determine tensile, compression and Shear strength of Sand
	Specimen by USTM.
C212. 3	Evaluate the sand properties by conducting permeability, clay content and sieve analysis
	tests.
C212. 4	Apply sand molding process through preparation of moulds using two molding boxes with
	or without patterns.
C212. 5	Determine the length of the raw material required and create the forging models involving
	upsetting, drawing and bending operations.

IV-SEM

Subject: Mathematics

Subject Code: 18MAT41

After successful completion of this course, the students will be able to;

СО	Description
C216.1	Solve first and second order ordinary differential equations by using appropriate numerical methods.
C216.2	Explain the idea of analyticity, potential field's residues and poles of complex potentials in field theory and electromagnetic theory.
C216.3	Solve Engineering problems using complex variable techniques
C216.4	Explain the basic concepts of probability, random variables, probability distribution and joint probability distribution.
C216.5	Analyze and Evaluate scientific hypotheses using rigorous statistical methods.

Subject: Applied thermodynamics

Subject Code: 18ME42

CO	Description
C217.1	Recall thermodynamic concepts to analyze the performance of I C engine and gas power
	cycles including propulsion systems.
C217.2	Analyze Rankine cycle for the improvement in performance of steam power plant.
C217.3	Perform the Combustion analysis of fuels or flue gases and Conduct the performance analysis
C217.5	of I.C. Engines.
C217.4	Compare the working principles and applications of different refrigeration systems and
	evaluate the psychometric properties of air conditioning systems.
C217.5	Explain the thermodynamic analysis of reciprocating air compressors and function of steam
	nozzle.



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Course Outcome AY: 2023-24

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Subject Code: 18ME43

Subject: Fluid Mechanics

After successful completion of this course, the students will be able to;

СО	Description	
C218.1	Define and formulate the properties of fluids, fluid statics and effect of buoyancy.	
C218.2	Interpret and apply the principles of fluid kinematics and dynamics, fluid flow measuring devices.	
C218.3	Formulate the correlations for the different fluid flows and analysis of different losses during the flow.	
C218.4	Analyze the flow over bodies and dimensional analysis.	
C218.5	Understand the basic concepts of compressible flow and CFD.	

Subject: Kinematics of Machines

Subject Code: 18ME44

After successful completion of this course, the students will be able to;

CO	Description	
C219.1	Identify mechanisms with basic understanding of motion.	
C219.2	Comprehend velocity and acceleration analysis of planar mechanisms using graphical method, Instantaneous Center Method and Klein's Construction	
C219.3	Comprehend velocity and acceleration analysis of planar mechanisms using analytical method	
C219.4	Define gear terminology and identify types of gear, law of gearing, interference and examine gear trains for velocity ratio, tooth load and torque by algebraic and tabular column methods.	
C219.5	Carry out motion analysis of cam profiles by analytical and graphical methods.	

V-SEM

Subject: Management and Economics

Subject Code: 18ME51

9	0				
After suc	ccessful completion	of this course,	the students	will be able to;	
CO				Description	

CO	Description
C301.1	Understand needs, functions, roles, scope and evolution of Management
C 301.2	Understand importance, purpose of Planning and hierarchy of planning and also analyze its
	types
C 301.3	Discuss Decision making, Organizing, Staffing, Directing and Controlling
C 301.4	Select the best economic model from various available alternatives
C 301.5	Understand various interest rate methods and implement the suitable one.

Subject: Design of Machine Elements-I

Subject Code: 18ME52

After successful completion of this course, the students will be able to;

СО	Description	
C302.1	Explain phases of design process, mechanical behavior & selection of engineering materials,	
	its codes & standards and stress concentration in machine elements.	
C302.2	Determine the behavior of machine components under impact and fatigue loading.	
C302.3	Design keys, shafts, joints and couplings.	
C302.4	Design of riveted and welded joints.	
C302.5	Design of threaded fasteners and power screws	

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Course Outcome

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AY: 2023-24

Subject: Dynamics of Machines

Subject Code: 18ME53

After successful completion of this course, the students will be able to;

CO	Description
C303.1	Determine the forces and couples for static and dynamic conditions of four bar and slider
	crank mechanisms to keep the system in equilibrium.
C303.2	Determine magnitude and angular position of balancing masses under static and dynamic
	condition of rotating and reciprocating masses in same and different planes.
C303.3	Determine sensitiveness, isochronism, effort and power of porter and hartnell governors.
C303.4	Determine gyroscopic couple and effects related to 2, 4 wheeler, plane disc, ship and aero
	planes.
C303.5	Understand types of vibration, SHM and methods of finding natural frequencies of simple
	mechanical systems.

Subject: Turbo Machines

Subject Code: 18ME54

After successful completion of this course, the students will be able to;

СО	Description
C304.1	Model studies and thermodynamics analysis of turbo machines.
C304.2	Analyze the energy transfer in Turbo machine with degree of reaction and utilization factor.
C304.3	Classify, analyze and understand various type of steam turbine.
C304.4	Classify, analyze and understand various type of hydraulic turbine.
C304.5	Understand the concept of radial power absorbing machine and the problems involved during its operation.

Subject: Fluid Power Engg.

Subject Code: 18ME55

СО	Description
C305.1	Identify and analyze the functional requirements of a fluid power transmission system for a given application
C305.2	Visualize how a hydraulic/pneumatic circuit will work to accomplish the function
C305.3	Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro- hydraulics, electro-pneumatics for a given application.
C305.4	Select and size the different components of the circuit
C305.5	Develop a comprehensive circuit diagram by integrating the components selected for the given application



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AY: 2023-24

Subject: Operations Management

Subject Code: 18ME56

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After successful completion of this course, the students will be able to;

CO	Description
C306.1	Explain the concept and scope of operations management in a business context
C306.2	Recognize the role of Operations management among various business functions and its
	role in the organizations' strategic planning and gaining competitive advantage.
C306 3	Analyze the appropriateness and applicability of a range of operations management
C300.3	systems/models in decision making.
C306.4	Assess a range of strategies for improving the efficiency and effectiveness of
	organizational operations.
C306.5	Evaluate a selection of frameworks used in the design and delivery of operations

Subject: Fluid Mechanics and Machinery lab

Subject Code: 18MEL57

After successful completion of this course, the students will be able to;

СО	Description		
C307.1	Perform experiments to determine the coefficient of discharge of flow measuring		
	devices.		
C307.2	Conduct experiments to measure the loss of head in flow through pipes.		
C307.3	Determine the force exerted by a jet on different geometry vanes		
C307.4	Test basic performance parameters of hydraulic turbines and pumps and execute the		
	knowledge in real life situations.		
C307 5	Conduct the performance of reciproceting Air compressor and Air blower		

C307.5 Conduct the performance of reciprocating Air compressor and

Subject: Energy Conversion Lab

Subject Code: 18MEL58

After successful completion of this course, the students will be able to;

CO	Description	
C308.1	Perform experiments to determine the properties of fuels and oils.	
C308.2	Conduct experiments on engines and draw characteristics.	
C308.3	Test basic performance parameters and the energy flow pattern of I.C. Engine and	
	implement the knowledge in industry.	
C308.4	Estimate exhaust emission, factors affecting them and report the remedies.	
C308.5	Exhibit his competency towards preventive maintenance of IC engines	

Subject: Environmental Studies

Subject Code: 18CIV59

After successful completion of this course, the students will be able to;

CO	Description	
C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and	
	water issues on a global scale.	
C300 2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem	
C309.2	or question related to the environment.	
C200.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic	
C309.3	components.	
C309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities	
	that managers face when dealing with complex issues.	
C309.5	Understand the principles of ecology and environmental issues that apply to air, land, and	
	water issues on a global scale.	

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VI-SEM

Subject Code: 18ME61

After successful completion of this course, the students will be able to;

CO	Description
$C_{210,1}$	Understand the concepts behind formulation methods in FEM and Choose interpolation
C310.1	polynomial equation for simplex elements
C310.2	Develop element characteristic equation and solve the global equation of FEA elements such
	as bars and trusses.
$C^{210.2}$	Develop element characteristic equation and solve the global equation of FEA for beams and
C310.5	circular shafts
C310.4	Develop element characteristic equation and solve the global equation of FEA for 1D heat
	transfer and fluid flow
C310.5	Develop element characteristic equation and solve the global equation of FEA for axis
	symmetric and dynamic problems

Subject: Design of Machine Element-II

Subject: Finite Element Analysis

After successful completion of this course, the students will be able to;

CO	Description
C311.1	Design and analyze behaviour of stresses in curved beams and compound cylinders.
C311.2	Design belts, wire ropes and chain drives & springs for Mechanical systems
C311.3	Design different types of gears and simple gear boxes for different applications.
C311.4	Design brakes and clutches
C311.5	Select suitable lubricants and analyze performance of hydrodynamic, hydrostatic and
	antifriction bearings.

Subject: Heat Transfer

After successful completion of this course, the students will be able to;

CO	Description	
C312.1	Understand the modes of heat transfer and apply the basic laws to formulate engineering	
	systems.	
C312.2	Understand and apply the basic laws of heat transfer to extended surface, composite	
	material and unsteady state heat transfer problems.	
C312.3	Analyze heat conduction through numerical methods and apply the fundamental principle to	
	solve radiation heat transfer problems.	
C312.4	Analyze heat transfer due to free and forced convective heat transfer.	
C312.5	Understand the design and performance analysis of heat exchangers and their practical	
	applications, Condensation and Boiling phenomena.	



Mech. Engg. Dept.

Course Outcome

Subject Code: 18ME62

Subject Code: 18ME63



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Approved by AICTE, New Delhi, Permanently Affiliated to VTU, Belagavi

AY: 2023-24

Subject: Non Traditional Machining

Subject Code: 18ME641

After successful completion of this course, the students will be able to;

СО	Description
C313.1	Understand and compare traditional and non-traditional machining process and recognize
	the need for Non-traditional machining process.
C313.2	Understand the constructional features, performance parameters, process characteristics,
	applications, advantages and limitations of USM, AJM and WJM.
C313.3	Understand chemical and electro-chemical machining process along with the
	constructional features, process parameters, process characteristics, applications,
	advantages and limitations.
C313.4	Understand the constructional feature of the equipment, process parameters, process
	characteristics, applications, advantages and limitations EDM & PAM.
C313.5	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment
	and mechanism of metal removal, applications, advantages and limitations LBM & EBM.

SUB: PLC & SCADA

Sub Code: 18EE652

After successful completion of this course, the students will be able to;

СО	Description
C319.1	Summarize the history, features, hardware, memory organization and basic programming
	with respect to PLC.
C319.2	Explain basic relay instruction operation and converting narrative expression to Ladder
	Diagrams.
C319.3	Explain Timer Instructions in PLC and I am able to describe Counter Instructions and
	Program Control Instructions of PLC.
C319.4	Discuss the execution of data transfer instructions, data compare instructions, arithmetic
	instructions and the basic operation of PLC closed-loop control system.
C319.5	Describe sequencer, bit shift register and SCADA in conjunction with PLC.

Subject: PROGRAMMING IN JAVA

Subject Code: 18CS653

СО	Description
C320.1	Explain the object-oriented concepts and JAVA.
C320.2	Develop computer programs to solve real world problems in Java.
C320.3	Develop simple GUI interfaces for a computer program to interact with users.



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Course Outcome

AY: 2023-24

SUB: Computer Aided Modeling and Analysis Lab

Sub Code: 18MEL66

Inculcating Values, Promoting Prosperity

After successful completion of this course, the students will be able to;

CO	Description	
C323.1	Demonstrate the basic features of an analysis package.	
C323.2	Use the modern tools to formulate the problem, and able to create geometry, descritize, apply boundary condition to solve problems of bars, truss, beams, plate to find stress with different loading conditions.	
C323.3	Demonstrate the deflection of beams subjected to point, uniformly distributed and varying loads further to use the available results to draw shear force and bending moment diagrams.	
C323.4	Analyze the given problem by applying basic principle to solve and demonstrate 1D and 2D heat transfer with conduction and convection boundary conditions.	
C323.5	Carry out dynamic analysis and finding natural frequencies for various boundary conditions and also analyze with forcing function.	

SUB: Heat Transfer Lab

Sub Code: 18MEL67

After successful completion of this course, the students will be able to;

CO	Description	
C324.1	Perform experiments to determine the thermal conductivity of a metal rod	
C324.2	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.	
C324.3	Estimate the effectiveness and efficiency in pin-fin	
C324.4	Determine the emissivity of the given test plate and Prove Stefan Boltzmann law of radiation.	
C324.5	Conduct and measure the overall heat transfer coefficient, effectiveness of parallel and counter flow heat exchangers.	
C324.6	Estimate the heat transfer coefficient for film wise and drop wise condensation processes.	
C324.7	Demonstrate the working of Refrigeration and Air-conditioning system.	
C324.8	Calculate temperature distribution of study and transient heat conduction through plane wall, cylinder and fin using numerical approach.	

SUB: Mini-Project

Sub Code: 18MEMP68

СО	Description				
C325.1	Practice acquired knowledge within the chosen area of technology for project				
	development.				
C325.2	Identify the technical aspects of the chosen project				
C325.3	Work as an individual or in a team in development of technical projects.				
C325.4	Communicate and report effectively project related activities and findings.				

SUB: Total Quality Management

After successful completion of this course, the students will be able to;

CO	Description
C406.1	Explain the various approaches of TQM and QMS.
C406.2	Identify the role of leader & leadership styles which helps for their future.
C406.3	Explain the methods to satisfy the customer, employee involvement and motivation techniques.
C406.4	Apply statistical tools for continuous improvement of quality systems
C406.5	Apply the tools and technique for effective implementation of TQM

VII-SEM

After successfu	l completion	of this course.	, the students	will be able to;
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СО	Description
C401.1	Recognize control system and its types, control action, and determine the system governing
	equations for physical models (Electrical, Thermal, Mechanical, Electro Mechanical).
C401.2	Estimate the response and error in response of first and second order systems subjected
	standard input signals.
C401.3	Calculate the gain of the system using block diagram and signal flow graph for a given
	application.
C401.4	Analyze a linear feedback control system for stability using Routh"s criterion and root Locus
	technique in complex domain.
C401.5	Analyze the stability of linear feedback control systems in frequency domain using polar plots, Nyquist
	and Bode plots.

Subject: Computer Aided Design and Manufacturing

After successful completion of this course, the students will be able to;

CO	Description
C402.1	Define Automation, CIM, CAD, CAM and explain the differences between these concepts.
	And Explain the basics of automated manufacturing industries through mathematical models
	and analyze different types of automated flow lines
C402.2	Solve simple problems of transformations of entities on computer screen and Categorize
C402.2	CAPP, MRP, PPC and CRP in Manufacturing system
C402.3	Understand the overall FMS and Solve the manual assembly line balancing problem
C402.4	Explain the use of different computer applications in manufacturing, and prepare part
	programs for simple jobs on CNC machine tools and robot programming.
C402.5	Visualize and appreciate the modern trends in Manufacturing like additive manufacturing,
	Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing

Subject: Control Engineering

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Mech. Engg. Dept.

Course Outcome

AY: 2023-24



Subject Code: 18ME71

Subject Code: 18ME72

Sub Code: 18ME734



Mech. Engg. Dept.

Academic Course Outcome

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AY: 2023-24

Subject: Mechatronics

Subject Code: 18ME754

After successful completion of this course, the students will be able to;

CO	Description
C411.1	Explain the basics of theory, operation, design and application of sensors and actuators.
C411.2	Explain the basics of architecture, programming and application of microcontrollers and
	microprocessors.
C411.3	Explain the PLC, basic structure, principle of operations and integration of different elements
C411.4	Apply knowledge of mechanical & electrical actuation systems.
C411.5	Explain the pneumatic and hydraulic actuation system

Subject: CIM LAB

Subject Code: 18MEL76

After successful completion of this course, the students will be able to;

CO	Course Outcome
C417. 1	Appreciate NC & CNC machines & its practical use in industry.
C417. 2	Distinguish between absolute & incremental coordinate system.
C417. 3	Make use of computer assisted part programming software to perform milling, drilling and
	turning operations in design, simulation and manufacturing.
C417. 4	Write manual part programs for milling, turning operations.
C417. 5	Explain what is FMS & ASRS
C417. 6	Develop the robot program by using basic commands.
C417.7	Read and explain Hydraulics & Pneumatic circuits.

Subject: Design Lab

Subject Code: 18MEL77

СО	Description
C418.1	To understand the working principles of machine elements such as Governors, Gyroscopes
	etc
C418.2	To identify forces and couples in rotating mechanical system components
C418.3	To identify vibrations in machine elements and design appropriate damping methods and to
	determine the critical speed of a rotating shaft
C418.4	To measure strain in various machine elements using strain gauges
C418.5	To determine the minimum film thickness, load carrying capacity, frictional torque and
	pressure distribution of journal bearing



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Mech. Engg. Dept.

Academic

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Course Outcome AY: 2023-24

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VIII-SEM

Subject: Energy Engineering

Subject Code: 18ME81

After successful completion of this course, the students will be able to;

CO	Course Outcome
C420.1	Understand the construction and working of steam generators and their accessories.
C420.2	Identify solar and biomass renewable energy sources and their utilization.
C420.3	Understand principles of energy conversion from alternate sources including wind, geothermal and tidal.
C420.4	Understand principles of energy conversion from alternate sources including Ocean and hydel.
C420.5	Understand principles of energy conversion from Nuclear energy source.

Subject: Automobile Engineering

Subject Code: 18ME824

After successful completion of this course, the students will be able to;

CO	Course Outcome
C424.1	To identify the different parts of an automobile and it's working
C424.2	To understand the working of transmission and braking systems
C424.3	To comprehend the working of steering and suspension systems
C424.4	To learn various types of fuels and injection systems
C424.5	To know the cause of automobile emission, its effects on environment and methods to reduce the emissions.



Head of the Dept. Mechanical Engg. **HSIT Nidasoshi**

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Course Outcomes

2023-24

Course Outcomes of all the courses from 3rd Semester to 4th Semester

Subject: Transform Calculus, Fourier Series and Numerical Techniques Sub Code: BECMAT301

After successful completion of this course, the students will be able to;

CO	Description
C201.1	Demonstrate the Fourier series to study the behavior of periodic functions and their applications
	in system communications, digital signal processing, and field theory.
C201.2	To use Fourier transforms to analyze problems involving continuous-time signals
C201.3	To apply Z-Transform techniques to solve difference equations
C201.4	Understand that physical systems can be described by differential equations and solve such
	equations
C201.5	Make use of correlation and regression analysis to fit a suitable mathematical model for
	statistical data

Subject: Digital System Design Using Verilog

Sub Code: BEC302

After successful completion of this course, the students will be able to;

СО	Description
C202.1	Simplify Boolean functions using K-map & Quine-McCluskey minimization technique.
C202.2	Analyze and design for combinational logic circuits.
C202.3	Analyze the concepts of Flip Flops (SR, D, T & JK) and design the synchronous sequential
	circuits using flip flops.
C202.4	Model Combinational circuits (adders, subtractors, multiplexers) and sequential circuits using
	Verilog data flow descriptions.
C202.5	Model Combinational circuits (adders, subtractors, multiplexers) and sequential circuits using
	Verilog behavioral and structural descriptions.

Subject: Digital System Design Using Verilog Lab

Sub Code: BEC302

After successful completion of this course, the students will be able to;

СО	Description
C202.1	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow,
	Behavioral and Gate level Abstractions.
C202.2	Describe sequential circuits like flip flops and counters in Behavioral description and obtain
C202.2	simulation waveforms.
C202.3	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.
C202.4	Interface the hardware to the programmable chips and obtain the required output.
C202.5	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow,
	Behavioral and Gate level Abstractions.

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Course Outcomes

2023-24

Subject: Electronic Principles and Circuits

Sub Code: BEC303

After successful completion of this course, the students will be able to;

CO	Description
C203.1	Understand the characteristics of BJTs and FETs for switching and amplifier circuits.
C203.2	Design and analyze amplifiers and oscillators with different circuit configurations and biasing conditions.
C203.3	Understand the feedback topologies and approximations in the design of amplifiers and oscillators.
C203.4	Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters and timers.
C203.5	Understand the power electronic device components and its functions for basic power electronic circuits.

Subject: Network Analysis

Sub Code: BEC304

After successful completion of this course, the students will be able to;

CO	Description
C204.1	Determine currents and voltages using source transformation/source shifting/mesh/nodal
	analysis and reduce given network using star delta transformation/source transformation /
	source shifting.
C204.2	Solve network problems by applying superposition/Reciprocity/Thevenin's
	Norton's/Maximum power transfer/Milliman's network theorems and electrical laws to reduce
	circuit complexities and to arrive at feasible solutions.
C204.3	Calculate current and voltage for the given circuit under transient conditions.
C204.4	Apply Laplace transform to solve the given network.
C204.5	Determine currents and voltages using source transformation/source shifting/mesh/nodal
020.00	analysis and reduce given network using star delta transformation/source transformation /
	source shifting.

Subject: Analog and Digital Systems Design Lab

Sub Code: BECL305

After successful completion of this course, the students will be able to;

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CO	Description	
C205.1	Design and analyze the BJT/FET amplifier and oscillator circuits.	
C205.2	Design and test Op-amp circuits to realize the mathematical computations, DAC and precision rectifiers.	
C205.3	Design and test the combinational logic circuits for the given specifications.	
C205.4	Test the sequential logic circuits for the given functionality.	
C205.5	Demonstrate the basic circuit experiments using 555 timers.	

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NAAC

Course Outcomes

2023-24

Subject: Sensors and Instrumentation

Sub Code: BEC306B

After successful completion of this course, the students will be able to;

CO	Description
C205.1	Design and analyze the BJT/FET amplifier and oscillator circuits.
C205.2	Design and test Op-amp circuits to realize the mathematical computations, DAC and precision rectifiers.
C205.3	Design and test the combinational logic circuits for the given specifications.
C205.4	Test the sequential logic circuits for the given functionality.
C205.5	Demonstrate the basic circuit experiments using 555 timers.

Subject: MATLab Programming

Sub Code: BECL358B

After successful completion of this course, the students will be able to;

СО	Description
C207.1	Understand the syntax of MATLAB for arithmetic computations, arrays, matrices. for the
G207.2	
C207.2	Understand the built in function, saving and loading data, and create plots
	corrupted bandlimited channels.
C207.3	Create program using symbolic computations, Importing and exporting data and files
C207.4	Create program using character strings, Command line functions and Built-in functions.
C207.5	Understand the syntax of MATLAB for arithmetic computations, arrays, matrices. for the
	given specifications

Subject: Electromagnetic Theory

Sub code: BEC401

СО	Description
C216.1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by
	applying conventional methods and charge in a volume.
C216.2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume
021002	Charge distribution by using Divergence Theorem.
C216.3	Determine potential and energy with respect to point charge and capacitance using Laplace
	equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for
	different current configurations
C216.4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic
	materials and voltage induced in electric circuits.
C216 5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors
021000	and Evaluate power associated with EM waves using Poynting theorem.



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ECE Dept.

Course Outcomes

2023-24

Subject: Principles of Communication Systems

Sub Code: BEC402

After successful completion of this course, the students will be able to;

CO	Description
C217.1	Understand the principles of analog communication systems and noise modelling.
C217.2	Identify the schemes for analog modulation and demodulation and compare their performance.
C217.3	Design of PCM systems through the processes sampling, quantization and encoding.
C217.4	Describe the ideal condition, practical considerations of the signal representation for baseband transmission of digital signals.
C217.5	Identify and associate the random variables and random process in Communication system design.

Subject: Control Systems

Sub Code: BEC403

After successful completion of this course, the students will be able to;

СО	Description
C218.1	Deduce transfer function of a given physical system, from differential equation representation
	or Block Diagram representation and SFG representation.
C218.2	Calculate time response specifications and analyze the stability of the system.
C218.3	Draw and analyze the effect of gain on system behavior using root loci.
C218.4	Perform frequency response Analysis and find the stability of the system. Root-locus
	technique.
C218.5	Represent State model of the system and find the time response of the system.

Subject: 8051 MICROCONTROLLER

Sub Code: BEC405A

CO	Description
C220.1	Write the differences between microcontroller and microprocessor.
C220.2	Write 8051 Assembly level programs using instruction set.
C220.3	Explain interfacing of 8051 with LEDs to I/O ports to switch on/off LED with respect to switch status.
C220.4	Write a Assembly language program to generate timings and waveforms using 8051 timers, to send & receive serial data using port.
C220.5	Explain 8051 Assembly language programming to generate an external interrupt and interfacing 8051 to ADC -0804.



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ECE Dept.

Course Outcomes

2023-24

Subject: Biology for Engineers

Sub Code: BBOK407

After successful completion of this course, the students will be able to;

СО	Description
C228.1	To familiarize the students with the basic biological concepts and their engineering
	applications.
C228.2	To enable the students with an understanding of biodesign principles to create novel devices
	and structures.
C228.3	To provide the students an appreciation of how biological systems can be re-designed as
	substitute products for natural systems.
C228.4	To motivate the students to develop interdisciplinary vision of biological engineering.

Subject: Universal Human Values

Sub Code: BUHK408

СО	Description
C229.1	Ethical human conduct
C229.2	Socially responsible behavior
C229.3	Holistic vision of life
C229.4	Environmentally responsible work
C229.5	Having Competence and Capabilities for Maintaining Health and Hygiene



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Course Outcomes

2023-24

Course Outcomes of all the courses from 3rd Semester to 8th Semester

Subject: Transform Calculus, Fourier Series and Numerical Techniques Sub Code: 21MAT31

After successful completion of this course, the students will be able to;

СО	Description
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral
	equation arising in network analysis, control systems and other fields of engineering.
C201.2	Demonstrate the Fourier series to study the behavior of periodic functions and their
	applications in system communications, digital signal processing and field theory.
C201.3	To use Fourier transforms to analyze problems involving continuous-time signals and to
	apply Z-Transform techniques to solve difference equations
C201.4	To solve mathematical models represented by initial or boundary value problems
	involving partial differential equations
C201.5	Determine the externals of functional using calculus of variations and solve problems
	arising in dynamics of rigid bodies and vibration analysis.

Subject: Digital System Design Using Verilog

Sub Code: 21EC32

After successful completion of this course, the students will be able to;

СО	Description
C202.1	Simplify Boolean functions using K-map & Quine-McCluskey minimization
	technique.
C202.2	Analyze and design MSI Components.
C202.3	Analyze the concepts of Flip Flops (SR, D, T & JK) and design the synchronous
	sequential circuits using flip flops.
C202.4	Understand the concept of verilog data flow description.
C202.5	Describe the verilog behavioral & structural description.

Subject: Basic Signal Processing

Sub Code: 21EC33

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CO	Description	
C203.1	Understand the basics of Linear Algebra	
C203.2	Analyze different types of signals and systems	
C203.3	Analyze the properties of discrete time signals & systems	
C203.4	Analyze discrete time signals & systems using Z transforms	



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Course Outcomes

2023-24

Subject: Analog Electronic Circuits

Sub Code: 21EC34

After successful completion of this course, the students will be able to;

СО	Description
C204.1	Understand the characteristics of BJT sand FETs for switching and amplifier circuits.
C204.2	Design and analyze FET amplifiers and oscillators with different circuit configurations and biasing conditions.
C204.3	Understand the feedback topologies and approximations in the design of amplifiers and oscillators
C204.4	Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters and timers.
C204.5	Understand the power electronic device components and its functions for basic power electronic circuits.

Subject: Analog and Digital Electronics Lab

Sub Code: 21EC35

After successful completion of this course, the students will be able to;

CO	Description
C205.1	Design and analyze the BJT/FET amplifier and oscillator circuits.
C205.2	Design and test Op-amp circuits to realize the mathematical computations,
	DAC and precision rectifiers.
C205.3	Design and test the combinational logic circuits for the given specifications.
C205.4	Test the sequential logic circuits for the given functionality.
C205.5	Demonstrate the basic circuit experiments using 555 timers.

Subject:Linear Integrated Circuits Lab using Pspice/MultiSIM Sub Code: 21EC383

CO	Description
C206.1	Sketch/draw circuit schematics, construct circuits, analyze and troubleshoot circuits containing op-amps, resistors, diodes, capacitors and independent sources.
C206.2	Relate to the manufacturer's data sheets of IC 555 timer and IC µa741 op-amp.
C206.3	Realize and verify the operation of analog integrated circuits like Amplifiers, Precision Rectifiers, Comparators and Waveform generators.
C206.4	Design and implement analog integrated circuits like Oscillators, Active filters, Timer circuits, Data converters and compare the experimental results with theoretical
	values.



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Course Outcomes

2023-24

Subject: Complex Analysis, Probability and Statistical Methods Sub code:21MAT41

After successful completion of this course, the students will be able to;

CO	Description	
C207.1	Use the concepts of an analytic function and complex potentials to solve the problems	
	arising in electromagnetic field theory. Utilize conformal transformation and complex	
	integral arising in aerofoil theory, fluid flow visualization and image processing.	
C207.2	Obtain Series Solutions of Ordinary Differential Equation.	
C207.3	Make use of the correlation and regression analysis to fit a suitable mathematical	
	model for the statistical data.	
C207.4	Apply discrete and continuous probability distributions in analyzing the probability	
	models arising in the engineering field.	
C207.5	Construct joint probability distributions and demonstrate the validity of testing the	
	hypothesis.	

Subject: Digital Signal Processing

Sub Code: 21EC42

After successful completion of this course, the students will be able to;

CO	Description
C208.1	Determine response of LTI systems using time domain and DFT techniques
C208.2	Compute DFT of real and complex discrete time signals.
C208.3	Compute DFT using FFT algorithms.
C208.4	Design FIR and IIR Digital Filters.
C208.5	Computation of signal processing operations using DSP processor.

Subject: Circuits and Controls

Sub Code: 21EC43

CO	Description	
C209.1	Analyze and solve Electric circuit, by applying, loop analysis, Nodal analysis and by applying network Theorems.	
C209.2	Evaluate two port parameters of a network and Apply Laplace transforms to solve electric networks.	
C209.3	Deduce transfer function of a given physical system, from differential equation representation or Block Diagram representation and SFG representation.	
C209.4	Calculate time response specifications and analyze the stability of the system.	
C209.5	Draw and analyze the effect of gain on system behavior using time response, frequency response methods And time response of system by state model approach.	



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Course Outcomes

2023-24

Subject: Communication Theory

Sub Code: 21EC44

After successful completion of this course, the students will be able to;

CO	Description
C210.1	Understand the amplitude & frequency modulation techniques and perform time and
	frequency domain transformations.
C210.2	Identify the schemes for amplitude and frequency modulation & demodulation of
	analog signals and compare the performance.
C210.3	Characterize the influence of channel noise on analog modulated signals.
C210.4	Understand the characteristics of pulse amplitude modulation, pulse position
	modulation and pulse code modulation systems.
C210.5	Illustration of digital formatting representations used for Multiplexers, Vocoders and
	Video transmission.

Subject: Biology for Engineers

Sub Code: 21BE45

After successful completion of this course, the students will be able to;

CO		Description
C211.1	Elucidate studies.	he basic biological concepts via relevant industrial applications and case
C211.2	Evaluate th projects.	e principles of design and development, for exploring novel bioengineering
C211.3	Corroborat	e the concepts of biomimetics for specific requirements.
C211.4	Think criti problems.	cally towards exploring innovative biobased solutions for socially relevant

Subject: Communication Laboratory I

Sub Code: 21EC46

CO	Description
C212.1	Demonstrate the AM and FM modulation and demodulation by representing the signals in time and frequency domain.
C212.2	Design and test the sampling, Multiplexing and PAM with relevant circuits.
C212.3	Demonstrate the basic circuitry and operations used in AM and FM receivers.
C212.4	Illustrate the operation of PCM and delta modulations for different input conditions
C212.5	Demonstrate the AM and FM modulation and demodulation by representing the signals in time and frequencydomain.



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Course Outcomes

2023-24

Subject: Constitution Of India, Professional Ethics

Sub Code: 21CIP47

Sub Code: 21EC481

After successful completion of this course, the students will be able to;

CO	Description
C213.1	Analyze the basic structure of Indian Constitution
C213.2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our
	constitution.
C213.3	know about our Union Government, political structure & codes, procedures.
C213.4	Understand our State Executive & Elections system of India.
C213.5	Remember the Amendments and Emergency Provisions, other important provisions
	given by the constitution.

Subject: Embedded C Basics Lab

After successful completion of this course, the students will be able to;

СО	Description
C214.1	Write C programs in 8051 for solving simple problems that manipulate input data
	using different instructions of 8051 C
C214.2	Develop testing and experimental procedures on 8051 Microcontroller, analyze their
	operation under different cases.
C214.3	Develop programs for 8051 Microcontroller to implement real world problems
C214.4	Design and Develop Mini projects
C214.5	Write C programs in 8051 for solving simple problems that manipulate input data
	using different instructions of 8051C

Subject: Universal Human Values

Sub Code: 21ECL49

CO	Description
C215.1	Holistic vision of life
C215.2	Socially responsible behavior
C215.3	Environmentally responsible work
C215.4	Ethical human conduct
C215.5	Having Competence and Capabilities for Maintaining Health and Hygiene


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Course Outcomes

2023-24

Subject: Digital Communication

Sub Code: 21EC51

After successful completion of this course, the students will be able to;

CO	Description
C301.1	Analyze different digital modulation techniques and choose the appropriate modulation
	technique for the given specifications
C301.2	Test and validate symbol processing and performance parameters at the receiver under ideal
	and corrupted band limited channels.
C301.3	Differentiate various spread spectrum schemes and compute the performance parameters of
	communication system.
C301.4	Apply the fundamentals of information theory and perform source coding for given message
C301.5	Apply different encoding and decoding techniques with error Detection and Correction.

Subject: Computer Originations & ARM Microcontrollers

Sub Code: 21EC52

After successful completion of this course, the students will be able to;

СО	Description
C302.1	Explain the basic organization of a computer system.
C302.2	Demonstrate functioning of different sub systems, such as processor, Input/output, and
	memory.
C302.3	Describe the architectural features and instructions of 32-bit microcontroller ARM Cortex
	M3.
C302.4	Apply the knowledge gained for Programming ARM Cortex M3 for different applications.

Subject: Computer Networks

Sub Code: 21EC53

CO	Description
C303.1	Understand the concepts of networking thoroughly
C303.2	Identify the protocols and services of different layers.
C303.3	Distinguish the basic network configurations and standards associated with each network
C303.4	Understand the concepts of TCP/IP protocol suite.
C303.5	Discuss and analyze the various applications that can be implemented on networks



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Course Outcomes

2023-24

Subject: Electromagnetic waves

Sub Code: 21EC54

After successful completion of this course, the students will be able to;

CO	Description
C304.1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume
C304.2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem
C304.3	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations
C304.4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits
C304.5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem

Subject: Communication Lab II

Sub Code: 21ECL55

After successful completion of this course, the students will be able to;

CO	Description
C305.1	Design and test the digital modulation circuits and display the waveforms.
C305.2	To Implement the source coding algorithm using C/C++/ MATLAB code.
C305.3	To Implement the Error Control coding algorithms using C/C++/ MATLAB code.
C305.4	Illustrate the operations of networking concepts and protocols using C programming and network simulators.

Subject: Research Methodology & Intellectual Property Rights

Sub Code: 21EC56

CO	Description
C306.1	To know the meaning of engineering research
C306.2	To know the procedure of Literature Review and Technical Reading.
C306.3	To know the fundamentals of patent laws and drafting procedure.
C306.4	Understanding the copyright laws and subject matters of copyrights and designs
C306.5	Understanding the basic principles of design rights .



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NAAC

Course Outcomes

2023-24

Subject: Environmental Studies

Sub Code: 21CIV57

After successful completion of this course, the students will be able to;

CO	Description
C307.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues
	on a global scale.
C307.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or
	question related to the environment.
C307.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.
C307.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that
	managers face when dealing with complex issues.

Subject: IoT (Internet of Things) Lab

Sub Code: 21EC581

After successful completion of this course, the students will be able to;

CO	Description
C308.1	Understand internet of Things and its hardware and software components
C308.2	Interface I/O devices, sensors & communication modules
C308.3	Remotely monitor data and control devices
C308.4	Develop real life IoT based projects

Subject: Technological Innovation Management and Entrepreneurship Sub Code: 21EC61

СО	Description
C310.1	Understand the fundamental concepts of Management and its functions
C310.2	Understand the different functions to be performed by managers/Entrepreneur.
C310.3	Understand the social responsibilities of a Business.
C310.4	Understand the Concepts of Entrepreneurship and to identify Business opportunities.
C310.5	Understand the components in developing a business plan and awareness about various sources of funding and Institutions supporting Entrepreneur.

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ECE Dept.

Course Outcomes

2023-24

Subject: Microwave Theory And Antennas

Sub Code: 21EC62

Sub Code: 21EC63

After successful completion of this course, the students will be able to;

CO	Description
C311.1	Describe the use and advantages of microwave transmission.
C311.2	Analyze various parameters related to transmission lines.
C311.3	Identify microwave devices for several applications.
C311.4	Analyze various antenna parameters and their significance in building the RF system
C311.5	Identify various antenna configurations for suitable applications.

Subject: VLSI Design & Testing

After successful completion of this course, the students will be able to;

CO	Description
C312.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology
	scaling
C312.2	Draw the basic gates using the stick and layout diagram with the knowledge of physical design
	aspects
C312.3	Interpret memory elements along with timing considerations
C312.4	Interpret testing and testability issues in combinational logic design.
C312.5	Interpret testing and testability issues in sequential logic design.

Subject: Artificial Neural Networks

Sub Code: 21EC641

After successful completion of this course, the students will be able to;

The successful completion of this course, the students will be use to,	
CO	Description
C313.1	Compare and contrast the biological neural network and ANN.
C313.2	Discuss the ANN for pattern classification.compare their performance.
C313.3	Develop and configure ANN's with different types of functions and learning algorithms.
C313.4	Apply ANN for real world problems.

Subject: Project Management

Sub Code: 21MEC651

After successful completion of this course, the students will be able to;

CO	Description
C314.1	Understand the selection, prioritization and initiation of individual projects and strategic
	role of project management.
C314.2	Understand the work breakdown structure by integrating it with organization also the
	scheduling and uncertainty in projects
C314.3	Understand risk management planning using project quality tools also the activities like
	purchasing, acquisitions, contracting, partnering and collaborations related to performing
	projects
C314.4	Determine project progress and results through balanced score card approach
C314.5	Draw the network diagram to calculate the duration of the project and reduce it using
	crashing

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ECE Dept.

Course Outcomes

2023-24

Subject: Programming In Java

Sub Code: 21EC654

After successful completion of this course, the students will be able to;

CO	Description
C320.1	Develop JAVA programs using OOP principles and proper program structuring.
C320.2	Develop JAVA program using packages, inheritance and interface.
C320.3	Develop JAVA programs to implement error handling techniques using exception handling.
C320.4	Demonstrate string handling concepts using JAVA.
C320.5	Develop JAVA programs using OOP principles and proper program structuring.

Subject: VLSI Lab

Sub Code: 21ECL66

After successful completion of this course, the students will be able to;

CO	Description
C324.1	Design and simulate combinational and sequential digital circuits using Verilog HDL
C324.2	Understand the Synthesis process of digital circuits using EDA tool
C324.3	Perform ASIC design flow and understand the process of synthesis, synthesis
	constraints and evaluating the synthesis reports to obtain optimum gate level net list
C324.4	Design and simulate basic CMOS circuits like inverter, common source amplifier
	and differential amplifiers. amplifiers
C324.5	Perform RTL-GDSII flow and understand the stages in ASIC design

2018 Scheme

Subject: Computer Networks

Sub Code: 18EC71

After successful completion of this course, the students will be able to;

CO	Description
C401.1	Understand the concepts of networking thoroughly
C401.2	Describe various networking architectures
C401.3	Identify the protocols and services of different layers.
C401.4	Distinguish the basic network configurations and standards associated with each network
C401.5	Analyze a simple network and measurement of its parameters.

Subject: VLSI Design

Sub Code: 18EC72



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NAAC

Course Outcomes

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After successful completion of this course, the students will be able to;

CO	Description
C402.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and
	technology scaling.
C402.2	Draw the basic gates using the stick and layout diagrams with the knowledge of
	physical design aspects.
C402.3	Demonstrate ability to design Combinational, sequential and dynamic logic circuits as
	per the requirements
C402.4	Interpret Memory elements along with timing considerations.
C402.5	Interpret testing and testability issues in VLSI Design

Subject: Digital Image Processing

Sub Code: 18EC733

After successful completion of this course, the students will be able to;

CO	Description
C403.1	Understand image formation and the role human visual system plays in perception of
	gray and color image data.
C403.2	Apply image processing techniques in spatial domain.
C403.3	Apply image processing techniques in frequency domain
C403.4	Conduct independent study and analysis of Image Enhancement and restoration
	techniques.
C403.5	Design and evaluate image analysis techniques

Subject: Machine Learning with Python

Sub Code: 18EC745

After successful completion of this course, the students will be able to;

CO	Description
C404.1	Identify the problems in machine learning.
C404.2	Select supervised, unsupervised or reinforcement learning for problem solving.
C404.3	Apply theory of probability and statistics in machine learning
C404.4	Apply concept learning, ANN, Bayes classifier, k nearest neighbour
C404.5	Perform statistical analysis of machine learning techniques.

Subject: Energy And Environment

Sub Code:18EC751

After successful completion of this course, the students will be able to;

CO	Description
C404.1	Summarize the basic concepts of energy, its distribution and general Scenario.
C404.2	Explain different energy storage systems, energy management, audit and economic

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	analysis.
C404.3	Summarize the environment eco system and its need for awareness.
C404.4	Identify the various types of environment pollution and their effects.
C404.5	Discuss the social issues of the environment with associated acts.

Subject: Computer Networks Laboratory

Sub Code: 18ECL76

After successful completion of this course, the students will be able to;

CO	Description
C406.1	Choose suitable tools to model network and understand the protocols at various OSI reference levels.
C406.2	Design a suitable network and simulate using a network simulator tool.
C406.3	Analyze the networking concepts and protocols using C/C++ Programming.
C406.4	Model the networks for different configurations and analyze the results.
C406.1	Choose suitable tools to model network and understand the protocols at various OSI reference levels.

Subject: VLSI Laboratory

Sub Code: 18ECL77

After successful completion of this course, the students will be able to;

	1 /
СО	Description
C407.1	Design and simulate combinational and sequential digital circuits using Verilog HDL
C407.2	Understand the Synthesis process of digital circuits using EDA tool
C407.3	Perform ASIC design flow and understand the process of synthesis, synthesis
	constraints and evaluating the synthesis reports to obtain optimum gate level net list
C407.4	Design and simulate basic CMOS circuits like inverter, common source amplifier and
	differential amplifiers amplifiers
C407.5	Perform RTL-GDSII flow and understand the stages in ASIC design

Subject: Project Work Phase – I

Sub Code: 18ECP78

After successful completion of this course, the students will be able to;

CO	Description
C408.1	Demonstrate a sound technical knowledge of their selected project topic.
C408.2	Undertake problem identification, formulation and solution.
C408.3	Design engineering solutions to complex problems utilizing a systems approach
C408.4	Survey the changes and advancements in the related area.
C408.5	Engineers and the community at large in written/oralforms.



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Course Outcomes

2023-24

Subject: Wireless and Cellular Communication

Sub Code: 18EC81

After successful completion of this course, the students will be able to;

CO	Description
C409.1	Explain concepts of propagation mechanisms like Reflection, Diffraction, Scattering
	in wireless channels.
C409.2	Develop a scheme for idle mode, call set up, call progress handling and call tear down
	in a GSM cellular network.
C409.3	Develop a scheme for idle mode, call set up, call progress handling and call tear down
	in a CDMA cellular network.
C409.4	Understand the basic operations and architecture of air interface in a LTE 4G system.
C409.1	Understand the concepts of OFDMA and SC-FDMA used in 4G LTE systems.

Subject: Network Security

Sub Code: 18EC821

After successful completion of this course, the students will be able to;

CO	Description
C410.1	Explain network security services and mechanisms and explain security concepts
C410.2	Understand the concept of Transport Level Security and Secure Socket Layer.
C410.3	Explain Security concerns in Internet Protocol security
C410.4	Explain Intruders, Intrusion detection and Malicious Software
C410.5	Explain Firewalls, Firewall Characteristics, Biasing and Configuration

Subject: Project Work

Sub Code: 18ECP83

After successful completion of this course, the students will be able to;

CO	Description
C412.1	Learn on their own, reflect on their learning and take appropriate actions to improve it.
C412.2	Make links across different areas of knowledge and to generate, develop and evaluate
	ideas and information so as to apply these skills to the project task
C412.3	Design and implementation of engineering solutions to societal/ environment/energy
	and automation problems utilizing a systems Approach.
C412.4	Present the project and be able to defend it.
C412.5	Communicate effectively and to present ideas clearly and coherently in both the
	written and oralforms.

Subject:Seminar Work

Sub Code: 18ECS84

After successful completion of this course, the students will be able to;

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Description

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C413.1	Identify a topic and survey the changes in the technologies/concepts relevant to the
	topic
C413.2	Discuss the technology and interpret the impact on the society, environment and the
	domain.
C413.3	Describe the behaviours and characteristics of an effective learner.
C413.4	Exhibiting good oral and written communication skills.
C413.5	Apply principles of ethics and respect in interaction and compile the report

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I. Program Specific Outcomes (PSOs):

PSO1:	An ability to understand the concepts of basic Electronics & Communication
	Engineering and to apply them to various areas like Signal processing, VLSI,
	Embedded systems, Communication Systems, Digital & Analog Devices.
PSO2:	An ability to solve complex Electronics and Communication Engineering problems, using
	latest hardware and software tools, along with analytical skills to arrive cost effective and
	appropriate solutions.



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Course Outcome

EEE

2022 Scheme

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcomes for 2022 Scheme Syllabus

Course Outcomes for 3rd Semester

Sub: Engineering Mathematics for EEE

Sub. Code: BMATE301

After successful completion of the course, the student will be able to:

СО	Description
C201.1	Understand that physical systems can be described by differential equations and solve such
	equations.
C201.2	Make use of correlation and regression analysis to fit a suitable mathematical model for
	statistical data
C201.3	Demonstrate the Fourier series to study the behavior of periodic functions and their
	Applications in system communications, digital signal processing, and field theory.
C201.4	To use Fourier transforms to analyze problems involving continuous-time signals and to
	apply Z-Transform techniques to solve difference equations.
C201.5	Apply discrete and continuous probability distributions in analyzing the probability
	models arising in the engineering field. Demonstrate the validity of testing the hypothesis

Sub: Electric Circuit Analysis

Sub. Code: BEE302

CO	Description
C202.1	Apply the basic concepts, basic laws and methods of analysis of DC and AC networks and
	reduce the complexity of network reduction using source shifting, source transformation
	and network reduction using transformations.
C202.2	Analyze complex electric circuits using network theorems.
C202.3	Discuss resonance in series and parallel circuits and also the importance of initial
	conditions and their evaluation.
C202.4	Develop solutions of electrical network using Laplace transformation.
C202.5	Discuss unbalanced three phase systems and also evaluate the performance of two port
	networks.



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Course Outcome

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Sub: Analog Electronic Circuits

Sub. Code: BEE303

After successful completion of the course, the student will be able to:

CO	Description
C203.1	Obtain characteristics of clipper and clamper circuits, design transistor biasing circuits and
	analyze bias stabilization and stability factors.
C203.2	Analyze transistor amplifier and its frequency response with low frequency signals.
C203.3	Explain concepts of multistage amplifiers and feedback amplifiers.
C203.4	Design and analyze different power amplifier circuits and oscillators.
C203.5	Explain the construction, working, characteristics and biasing of JFET and MOSFET.

Sub: Transformers and Generators

After successful completion of the course, the student will be able to:

The successful completion of the course, the student will be usic to.	
CO	Description
C204.1	Explain the construction, working and evaluate the performance of single phase Transformer.
C204.2	Explain the construction, working, connection types and parallel operation of three phase Transformer and discuss about Autotransformer and Tap changing transformer.
C204.3	Explain the construction, working and analysis of Synchronous Generator and also evaluate the performance of Salient Pole Synchronous Generator.
C204.4	Explain the construction, working and types of wind and solar power generators.

Sub: Transformers and Generators Lab

Sub. Code: BEEL305

Sub. Code: BEE304

CO	Description
C205.1	Conduct suitable test on single phase step up or step down transformer and predetermine
	efficiency and regulation and equivalent circuit parameters.
C205.2	Conduct various tests on transformers and synchronous machines and evaluate their
	performance.
C205.3	Calculate the voltage regulation of an alternator using different methods for comparison.
C205.4	Model the transformer for automatic voltage regulation and simulate power angle curve of
	synchronous generator using MATLAB.



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EEE

2022 Scheme

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Sub: Digital Logic Circuit

Sub. Code: BEE306A

After successful completion of the course, the student will be able to:

CO	Description
C206.1	Explain the concept of combinational and sequential logic circuits.
C206.2	Analyze and design combinational circuits.
C206.3	Describe and characterize flip flops and its applications.
C206.4	Design the sequential circuits using SR, JK, D and T flip-flops and Melay and Moore
	applications.
C206.5	Design applications of combinational and Sequential circuits also employ the digital
	circuits for different applications.

Sub: 555 IC Laboratory

Sub. Code: BEEL358B

СО		Description
C212.1	Analyze in	an intelligent manner, think better, and perform better.

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Course Outcomes for 4th Semester

Sub: Electric Motors

After successful completion of the course, the student will be able to:

CO	Description
C218.1	Explain the construction and operation, characteristics, testing of DC motors and
	determine losses and efficiency.
C218.2	Describe construction, operation, types and characteristics of three phase Induction
	motors.
C218.3	Determine the performance parameters of three Induction motor and discuss working of
	induction motor as induction generator.
C218.4	Discuss starting and speed control of three phase Induction motor and construction and
	working of different types of single phase Induction motors.
C218.5	Explain principle of operation, characteristics of synchronous and other motors.

Sub: Transmission And Distribution

After successful completion of the course, the student will be able to:

CO	Description
C219.1	Explain the structure of electrical power system, its components, advantages of high
	voltage AC and DC transmission, various conductors used for transmission, sag and its
	calculation.
C219.2	Explain various types of insulators and methods to improve string efficiency.
C210.2	Explain the various transmission line parameters, their effects on transmission of
C219.5	electricity.
C219.4	Evaluate the parameters that influence the performance of transmission line and to
	calculate performance parameters of various transmission lines.
C219.5	Explain carona and its effects, underground cable and its construction, classification,
	limitations and specifications.
C219.6	Evaluate different types of distribution systems.



Course Outcome

EEE

2022 Scheme

Sub. Code: BEE402

Sub. Code: BEE401

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Sub: Microcontrollers

Sub. Code: BEE403

After successful completion of the course, the student will be able to:

CO	Description
C220.1	Outline the 8051 architecture, registers, internal memory organization, addressing modes.
C220.2	Discuss 8051 addressing modes, instruction set of 8051, accessing data and I/O port
	programming.
C220.2	Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and
C220.5	arithmetic operations, data conversion and timer/counter programming.
C220.4	Summarize the basics of serial communication and interrupts, also develop 8051 programs
	for serial data communication and interrupt programming.
C220.5	Program 8051 to work with external devices for ADC, DAC, Stepper motor control, DC
	motor control.

Sub: Electric Motors Laboratory

Sub. Code: BEEL404

After successful completion of the course, the student will be able to:

СО	Description
C221.1	Test dc machines to determine their characteristics.
C221.2	Change the speed of dc motor by selecting suitable method.
C221.3	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C221.4	Assess the performance of single phase and three phase induction motor by conducting
	load test.
C221.5	Experiment with induction motor to pre-determine the performance characteristics.
C221.6	Test on synchronous motor to draw the performance curves.

Sub: Electric Power Generation and Economics

Sub. Code: BEE405A

CO	Description
C222.1	Explain the basics of hydro electric power plant, merits and demerits of hydroelectric
	power plants, site selection, arrangement and elements of hydro electric plant.
C222.2	Explain the working, site selection and arrangement of Steam, Diesel and Gas Power
	Plants.
C222.3	Explain the working, site selection and arrangement of Nuclear Power Plants.
C222.4	Explain the importance of different equipments in substation, Interconnection of power
	stations and different types of grounding.
C222.5	Explain the economics of power generation.



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Course Outcome

EEE

2022 Scheme

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Sub: Sci Lab / MATLAB for Electrical & Electronic Measurements Sub. Code: BEEL456B

After successful completion of the course, the student will be able to:

CO	Description
C227.1	Design and analyze measurement of resistance, inductance, capacitance and frequency by using different types of bridges.
C227.2	Design and analyze the measurement of power, energy, flux and flux density in single phase and three phase circuits.
C227.3	Test and analyze CT and VT using silsbees deflection method.
C227.4	Design and analyze measurement of voltage using true RMS reading and digital voltmeters.
C227.5	Design and analyze measurement of Quality factor of an Electrical circuit using Q meter.

Sub: Biology for Engineers

Sub. Code: BBOK407

After successful completion of the course, the student will be able to:

CO	Description
C230.1	To familiarize the students with the basic biological concepts and their engineering applications.
C230.2	To enable the students with an understanding of biodesign principles to create novel devices and structures.
C230.3	To provide the students an appreciation of how biological systems can be redesigned as substitute products for natural systems.
C230.4	To motivate the students to develop interdisciplinary vision of biological engineering.
C230.5	Understand the Trends of Bioengineering.

Sub: Universal Human Values

Sub. Code: BUHK408

CO	Description
C231.1	Appreciation and aspiration for excellence (merit) and gratitude for all.
C231.2	Having Competence and Capabilities for Maintaining Health and Hygiene.
C231.3	Socially responsible behavior.
C231.4	Environmentally responsible work.
C231.5	Holistic vision of life and Ethical human conduct.



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2022 Scheme

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Course Outcome

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcomes for 5th Semester

Sub: Engineering Management & Entrepreneurship

Sub. Code: BEE501

After successful completion of the course, the student will be able to:

CO	Description
C301.1	Understand the fundamental concepts of Management and its functions.
C301.2	Understand the different functions to be performed by managers/Entrepreneur.
C301.3	Understand the social responsibilities of a Business.
C301.4	Understand the concepts of Entrepreneurship and to identify Business opportunities.
C301.5	Understand the components in developing a business plan and awareness about various
	sources of funding and Institutions supporting Entrepreneur.

Sub: Signals & Digital Signal Processing

Sub. Code: BEE502

After successful completion of the course, the student will be able to:

CO	Description
C302.1	Discuss classification and basic operations that can be performed on both continuous and
	discrete time signals and to understand sampling theorem.
C302.2	Evaluate Discrete Fourier Transform of a sequence, to understand the various properties of
	DFT and signal segmentation using overlap and overlap add method.
C202.2	Evaluate Discrete Fourier Transform of a sequence using decimation in time and
C302.5	decimation in frequency methods.
C302.4	To design Butterworth and Chebyshev IIR digital filters and to represent the filters using
	different methods and to represent IIR filter using different methods.
C302.5	To design FIR filters using windows method and frequency sampling method and to
	represent FIR filters using direct method and lattice method.

Sub: Power Electronics

Sub. Code: BEE503

After successful completion of the course, the student will be able to:

CO	Description
C303.1	Explain application areas of power electronics, types of power electronic circuits and
	switches and characteristics of power diodes and operation of diode rectifiers with R and
	RL load.
C303.2	Explain steady state, switching characteristics and gate /base drive requirements of
	different power transistors.
C303.3	Discuss different types of thyristors, their operation, characteristics and firing circuit.
C303.4	Discuss the principle of operation and analysis of controlled rectifiers and AC voltage
	controllers.
C303.5	Discuss the principle of operation and analysis of DC – DC and DC –AC converters.

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Course Outcome

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2022 Scheme

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Sub: Power Electronics Lab

Sub. Code: BEEL504

After successful completion of the course, the student will be able to:

СО	Description
C304.1	Analyze the static characteristics of semiconductor devices to discuss their performance.
C304.2	Experiment with different methods of triggering the SCR.
C304.3	Analyze the performance of single phase controlled full wave rectifier and AC voltage
	controller with different types of load conditions.
C304.4	Determine the speed control of a stepper motor, universal motor and DC motors using
	different types of converter.
C304.5	Experiment with single phase MOSFET/IGBT based PWM inverter.

Sub: High Voltage Engineering

Sub. Code: BEE515A

After successful completion of the course, the student will be able to:

CO	Description
C305.1	Explain conduction and breakdown phenomenon in gases, liquid and solid dielectrics.
C305.2	Illustrate various techniques of generation of different forms of high voltages and currents.
C305.3	Analyze measurement techniques for high voltages and currents.
C305.4	Explain overvoltage phenomenon and protection of electric power systems.
C305.5	Explain non-destructive testing of materials and electric apparatus and high-voltage testing
	of electric apparatus.

Sub: Mini-Project

Sub. Code: BEE586

After successful completion of the course, the student will be able to:

CO	Description
C309.1	Demonstrate the knowledge of engineering fundamentals to identify, formulate and solve
	engineering problems.
C309.2	Present the project and be able to defend it.
C309.3	Make links across different areas of knowledge and to generate, develop and evaluate ideas
	and information so as to apply these skills to the project task.
C309.4	habituated to critical thinking and use problem solving skills
C309.5	Communicate effectively and to present ideas clearly and coherently in both the written and
	oral forms.
C309.6	Work in a team to achieve common goal.
C309.7	Learn on my own and take appropriate actions.

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Sub: Research Methodology & Intellectual Property Rights

Sub. Code: BRMK557

After successful completion of the course, the student will be able to:

CO	Description
C310.1	To know the meaning of engineering research.
C310.2	To know the procedure of Literature Review and Technical Reading.
C310.3	To know the fundamentals of patent laws and drafting procedure.
C310.4	Understanding the copyright laws and subject matters of copyrights and designs.
C310.5	Understanding the basic principles of design rights.

Sub: Environmental Studies

Sub. Code: BESK508

CO	Description
C311.1	To understand the principles of ecology and environmental issues that apply to air, land,
	and water issues on a global scale.
C311.2	To Develop critical thinking and/or observation skills, and apply them to the analysis of a
	problem or question related to the environment as legislation.
C311.3	Apply their ecological knowledge to illustrate and grasp the problem and describe the
	realities that managers face when dealing with complex issues



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2021 Scheme

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Course Outcomes for 2021 Scheme Syllabus

Course Outcomes for 3rd Semester

Sub: Transform Calculus, Fourier Series and Numerical Techniques

Sub. Code: 21MAT31

After successful completion of the course, the student will be able to:

CO	Description
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
C201.2	Demonstrate the Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
C201.3	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations.
C201.4	To solve mathematical models represented by initial or boundary value problems involving partial differential equations.
C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibration analysis.

Sub: Analog Electronic Circuits and Op - Amps

Sub. Code: 21EE32

CO	Description
C202.1	Obtain characteristics of clipper and clamper circuits, design voltage divider biasing circuits
	and analyze transistor circuit using h- parameter.
C202.2	Design and analyze multistage amplifiers and feedback circuits.
C202.3	Design and analyze different power amplifier circuits and explain the construction, working
	and characteristics of JFET and MOSFET.
C202.4	Explain concepts of Op-amp, active filters and DC voltage regulators.
C202.5	Demonstrate the application of Op-amps.



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Course Outcome

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2021 Scheme

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Sub: Electric Circuit Analysis

Sub. Code: 21EE33

After successful completion of the course, the student will be able to:

CO	Description
C203.1	Apply the basic concepts, basic laws and methods of analysis of DC and AC networks and
	reduce the complexity of network using source shifting, source transformation and network
	reduction using transformations.
C203.2	Analyze complex electric circuits using network theorems.
C203.3	Discuss resonance in series and parallel circuits and also the importance of initial
	conditions and their evaluation.
C203.4	Analyze typical waveforms using Laplace transformation.
C203.5	Discuss unbalanced three phase systems and also evaluate the performance of two port
	networks.

Sub: Transformers and Generators

Sub. Code: 21EE34

After successful completion of the course, the student will be able to:

CO	Description
C204.1	Discuss the principle of operation, construction and performance evaluation of 1-phase,
	3-Phase transformers and Autotransformer.
C204.2	Explain the parallel operation of transformer and discuss about autotransformer and tap
	changing transformer.
C204.3	Describe the fundamental concepts of DC and Synchronous Generator.
C204.4	Determine the regulation of Synchronous Generator by EMF, MMF and ZPF Methods.
C204.5	Analyze the performance of Synchronous Generator.

Sub: Electrical Machines Laboratory - 1

Sub. Code:21EEL35

CO	Description
C205.1	Evaluate the performance of transformers from the test data obtained.
C205.2	Explain the operation of two single phase transformers of different KVA rating connected
	parallel fashion.
C205.3	Explain the operation of three single phase transformers for three phase operation and phase
	conversion.
C205.4	Determine the voltage regulation of synchronous generator using the test data obtained in
	the laboratory.
C205.5	Evaluate the performance of synchronous generators from the test data and assess the
	performance of synchronous generator connected to infinite bus.



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Sub: Social Connect & Responsibility

After successful completion of the course, the student will be able to:

СО	Description
C206.1	Develop an eco-friendly relationship for saving the natural resources and preservation of
	nature.
C206.2	Develop multicultural awareness and appreciation for Music and Drama by exposing
	learners to various forms of Art.
C206.3	Understand the concept of agricultural operations.
C206.4	Develop an eco-friendly relationship for saving the natural resources and preservation of
	nature.
C206.5	Describe the regional culinary practices and its importance in day-to-day life.

Sub: Constitution of India & Professional Ethics

After successful completion of the course, the student will be able to:

CO	Description
C209.1	Have general knowledge and legal literacy and thereby to take up competitive
	Examinations.
C209.2	Understand state and central policies, fundamental duties.
C209.3	Understand Electoral Process, special provisions.
C209.4	Understand powers and functions of Municipalities, Panchayats and Co-operative Societies.
C209.5	Understand Engineering ethics and responsibilities of Engineers.
	Have an awareness about cyber law.

Sub: 555 IC Laboratory

After successful completion of the course, the student will be able to:

СО	Description
C212.1	Analyse in an intelligent manner, think better, and perform better.



EEE

Sub. Code: 21CIP37

Sub. Code: 21SCR36

Sub. Code: 21EEL383



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Course Outcome

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Course Outcomes for 4th Semester

Sub: Complex Analysis, Probability and Statistical Methods

Sub. Code: 21MAT41

After successful completion of the course, the student will be able to:

CO	Description
C215.1	Use the concepts of an analytic function and complex potentials to solve the problems arising in electromagnetic field theory. Utilize conformal transformation and complex integral arising in aerofoil theory fluid flow visualization and image processing
C215.2	Obtain Series Solutions of Ordinary Differential Equation.
C215.3	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
C215.4	Apply discrete and continuous probability distributions in analyzing the probability models arising in the engineering field.
C215.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Sub: Digital System Design

Sub. Code: 21EE42

CO	Description
C216.1	Develop simplified switching equation using Karnaugh Maps and Quine McClusky
	techniques.
C216.2	Design Multiplexer, Encoder, Decoder, Adder, Subtractors and Comparator as digital
C210.2	combinational control circuits.
C216.3	Design flip flops, counters, shift registers as sequential control.
C216.4	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits
C216.5	Explain the functioning of Read only and Read/Write Memories, Programmable ROM,
	EPROM and Flash memory.



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Sub: Microcontroller

Sub. Code: 21EE43

After successful completion of the course, the student will be able to:

CO	Description
C217.1	Outline the 8051 architecture, registers, internal memory organization, addressing modes.
C217.2	Discuss 8051 addressing modes, instruction set of 8051, accessing data and I/O port
	programming.
C217.3	Develop 8051 C programs for time delay, I/O operations, I/O bit manipulation, logic and
	arithmetic operations, data conversion and timer/counter programming.
C217.4	Summarize the basics of serial communication and interrupts, also develop 8051 programs
	for serial data communication and interrupt programming.
C217.5	Program 8051 to work with external devices for ADC, DAC, Stepper motor control, DC
	motor control.

Sub: Electric Motors

Sub. Code: 21EE44

After successful completion of the course, the student will be able to:

СО	Description
C218.1	Explain the characteristics, applications, losses and efficiency of different DC motors.
C218.2	Describe the testing methods of DC motors and performance characteristics of three phase
	Induction motors.
C218.3	Determine the performance parameters of three Induction motor using test data and circle
	diagram.
C218.4	Explain starting and speed control of three phase Induction motor and construction and
	working of different types of single phase Induction motors.
C218.5	Explain principle of operation of synchronous and other motors.

Sub: Biology for Engineers

Sub. Code: 21BE45

CO	Description
C219.1	Elucidate the basic biological concepts via relevant industrial applications and case studies.
C219.2	Evaluate the principles of design and development, for exploring novel bioengineering
	projects.
C219.3	Corroborate the concepts of biomimetics for specific requirements.
C219.3 C219.4	Corroborate the concepts of biomimetics for specific requirements. Think critically towards exploring innovative bio based solutions for socially relevant
C219.3 C219.4	Corroborate the concepts of biomimetics for specific requirements. Think critically towards exploring innovative bio based solutions for socially relevant problems.



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Sub: Electrical Machines Laboratory - II

Sub. Code: 21EEL46

After successful completion of the course, the student will be able to:

CO	Description
C220.1	Test dc machines to determine their characteristics.
C220.2	Change the speed of dc motor by selecting suitable method.
C220.3	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
C220.4	Assess the performance of single phase and three phase induction motor by conducting load
	test.
C220.5	Experiment with induction motor to pre-determine the performance characteristics.
C220.6	Test on synchronous motor to draw the performance curves.

Sub: Simulation of Op-Amp Circuits

Sub. Code: 21EEL484

After successful completion of the course, the student will be able to:

CO	Description
C227.1	Conduct experiment to determine the characteristic parameters of OP-Amp
C227.2	Design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator
C227.3	Design test the OP-Amp as oscillators and filters.
C227.4	Design and study of Linear IC's as multivibrator power supplies.
C227.5	Realization of R-2R ladder DAC and Two bit Flash ADC.

Sub: Universal Human Values-II: Understanding Harmony and Ethical Human Conduct Sub. Code: 21UHV49

By the end of the course, students are expected to positively impact common graduate attributes like:

CO	Description
C228.1	Holistic vision of life.
C228.2	Socially responsible behavior.
C228.3	Environmentally responsible work.
C228.4	Ethical human conduct.
C228.5	Having Competence and Capabilities for Maintaining Health and Hygiene.
C228.6	Appreciation and aspiration for excellence (merit) and gratitude for all.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcomes for 5th Semester

Sub: Transmission and Distribution

After successful completion of the course, the student will be able to:

CO	Description
C301.1	Explain transmission and distribution scheme, identify the importance of different
	transmission systems and types of insulators.
C301.2	Analyze and compute the parameters of the transmission line for different configurations.
C301.3	Evaluate the performance of the overhead line.
C301.4	Explain the phenomenon of Corona, advantages & disadvantages of Corona. Explain the
	construction & use of underground cables, explain the grading of cables.
C301.5	Explain various types of distribution systems, reliability and quality of distribution system.

Sub: Control Systems

Sub. Code: 21EE52

Sub. Code: 21EE51

After successful completion of the course, the student will be able to:

СО	Description
C302.1	Demonstrate the mathematical modelling of electrical, mechanical & analogous systems
	and Determine the performance characteristics of AC/DC servomotors & synchro-
	transmitter receiver pair used in control systems.
C302.2	Apply block diagram and signal flow graph methods to obtain transfer function of systems.
C302.3	Determine transient and steady state time response of a simple control system & evaluate
	the performance of a given system in time and frequency domains using software package
	and discrete components.
C302.4	Determine the stability of the system by using Routh criterion, root locus, bode plot and
	Nyquist plot methods and using software package.
C302.5	Design, analyze and experiment with different types of compensators and controllers using
	software package and discrete components.

Sub: Power System Analysis-1

Sub. Code: 21EE53

After successful completion of the course, the student will be able to:

CO	Description	
C303.1	Model the power system components & construct per unit impedance diagram of power	
	system.	
C303.2	Analyze three phase symmetrical faults on power system.	
C303.3	Compute unbalanced phasors in terms of sequence components and vice versa, also develop	
	sequence networks.	
C303.4	Analyze various unsymmetrical faults on power system.	
C303.5	Examine dynamics of synchronous machine and determine the power system stability.	



Course Outcome



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Course Outcome

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Sub: Power Electronics

Sub. Code: 21EE54

After successful completion of the course, the student will be able to:

CO	Description	
C304.1	Explain application areas of power electronics, types of power electronic circuits and	
	switches, their characteristics and specifications.	
C304.2	Explain different types of power diodes, its effects on RL circuits and operation and	
	analysis of single phase diode rectifier circuits.	
C204.2	Explain steady state, switching characteristics and gate /base drive requirements of different	
C304.5	power transistors and their comparison.	
C304.4	4.4 Discuss different types of thyristors, their operation, characteristics and firing circuits.	
C304.5	Discuss the principle of operation and analysis of controlled rectifiers, AC voltage	
	controllers, DC – DC and DC –AC converters	

Sub: Power Electronics Laboratory

Sub. Code: 21EEL55

After successful completion of the course, the student will be able to:

CO	Description	
C305.1	Analyze the static characteristics of semiconductor devices to discuss their performance.	
C305.2	Experiment with different methods of triggering the SCR.	
C305.3	Analyze the performance of single phase controlled full wave rectifier and AC voltage controller with different types of load conditions.	
C305.4	Determine the speed control of a stepper motor, universal motor and DC motors using different types of converter.	
C305.5	Experiment with single phase MOSFET/IGBT based PWM inverter.	

Sub: Research Methodology & Intellectual Property Rights

Sub. Code: 21RMI56

CO	Description
C306.1	To know the meaning of engineering research
C306.2	To know the procedure of Literature Review and Technical Reading.
C306.3	To know the fundamentals of patent laws and drafting procedure
C306.4	Understanding the copyright laws and subject matters of copyrights and designs.
C306.5	Understanding the basic principles of design rights.



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Course Outcome

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Sub: Environmental Studies

Sub. Code: 21CIV57

After successful completion of the course, the student will be able to:

CO	Description
C307.1	Understand the principles of ecology and environmental issues that apply to air, land, and
	water issues on a global scale.
C207.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a
C307.2	problem or question related to the environment.
C207.2	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic
C307.3	components.
C207 4	Apply their ecological knowledge to illustrate and graph a problem and describe the
C307.4	realities that managers face when dealing with complex issues.
C307.5	Understand the principles of ecology and environmental issues that apply to air, land, and
	water issues on a global scale.

Sub: Renewable Energy Projects

Sub. Code: 21EEP584

СО		Descriptio	on
C311.1	Analyze in	a systematic way, think better, and per	form better.

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Course Outcome



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Course Outcomes for 6th Semester

Sub: Management and Entrepreneurship

Sub. Code: 21EE61

After successful completion of the course, the student will be able to:

CO	Description
C212.1	Explain the field of management, task of the manager, planning and steps in decision
C312.1	making.
	Discuss the structure of organization, importance of staffing, leadership styles, modes of
C312.2	communication techniques of coordination and importance of managerial control in
	business.
C312.3	Explain the concepts of entrepreneurship and a businessman's social responsibilities
	towards different groups.
C312.4	Explain the social responsibility of business and leadership and discuss role of SSI's
	in Explain the social responsibility of business and leadership the development of country
	and state/central level, institutions/agencies supporting business enterprises.
C312.5	Discuss the concepts of project management, capital budgeting, project feasibility studies,
	need for project report and new control techniques.

Sub: Power System Analysis-2

Sub. Code: 21EE62

After successful completion of the course, the student will be able to:

CO	Description	
C313.1	Formulate network matrices and models for solving load flow problems.	
C313.2	Perform steady state power flow analysis of power systems using numerical iterative	
	techniques.	
C313.3	Solve issues of economic load dispatch and unit commitment problems.	
C313.4	Analyze short circuit faults in power system networks using bus impedance matrix.	
C313.5	Apply Point by Point method and Runge Kutta Method to solve Swing Equation.	

Sub: Signal & Digital Signal Processing

Sub. Code: 21EE63

After successful completion of the course, the student will be able to:

СО	Description	
C314.1	Discuss classification and basic operations that can be performed on both continuous and	
	discrete time signals.	
C314.2	Evaluate Discrete Fourier Transform of a sequence and the convolution of two sequences to	
	determine the output sequence.	
C314.3	Evaluate Discrete Fourier Transform of a sequence by using fast methods.	
C314.4	Design Butterworth and Chebyshev IIR digital filters and FIR filters using different	
	techniques.	
C314.5	Develop different structures for IIR and FIR filters.	

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Sub: Electrical Engineering Materials

After successful completion of the course, the student will be able to:

CO	Description	
C318.1	Discuss electrical and electronics materials, their importance, classification and operational requirement	
C318.2	Discuss conducting, dielectric, insulating and magnetic materials used in engineering, their properties and classification.	
C318.3	Explain the phenomenon superconductivity, super conducting materials and their application in engineering.	
C318.4	Explain the superconductive materials and its applications.	
C318.5	Explain the plastic and mention their properties and applications and also discuss materials used for Opto electronic devices.	

Sub: Project Management

Sub. Code: 21ME651

Sub. Code: 21EE644

After successful completion of the course, the student will be able to:

CO	Description	
C318.1	Understand the selection, prioritization and initiation of individual projects and strategic	
	role of project management.	
C318.1	Understand the work breakdown structure by integrating it with organization also the	
	scheduling and uncertainty in projects.	
	Understand risk management planning using project quality tools also the activities like	
C318.1	purchasing, acquisitions, contracting, partnering and collaborations related to performing	
	projects.	
C318.1	Determine project progress and results through balanced score card approach.	
C318.1	Draw the network diagram to calculate the duration of the project and reduce it using	
	crashing.	

Sub: Programming In Java

Sub. Code: 21CS654

After successful completion of the course, the student will be able to:

CO	Description
C320.1	Develop JAVA programs using OOP principles and proper program structuring.
C320.2	Develop JAVA program using packages, inheritance and interface.
C320.3	Develop JAVA programs to implement error handling techniques using exception handling
C320.4	Demonstrate string handling concepts using JAVA.

EEE **Course Outcome**

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Sub: Sensors & Actuators

Sub. Code: 21EC655

After successful completion of the course, the student will be able to:

CO	Description
C321.1	Discuss the fundamental concepts related to sensors and measurement, functional elements
	of System.
C321.2	Interpret and analyze the static and dynamic characteristics of instruments.
C321.3	Elucidate the working principle and usage of different transducers for temperature,
	displacement.
C321.4	Discuss the principle and working of different types of actuators used in industrial
	application.
C321.5	Discuss the principle and working of strain, force and torque measurement.

Sub: Digital Signal Processing Laboratory

Sub. Code: 21EEL66

After successful completion of the course, the student will be able to:

CO	Description
C323.1	Conduct sampling of signals in time and frequency domains.
C323.2	Evaluate the impulse response of a system.
C323.3	Obtain convolution of given sequences to evaluate the response of a system.
C323.4	Compute DFT and IDFT of a given sequence using the basic definition and/or fast methods.
C323.5	Provide a solution for a given difference equation.
C323.6	Design and implement IIR and FIR filters.

Sub: Mini-Project

Sub. Code: 21EEMP67

CO	Description
C324.1	Demonstrate the knowledge of engineering fundamentals to identify, formulate and solve
	engineering problems.
C324.2	Present the project and be able to defend it and make links across different areas of
	knowledge and develop and evaluate ideas and information so as to apply these skills to the
	project task.
C324.3	Habituated to critical thinking and use problem solving skills.
C324.4	Communicate effectively and to present ideas clearly and coherently in both the written and
	oral forms.
C324.5	Work in a team to achieve common goal and learn on own and take appropriate actions.

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Course Outcome

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcomes for 7th Semester

Sub: High Voltage & Power System Protection

Sub. Code: 21EE71

After successful completion of the course, the student will be able to:

CO	Description				
C401.1	Apply the knowledge of dielectric property for insulation, it's performances as per				
	Standards and High voltage application in power system Equipments.				
C401.2	Analyze the circuits of high voltages, high currents in Generation and Measurements.				
C401.3	Apply relays to the power system protection and discuss overcurrent protection.				
C401.4	Discuss protection of generators, motors, Transformer and Bus Zone Protection, distance				
	and differential protection, pilot relaying schemes.				
C401.5	Discuss the construction, operating principles and performances of circuit breaker and				
	describe the causes of over voltages and their remedial measures.				

Sub: Power System Operation & Control

Sub. Code: 21EE72

After successful completion of the course, the student will be able to:

CO	Description			
402.1	Describe various levels of controls in power systems, architecture and configuration of			
	SCADA.			
402.2	Develop and analyze mathematical models of Automatic Load Frequency Control.			
402.3	Develop mathematical model of Automatic Generation Control in Interconnected Power			
	system.			
402.4	Discuss the Control of Voltage, Reactive Power and Voltage collapse.			
402.5	Explain security, contingency analysis, state estimation of power systems.			

Sub: Power System Planning

Sub. Code: 21EE731

After successful completion of the course, the student will be able to:

CO	Description
C403.1	Discuss primary components of power system planning, planning methodology for
	optimum power system expansion and load forecasting.
C403.2	Understand economic appraisal to allocate the resources efficiently and appreciate the
	investment decisions.
	Discuss expansion of power generation and planning for system energy in the country,
C403.3	evaluation of operating states of transmission system, their associated contingencies and the
	stability of the system.
C403.4	Discuss principles of distribution planning, supply rules, network development and the
	system studies.
C403.5	Discuss planning and implementation of electric -utility activities, market principles and
	the norms framed.

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Course Outcome

EEE

2021 Scheme

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Sub: Micro & Nano Scale Sensors & Transducers

Sub. Code: 21EE742

After successful completion of the course, the student will be able to:

CO	Description
C409.1	Explain the structure, theory of pressure sensors based on nanotechnology.
C409.2	Describe structure, theory and operation of sensors based on nanotechnology for Motion,
	acceleration measurement, gas and smoke detection.
C409.3	Discuss structure, working of moisture sensors & Optoelectronic and Photonic Sensors
	based on nanotechnology.
C409.4	Analyze the structure, operation of Biological Sensors, Chemical Sensors, and the so-called
	"Lab-on-a-Chip" sensors.
C409.5	Analyze the performance & design of Integrated Sensor/Actuator Units and Special
	Purpose Sensors.

Sub: E-Waste Management

Sub. Code: 21EC755

CO	Description
C417.1	Understand the existing discourse on e-waste and its management, statistics across the
	world, opportunities, and challenges w.r.t. regulatory framework, SDGs, CE, and LCIA
	(Life Cycle Impact Assessment) and MFA (Material Flow Analysis), Indian scenario.
C417.1	Describe EPR, a regulatory framework for achieving specified goals across different
C417.1	countries and impacts on environment and human health.
	Explain themes in the context of resource use and sustainable development. Urban mining,
	informal sector operations and need for resource use policy, financial support for recycling
C417.1	infrastructure building, etc. in Indian context and also explain to what extent - different
	aspects of e-waste management have been incorporated in the existing regulatory
	framework in comparison with international legislatures.
C417.1	Identify and infer pan-Indian initiatives dealing with e-waste management, ranging from
	building knowledge base through research and social action by different stakeholders to
	technological and legal advancements, and industrial initiatives. Analyze roadmap for the
	Agenda 2030.
C417.5	Use opportunities and challenges around four domains: legal and judicial domain;
	economic concerns; recycling culture/society; and environment concerns.



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Course Outcome

EEE

2021 Scheme

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Sub: Project Work

Sub. Code: 21EEP76

CO	Description
C418.1	Demonstrate the knowledge of engineering fundamentals to identify, formulate and solve
	engineering problems.
C418.2	Present the project and be able to defend it.
C418.3	Make links across different areas of knowledge and to generate, develop and evaluate ideas
	and information so as to apply these skills to the project task.
C418.4	habituated to critical thinking and use problem solving skills
C418.5	Communicate effectively and to present ideas clearly and coherently in both the written and
	oral forms.
C418.6	Work in a team to achieve common goal.
C418.7	Learn on my own and take appropriate actions.



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Course Outcomes

CSE

NBA

2022 Scheme

III SEMESTER

SUB: Mathematics for Computer Science

Sub Code: BCS301

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

СО	Description
C201.1	Explain the basic concepts of probability, random variables, probability distribution
C201.2	Apply suitable probability distribution models for the given scenario.
C201.3	Apply the notion of a discrete-time Markov chain and n-step transition probabilities to solve the given problem
C201.4	Use statistical methodology and tools in the engineering problem-solving process. Compute the confidence intervals for the mean of the population.
C201.5	Apply the ANOVA test related to engineering problems.

SUB: Digital Design and Computer Organization

Sub Code: BCS302

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

CO	Description
C202.1	Apply the K-Map techniques to simplify various Boolean expressions.
C202.2	Design different types of combinational and sequential circuits along with Verilog programs.
C202.3	Describe the fundamentals of machine instructions, addressing modes and Processor performance.
C202.4	Explain the approaches involved in achieving communication between processor and I/O devices.
C202.5	Analyze internal Organization of Memory and Impact of cache/Pipelining on Processor Performance.

SUB: Operating Systems

Sub Code: BCS303

CO	Description
C203.1	Explain the structure and functionality of operating system
C203.2	Apply appropriate CPU scheduling algorithms for the given problem.
C203.3	Analyze the various techniques for process synchronization and deadlock handling
C203.4	Apply the various techniques for memory management
C203.5	Explain file and secondary storage management strategies.
C203.6	Describe the need for information protection mechanisms



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SUB: Data Structures and Applications

Sub Code: BCS304

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

СО	Description
C204.1	Explain different data structures and their applications.
C204.2	Apply Arrays, Stacks and Queue data structures to solve the given problems.
C204.3	Use the concept of linked list in problem solving.
C204.4	Develop solutions using trees and graphs to model the real-world problem.
C204.5	Explain the advanced Data Structures concepts such as Hashing Techniques and Optimal Binary Search Trees.

SUB: Data Structures Laboratory

Sub Code: BCSL305

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

CO	Description
C205.1	Analyze various linear and non-linear data structures
C205.2	Demonstrate the working nature of different types of data structures and their applications
C205.3	Use appropriate searching and sorting algorithms for the given scenario.
C205.4	Apply the appropriate data structure for solving real world problems
C205.5	Analyze various linear and non-linear data structures

SUB: Object Oriented Programming with Java

Sub Code: BCS306A

CO	Description
C206.1	Demonstrate proficiency in writing simple programs involving branching and looping structures.
C206.2	Design a class involving data members and methods for the given scenario.
C206.3	Apply the concepts of inheritance and interfaces in solving real world problems.
C206.4	Use the concept of packages and exception handling in solving complex problem.
C206.5	Apply concepts of multithreading, autoboxing and enumerations in program development.


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Course Outcomes

CSE

NBA

2022 Scheme

SUB: Social Connect & Responsibility

Sub Code: BSCK307

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

CO	Description
C208.1	Communicate and connect to the surrounding.
C208.2	Create a responsible connection with the society.
C208.3	Involve in the community in general in which they work
C208.4	Notice the needs and problems of the community and involve them in problem – solving.
C208.5	Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems
C208.6	Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

SUB: Data Visualization with Python

Sub Code: BCS358D

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

CO	Description
C212.1	Demonstrate the use of IDLE or PyCharm IDE to create Python Applications
C212.2	Use Python programming constructs to develop programs for solving real-world problems
C212.3	Use Matplotlib for drawing different Plots
C212.4	Demonstrate working with Seaborn, Bokeh for visualization.
C212.5	Use Plotly for drawing Time Series and Maps.

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Course Outcomes 2022 Scheme

CSE

NBA

IV SEMESTER

SUB: Analysis & Design of Algorithms

Sub Code: BCS401

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

CO	Description
C216.1	Apply asymptotic notational method to analyze the performance of the algorithms in terms of time complexity.
C216.2	Demonstrate divide & conquer approaches and decrease & conquer approaches to solve computational problems.
C216.3	Make use of transform & conquer and dynamic programming design approaches to solve the given real world or complex computational problems
C216.4	Apply greedy and input enhancement methods to solve graph & string based computational problems.
C216.5	Analyse various classes (P,NP and NP Complete) of problems
C216.6	Illustrate backtracking, branch & bound and approximation methods.

SUB: Microcontrollers

Sub Code: BCS402

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

CO	Description
C217.1	Explain the ARM Architectural features and Instructions.
C217.2	Develop programs using ARM instruction set for an ARM Microcontroller
C217.3	Explain C-Compiler Optimizations and portability issues in ARM Microcontroller
C217.4	Apply the concepts of Exceptions and Interrupt handling mechanisms in developing applications.
C217.5	Demonstrate the role of Cache management and Firmware in Microcontrollers.

SUB: Database Management System

Sub Code: BCS403

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CO	Description
C218.1	Describe the basic elements of a relational database management system
C218.2	Design entity relationship for the given scenario.
C218.3	Àpply various Structured Query Language (SQL) statements for database manipulation.
C218.4	Analyse various normalization forms for the given application
C218.5	Develop database applications for the given real world problem.



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C218.6 Understand the concepts related to NoSQL databases.

SUB: Analysis & Design Of Algorithms Lab

Sub Code: BCSL404

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

CO	Description
C219.1	Develop programs to solve computational problems using suitable algorithm design strategy.
C219.2	Compare algorithm design strategies by developing equivalent programs and observing running times for analysis (Empirical).
C219.3	Make use of suitable integrated development tools to develop programs
C219.4	Choose appropriate algorithm design techniques to develop solution to the computational and complex problems.
C219.5	Demonstrate and present the development of program, its execution and running time(s) and record the results/inferences.

SUB: Discrete Mathematical Structures

Sub Code: BCS405A

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

CO	Description
C220.1	Apply concepts of logical reasoning and mathematical proof techniques in proving theorems and statements.
C220.2	Demonstrate the application of discrete structures in different fields of computer science.
C220.3	Apply the basic concepts of relations, functions and partially ordered sets for computer representations.
C220.4	Solve problems involving recurrence relations and generating functions.
C220.5	Illustrate the fundamental principles of Algebraic structures with the problems related to computer science & engineering.

SUB: Technical Writing Using LatexSub Code: BCSL456DAfter successful completion of this course, the students will be able to:

СО	Description
C227.1	Apply basic LaTeX command to develop simple document
C227.2	Develop LaTeX script to present the tables and figures in the document
C227.3	Illustrate LaTeX script to present theorems and mathematical equations in the document
C227.4	Develop programs to generate the complete report with citations and a bibliography

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C227.5	Hirasugar Institute of Technology, Nidasoshi.	NBA
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C227.5	Illustrate the use of Tikz and algorithm libraries to design graphics and algorit	hms in
	Document.	

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III SEMESTER

SUB: Transform Calculus, Fourier Series And Numerical Techniques Sub Code: 21MAT31 After successful completion of this course, the students will be able to:

CO	Description
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering
C201.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

SUB: Data Structures and Applications

Sub Code: 21CS32

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

CO	Description
C202.1	Identify different data structures and their applications.
C202.2	Apply stack and queues in solving problems.
C202.3	Demonstrate application of linked list.
C202.4	Explore the applications of trees and graphs to model and solve the real world problem.
C202.5	Make use of Hashing techniques and resolve collisions during mapping of key value pairs.

SUB: Analog and Digital Electronics

Sub Code: 21CS33

CO	Description	
C203.1	Design and analyze application of analog circuits using photo devices, timer IC, power supply regulator IC and OPAMP.	
C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.	
C203.3	Simplify digital circuits using Karnaugh Map, and Ouine-McClusky Methods	_
C203.4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.	•
C203.5	Develop simple HDL programs.	



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SUB: Computer Organization and Architecture

Sub Code: 21CS34

After succe	ssful com	pletion of	this course	the students	will be	abla tar
	And the second second	station of	uno course	, the students	will be	able to:

CO	Description	
C204.1	Explain the organization and architecture of computer systems with machine instructions and programs	
C204.2	Analyze the input/output devices communicating with computer system	-
C204.3	Demonstrate the functions of different types of memory devices	-
C204.4	Apply different data types on simple arithmetic and logical unit	-
C204.5	Analyze the functions of basic processing unit, Parallel processing and pipelining.	

SUB: Object Oriented Programming Lab with Java

Sub Code: 21CSL35

After su	scessful completion of this course, the students will be able to:
СО	Description
C205.1	Use Eclipse/NetBeans IDE to design, develop, debug Java Projects.
C205.2	Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP
C205.3	Demonstrate the ability to design and develop java programs, analyze, and interpret object-oriented data and document results.
C205.4	Apply the concepts of multiprogramming, exception/event handling, abstraction to develop robust programs.
C205.5	Develop user friendly applications using File I/O and GUI concepts.

SUB: Programming in C++

Sub Code: 21CS382

After successful completion of this course, the students will be able to: CO Description Explain the object oriented programming concepts, terminologies in object oriented C210.1 programming and difference between C and C++ language

C210.2	Understand and define different types of functions inside the class and out side the class definition
C210.3	Design and implement inheritance and polymorphism in C++ programming language.
C210.4	Design and Develop programs using text as well as binary file handling concents
C210.5	Design and implement exception handling code to handle run time errors in the program.

SUB: Social Connect and Responsibility After successful completion of this agure

Sub Code: 21SCR36 *

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CO	Description
C206.1	Develop an eco-friendly relationship for saving the natural resources and



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	preservation of nature.
C206.2	Develop multicultural awareness and appreciation for Music and Drama by exposing learners to various forms of Art.
C206.3	Understand the concept of agricultural operations.
C206.4	Develop an eco-friendly relationship for saving the natural resources and preservation of nature.
C206.5	Describe the regional culinary practices and its importance in day-to-day life

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IV SEMESTER

SUB: Mathematical Foundations for Computing Probability and Statistics

Sub Code: 21MATCS41

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

СО	Description
C211.1	Apply the concepts of logic for effective computation and relating problems in the Engineering domain.
C211.2	Analyze the concepts of functions and relations to various fields of Engineering. Comprehend the concepts of Graph Theory for various applications of Computational Sciences.
C211.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
C211.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the Statistical data.
C211.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

SUB: Design and Analysis of Algorithms

Sub Code: 21CS42

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

CO	Description	-
C212.1	Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.	Ī
C212.2	Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same	
C212.3	Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.	
C212.4	Apply and analyze dynamic programming approaches to solve some problems. and improve an algorithm time efficiency by sacrificing space.	
C212.5	Apply and analyze backtracking, branch and bound methods and to describe P, NP and NP-Complete problems.	

SUB: Microcontrollers and Embedded Systems

Sub Code: 21CS43

CO	Description
C213.1	Explain C-Compilers and optimization
C213.2	Describe the ARM microcontroller's architectural features and program module.



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C213.3	Apply the knowledge gained from programming on ARM to different applications
C213.4	Program the basic hardware components and their application selection method
C213.5	Demonstrate the need for a real-time operating system for embedded system applications.

SUB: Operating Systems

Sub Code: 21CS44 After successful completion of this course, the students will be able to:

СО	Description
C214.1	Demonstrate need for Operating System and its types.
C214.2	Explain the multithreaded systems and scheduling algorithms.
C214.3	Illustrate the concept of process synchronization and Deadlock
C214.4	Explain the concept of memory management and File System.
C214.5	Illustrate the different concepts of disk management, Protection and Linux System case studies.

SUB: Biology for Engineers

Sub Code: 21BE45

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

CO	Description
C215.1	Elucidate the basic biological concepts via relevant industrial applications and case studies.
C215.2	Evaluate the principles of design and development, for exploring novel bioengineering projects.
C215.3	Corroborate the concepts of biometrics for specific requirements
C215.4	Think critically towards exploring innovative bio based solutions for socially relevant problems.
C215.5	Future Trends in Bioengineering

SUB: Python Programming Laboratory

Sub Code: 21CSL46

СО	Description	
C216.1	Demonstrate proficiency in handling of loops and creation of functions	
C216.2	Identify the methods to create and manipulate lists, tuples and dictionaries	-
C216.3	• Discover the commonly used operations involving regular expressions and file system.	•
C216.4	Interpret the concepts of Object-Oriented Programming as used in Python	
C216.5	Determine the need for scraping websites and working with PDF, JSON and other file formats.	



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SUB: Constitution of India, Professional Ethics

Sub Code: 21CIP47

CSE

NBA

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

CO	Description
C217.1	Analyse the basic structure of Indian Constitution
C217.2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
C217.3	Know about our Union Government, political structure & codes, procedures
C217.4	Understand our State Executive & Elections system of India.
C217.5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

SUB: Web Programming

Sub Code: 21CSL481

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After successful completic	on of	this course,	the students	will be able to:
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СО	Description
C218.1	Describe the fundamentals of web and concept of HTML.
C218.2	Use the concepts of HTML, XHTML to construct the web pages.
C218.3	Interpret CSS for dynamic documents
C218.4	Evaluate different concepts of JavaScript & Construct dynamic documents.
C218.5	Design a small project with JavaScript and XHTML.

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Course Outcomes

CSE

NBA

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V SEMESTER

Sub Code: 21CS51

SUB: Automata Theory and compiler Design After successful completion of this course, the students will be able to:

CO	Description
C301.1	Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation.
C301.2	Design and develop lexical analyzers, parsers and code generators.
C301.3	Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
C301.4	Acquire fundamental understanding of the structure of a Compiler and Apply concepts automata theory and Theory of Computation to design Compilers
C301.5	Design computations models for problems in Automata theory and adaptation of such model in the field of compilers

SUB: Computer Networks

Sub Code: 21CS52

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

CO	Description	
C302.1	Learn the basic needs of communication system.	
C302.2	Interpret the communication challenges and its solution.	
C302.3	Identify and organize the communication system network components.	
C302.4	Design communication networks for user requirements.	

SUB: Database Management Systems

Sub Code: 21CS53

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

CO	Description
C303.1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS
C303.2	Use Structured Query Language (SQL) for database manipulation and also demonstrate the basic of query evaluation.
C303.3	Design and build simple database systems and relate the concept of transaction, concurrency control and recovery in database
C303.4	Develop application to interact with databases, relational algebra expression.
C303.5	Develop applications using tuple and domain relation expression from queries.

SUB: Artificial Intelligence and Machine Learning

Sub Code: 21CS54



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CO	Description
C304.1	Apply the knowledge of searching and reasoning techniques for different applications.
C304.2	Have a good understanding of machine leaning in relation to other fields and fundamental issues and challenges of machine learning.
C304.3	Apply the knowledge of classification algorithms on various dataset and compare results
C304.4	Model the neuron and Neural Network, and to analyze ANN learning and its applications.
C304.5	Identifying the suitable clustering algorithm for different pattern

SUB: Database Management Systems Laboratory with Mini Project After successful completion of this course, the students will be able to:

Sub Code: 21CSL55

CO	Description
C305.1	Demonstrate the working of Create, Update and query on the database.
C305.2	Demonstrate the working of different concepts of DBMS
C305.3	Implement, analyze and evaluate the project developed for an application.

SUB: Research Methodology & Intellectual Property RightsSub Code: 21RMI56After successful completion of this course, the students will be able to:

CO	Description
C306.1	To know the meaning of engineering research
C306.2	To know the procedure of Literature Review and Technical Reading.
C306.3	To know the fundamentals of patent law sand drafting procedure.
C306.4	Understanding the copyright laws and subject matters of copyrights and designs
C306.5	Understanding the basic principles of design rights.

SUB: Environmental Studies

Sub Code: 21CIV57

CO	Description
C307.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.
C307.2	'Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
C307.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.
C307.4	Apply their ecological knowledge to illustrate and graph a problem and describe the



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	realities that managers face when dealing with complex issues.
C307.5	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.

SUB: Angular JS and Node JS

Sub Code: 21CSL581

CO	Description	
C308.1	Describe the features of Angular JS.	
C308.2	Recognize the form validations and controls.	
C308.3	Implement Directives and Controllers.	
C308.4	Evaluate and create database for simple application.	×0.
C308.5	Plan and build webservers with node using Node .JS.	

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Course Outcomes

CSE

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VI SEMESTER

SUB: Software Engineering & Project Management After successful completion of this course, the students will be able to:

CO Description Understand the activities involved in software engineering and analyze the role of C310.1 various process models Explain the basics of object-oriented concepts and build a suitable class model using C310.2 modelling techniques Describe various software testing methods and to understand the importance of agile C310.3 methodology and DevOps Illustrate the role of project planning and quality management in software C310.4 development Understand the importance of activity planning and different planning models C310.5

SUB: Fullstack Development

Sub Code: 21CS62

Sub Code: 21CS61

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

CO	Description
C311.1	Understand the working of MVT based full stack web development with Django.
C311.2	Designing of Models and Forms for rapid development of web pages.
C311.3	Analyze the role of Template Inheritance and Generic views for developing full stack web applications.
C311.4	Apply the Django framework libraries to render nonHTML contents like CSV and PDF.
C311.5	Perform jQuery based AJAX integration to Django Apps to build responsive full stack web applications,

SUB: Computer Graphics And Fundamentals Of Image Processing Sub Code: 21CS63 After successful completion of this course, the students will be able to:

СО	Description
C312.1	Construct geometric objects using Computer Graphics principles and OpenGL APIs.
C312.2	Use OpenGL APIs and related mathematics for 2D and 3D geometric Operations on the objects.
C312.3	Design GUI with necessary techniques required to animate the created objects
C312.4	Apply OpenCV for developing Image processing applications.
C312.5	Apply Image segmentation techniques along with programming, using OpenCV, for developing simple applications.



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Course Outcomes

CSE

NBA

SUB: Advanced Java Programming

Sub Code: 21CS642

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

CO	Description
C314.1	Understanding the fundamental concepts of Enumerations and Annotations
C314.2	Apply the concepts of Generic classes in Java programs
C314.3	Demonstrate the concepts of String operations in Java
C314.4	Develop web based applications using Java servlets and JSP
C314.5	Illustrate database interaction and transaction processing in Java

SUB: Programming In Java

Sub Code: 21CS654

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

СО	Description
C320.1	Develop JAVA programs using OOP principles and proper program structuring.
C320.2	Develop JAVA program using packages, inheritance and interface.
C320.3	Develop JAVA programs to implement error handling techniques using exception handling
C320.4	Demonstrate string handling concepts using JAVA.

SUB: Computer Graphics And Image Processing LaboratorySub Code: 21CSL66After successful completion of this course, the students will be able to:Sub Code: 21CSL66

CO	Description
C321.1	Use openGL /OpenCV for the development of mini Projects.
C321.2	Analyze the necessity mathematics and design required to demonstrate basic geometric transformation techniques
C321.3	Demonstrate the ability to design and develop input interactive techniques
C321.4	Apply the concepts to Develop user friendly applications using Graphics and IP concepts.

SUB: Mini Project

Sub Code: 21CSMP67

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

СО	Description	
C322.1	To implement the solutions for the given problems using modern tools.	1
C322.2	To exhibit team work skills.	
C322.3	Apply the knowledge of managing the project and its finance.	

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C322.4	Do the analysis of project and resolve the issues.	1.4
C322.5	Apply the training knowledge in future for lifelong learning	

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 Course Outcomes

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 2018 Scheme

III SEMESTER

SUB: Transform Calculus, Fourier Series And Numerical TechniquesSub Code: 18MAT31After successful completion of this course, the students will be able to:Sub Code: 18MAT31

CO	Description
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
C201.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

SUB: Data Structures and Applications

Sub Code: 18CS32

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

СО	Description
C202.1	Use different types of data structures, operations and algorithms
C202.2	Apply searching and sorting operations on files
C202.3	Use stack, Queue, Lists, Trees and Graphs in problem solving
C202.4	Implement all data structures in a high-level language for problem solving.

SUB: Analog and Digital Electronics

Sub Code: 18CS33

14

CO	Description
C203.1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
C203.3	Simplify digital circuits using Karnaugh Map and Quine-McClusky Methods
C203.4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
C203.5	Develop simple HDL programs.



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Sub Code: 18CS34

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Course Outcomes

2018 Scheme

SUB: Computer Organization

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

СО	Description
C204.1	Explain the basic structure of computers, performance of processor, memory organization, machine instructions and assembly language.
C204.2	Demonstrate functioning of different subsystems, such as processor, input output and memory.
C204.3	Explain the working principles of different type's memory system.
C204.4	Apply the knowledge of arithmetic operations and analyze simple arithmetic and logical units.
C204.5	Illustrate hardwired control and micro programmed control, pipelining, embedded system and other computing systems.

SUB: Software Engineering

Sub Code: 18CS35

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

CO	Description	
C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.	
C205.2	Assess professional and ethical responsibility	
C205.3	Function on multi-disciplinary teams	
C205.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice	
C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems	

SUB: Discrete Mathematical Structures

Sub Code: 18CS36

14

СО	Description
C206.1	Demonstrate the correctness of an argument using propositional and predicate logic, and truth tables.
C206.2	Demonstrate the properties of Integers & fundamental principles of Counting.
C206.3	Make use of Relation and Function's properties to solve logical problems.
C206.4	Solve problems involving principle of Inclusion & Exclusion, and recurrence relations.
C206.5	Explain the fundamentals of Graphs and Trees.



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SUB: Analog and Digital Electronics Laboratory

Sub Code: 18CSL37

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

СО	Description
C207.1	Use appropriate design equations / methods to design the given circuit.
C207.2	Examine and verify the design of both analog and digital circuits using simulators
C207.3	Make us of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.
C207.4	Compile a laboratory journal which includes; aim, tool /instruments /software /components used, design equations used and designs, schematics, program listing, procedure followed, relevant theory, results as graphs and tables, interpreting and concluding the findings.

SUB: Data Structures Laboratory

Sub Code: 18CSL38

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

CO	Description
C208.1	Implement various linear and non-linear data structures.
C208.2	Demonstrate the working nature of different types of data structures and their applications.
C208.3	Implement the searching and sorting algorithms.
C208.4	Select the appropriate data structures for solving computing problems.

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Course Outcomes

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2018 Scheme

IV SEMESTER

SUB: C	omplex Analysis, Probability and Statistical Methods Sub Code: 18MAT41	
Aner su	ccessful completion of this course, the students will be able to:	
CO	Description	
C210.1	Use the concepts of analytic function and complex potentials to solve the problems arising in Electromagnetic field theory.	
C210.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fl flow Visualization and image processing.	
C210.3 Apply discrete and continuous probability distributions in analyzing the models arising in engineering field.		
C210.4 Make use of the correlation and regression analysis to fit a suitable model for the Statistical data.		
C210.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.	

SUB: Design and Analysis of Algorithms

Sub Code: 18CS42

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

CO	Description
C211.1	Explain the specifications of algorithms, fundamental data structures and their operations.
C211.2	Explain various searching problem solving techniques.
C211.3	Explain various sorting problem solving techniques.
C211.4	Estimate the computational complexity of different algorithms.
C211.5	Choose appropriate algorithmic strategies for problem solving.

SUB: Operating Systems

Sub Code: 18CS43

CO	Description
C212.1	Demonstrate need for Operating System and its types.
C212.2	Explain the multithreaded systems and scheduling algorithms.
C212.3	Illustrate the concept of process synchronization and Deadlock.
C212.4	Explain the concept of memory management and File System.
C212.5	Illustrate the different concepts of disk management, Protection and Linux System case studies.



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Course Outcomes

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Sub Code: 18CS44

SUB: Microcontrollers and Embedded Systems After successful completion of this course, the students will be able to:

CO	Description
C213.1	Describe the architectural features and instructions of ARM microcontroller.
C213.2	Apply the knowledge gained for Programming ARM for different applications.
C213.3	Interface external devices and I/O with ARM microcontroller.
C213.4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C213.5	Develop the hardware /software co-design and firmware design approaches.

SUB: Object Oriented Concepts

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

CO	Description
C214.1	Explain concepts of object oriented programming with C++.
C214.2	Develop Java programs to solve problems.
C214.3	Explain Inheritance, Exceptions, Packages and Interfaces in Java.
C214.4	Develop multithreaded programs.
C214.5	Develop simple event based Graphical User Interfaces using Swings.

SUB: Data Communication

Sub Code: 18CS46

Sub Code: 18CS45

СО	Description	6
C215.1	Explain the various components of data communication.	
C215.2	Explain the fundamentals of digital communication and switching.	
C215.3	Compare and contrast data link layer protocols.	
C215.4	Summarize IEEE 802.xx standards	



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Course Outcomes

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SUB: Design, Analysis of Algorithms Laboratory

Sub Code: 18CSL47

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

CO	Description
C216.1	Develop Java programs to demonstrate Inheritance, Exception handling and multi- threading concepts.
C216.2	Develop a Java Program to demonstrate the stack operations.
C216.3	Develop the variety of algorithms using Greedy, dynamic programming and Backtracking techniques.
C216.4	Analyze the performance of sorting algorithms based on divide-and-conquer technique.

SUB: Microcontrollers and Embedded Systems Laboratory Sub After successful completion of this course, the students will be able to:

Sub Code: 18CSL48

СО	Description
C217.1	Develop and test Assembly Language Program (ALP) using ARM7TDMI/LPC2148
C217.2	Conduct the following experiments on an ARM7TDMI/LPC2148 evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4 tool /compiler tool/ compiler.
C217.3	Choose micro controllers for various kinds of applications.

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V SEMESTER

TTT I

Sub Code: 18CS51

1	T2 1 1
After successful completion of this course	, the students will be able to:
SUB: Management & Entrepreneurship Fo	or 11 mausu y

CO	Description	
C301.1	Explain the basic concepts of management, planning, Organizing and Staffing.	
C301.2	Summarize the appropriate leadership styles, motivation theories, communications, Coordination and controlling, methods	
C301.3	Interpret the meaning of entrepreneur, entrepreneurship and role in economic development on India. Along with Identification of business opportunities and feasibility study	
C301.4	Inferring the new ideas, Prepare project report based on guidelines of planning commission by utilizing the resources available effectively through ERP	
C301.5	Explain the IPRs and institutional support in Micro and Small Enterprises as per the Indian Industrial Policy 2007.	

SUB: Computer Networks

Sub Code: 18CS52

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

СО	Description
C302.1	Explain principles of application layer protocols
C302.2	Identify transport layer services and infer UDP and TCP protocols
C302.3	Classify routers, IP and Routing Algorithms in network layer
C302.4	Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard
C302.5	Explain Multimedia Networking and Network Management

SUB: Database Management Systems

Sub Code: 18CS53

CO	Description
C303.1	Define, Identify and analyze database objects, enforce integrity constraints on a database using RDBMS.
C303.2	Use Structured Query Language (SQL) for database manipulation.
C303.3	Build simple database systems
C303.4	Develop application to interact with databases.



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2018 Scheme

CSE

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Course Outcomes

SUB: Automata Theory and Computability

Sub Code: 18CS54

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

CO	Description
C304.1	Apply the fundamental understanding of automata theory to design FSMs for regular Languages.
C304.2	Demonstrate the understanding of the regular expressions & Regular grammar and their Equivalence.
C304.3	Apply the fundamental understanding of automata theory to design and develop CFG and PDA and their relative powers.
C304.4	Apply the fundamental understanding of automata theory to design and develop Turing Machine.
C304.5	Explain the fundamental understanding of Decidability and Complexity of the problems.

Sub Code: 18CS55

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

CO	Description
C305.1	Demonstrate proficiency in handling of loops and creation of functions
C305.2	Identify the methods to create and manipulate lists, tuples and dictionaries.
C305.3	Discover the commonly used operations involving regular expressions and file system.
C305.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C305.5	Determine the need for scraping websites and working with CSV, JSON and other file formats.

SUB: Unix Programming

Sub Code: 18CS56

CO	Description	
C306.1	Explain Unix Architecture, File system and use of Basic Commands	
C306.2	Illustrate Shell Programming and to write Shell Scripts	
C306.3	Categorize, compare and make use of Unix System Calls	
C306.4	Build an application/service over a Unix system	
C306.5	Explain signal and daemon characteristics	

SUB: Application Development Using Python



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SUB: Computer Networks Laboratory

Sub Code: 18CSL57

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

CO	Description
C307.1	Analyze and Compare various networking protocols.
C307.2	Demonstrate the working of different concepts of networking.
C307.3	Implement, analyze and evaluate networking protocols in NS2 / NS3 and Java Programming.

SUB: DBMS Laboratory with Mini Project

Sub Code: 18CSL58

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

CO	Description	_
C308.1	Demonstrate creation and manipulation operations on database.	
C308.2	Demonstrate the working of different concepts of DBMS	
C308.3	Develop and demonstrate the project developed for an application.	

SUB: Environmental Studies

Sub Code: 18CIV59

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

CO	Description
C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.
C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components
C309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

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2018 Scheme

CSE

NBA

Course Outcomes

VI SEMESTER

SUB: System Software and Compilers

Sub Code: 18CS61

After su	ccessful completion of this course, the students will be able to:
CO	Description
C310.1	Explain system software such as assemblers and Loader
C310.2	Apply the fundamental concepts learnt for designing & implementing lexical analysis phase of compiler.
C310.3	Apply the concepts studied for designing & Developing Syntax analysis phase.
C310.4	Make use of translation techniques learnt for code generation phase.
C310.5	Utilize LEX and YACC tools for implementing different concepts of system software.

SUB: Computer Graphics and Visualization

Sub Code: 18CS62

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

CO	Description	
C311.1	Explain hardware, software and OpenGL Graphics Primitives.	
C311.2	Illustrate Geometric transformations on both 2D and 3D objects.	
C311.3	Apply concepts of clipping, color and Illumination Models in 2D and 3D objects.	
C311.4	Apply the concepts of viewing and visible surface detection of 3D objects	
C311.5	Explain curve generating concepts and interactive computer graphics using the OpenGL.	

SUB: Web Technology and its Applications

Sub Code: 18CS63

CO	Description
C312.1	Adapt HTML and CSS syntax and semantics to build web pages.
C312.2	Construct and visually format tables and forms using HTML and CSS.
C312.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
C312.4	Appraise the principles of object oriented development using PHP
C312.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.



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Course Outcomes

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NBA

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SUB: Data Mining and Data Warehousing

Sub Code: 18CS641

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

CO	Description		
C313.1	Explain data warehouse and multi-dimensional data models.		
C313.2	Explain various operations on data warehouse and data models.		
C313.3	Apply concept, algorithms and applications of association rules for solving data mining problems.		
C313.4	Apply concept, algorithms and applications of classifications for solving data mining problems.		
C313.5	Apply concept, algorithms and applications clustering for solving data mining problems.		

SUB: Programming in Java

Sub Code: 18CS653

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

CO	Description
C320.1	Explain the object-oriented concepts and JAVA.
C320.2	Develop computer programs to solve real world problems in Java.
C320.3	Develop simple GUI interfaces for a computer program to interact with users.

SUB: System Software Laboratory

Sub Code: 18CSL66

CO	Description
C322.1	Demonstrate the Lexical analysis using Lexer.
C322.2	Demonstrate the syntax analysis phase of Compiler design using Parser.
C322.3	Develop the different CPU scheduling algorithms.
C322.4	Demonstrate the different memory management algorithms.
C322.5	Demonstrate the deadlock handling algorithm.



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Course Outcomes

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SUB: Computer Graphics Laboratory with Mini Project After successful completion of this course, the students will be able to: Sub Code: 18CSL67

CO	Description	
C323.1	Demonstrate simple algorithms using OpenGL Graphics Primitives and attributes.	
C323.2	Demonstrate line drawing and clipping algorithms using OpenGL functions.	
C323.3	Demonstrate 2D and 3D Geometric transformations using OpenGL functions.	
C323.4	Demonstrate computer graphics applications using OpenGL.	
C323.5	Make use of OpenGL functions to animate real world problems.	

SUB: Mobile Application Development

Sub Code: 18CSMP68

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

CO	Description
C324.1	Create, test and debug Android application by setting up Android development environment.
C324.2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
C324.3	Infer long running tasks and background work in Android applications.
C324.4	Demonstrate methods in storing, sharing and retrieving data in Android applications.
C324.5	Infer the role of permissions and security for Android applications.

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VII SEMESTER

SUB: Artificial Intelligence and Machine Learning

Sub Code: 18CS71

Sub Code: 18CS82

After su	ccessful completion of this course, the students will be able to:
СО	Description
C401.1	Appraise the theory of Artificial intelligence and Machine Learning
C401.2	Illustrate the working of AI and ML Algorithms.
C401.3	Demonstrate the applications of AI and ML.

SUB: Big Data Analytics

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

CO	Description
C402.1	Understand fundamentals of Big Data analytics.
C402.2	Investigate Hadoop framework and Hadoop Distributed File system.
C402.3	Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data.
C402.4	Demonstrate the MapReduce programming model to process the big data along with Hadoop tools.
C402.5	Use Machine Learning algorithms for real world big data and analyze web contents and Social Networks to provide analytics with relevant visualization tools.

SUB: Advanced Computer Architecture

Sub Code: 18CS733

CO	Description
C405.1	Explain the fundamentals of computer architecture.
C405.2	Explain the basic concepts of Pipelining.
C405.3	Explain Internal Data Forwarding, Software Interlocking, Hardware Score boarding, Hazard avoidance, Branch handling and Instruction issuing techniques.
C405.4	Explain multi-processor and thread level parallelism.
C405.5	Explain parallel programming model.



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SUB: Cryptography

Sub Code: 18CS744

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

CO	Description	
C411.1	Define and Explain cryptography, its principles and algorithms.	
C411.2	Illustrate Public and Private key cryptography	
C411.3	Explain Key management, distribution and certification	
C411.4	Explain authentication protocols	
C411.5	Explain IP Security.	

SUB: Artificial Intelligence and Machine Learning LaboratorySub Code: 18CSL76After successful completion of this course, the students will be able to:Sub Code: 18CSL76

CO	Description
C417.1	Implement and demonstrate AI and ML algorithms.
C417.2	Evaluate different algorithms.

SUB: Project Work Phase - I

Sub Code: 18CSP77

CO	Description
C418.1	Understanding of the state of things.(Literature Survey)
C418.2	Serious needs/problems of the people where it demands solution.(Problem Identification)
C418.3	Discover answers to problems through the application of scientific procedures. (Methodology)
C418.4	Written and overall communication.
C418.5	Understand the planning of Project.

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VIII SEMESTER

SUB: Internet of Things . 0

Sub Code: 18CS81

After su	ccessful completion of this course, the students will be able to:
CO	Description
C419.1	Assess the genesis and impact of IoT applications, architectures in real world.
C419.2	Illustrate diverse methods of deploying smart objects and connect them to network.
C419.3	Compare different Application protocols for IoT.
C419.4	Infer the role of Data Analytics and Security in IoT.
C419.5	Appraise and Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry.

SUB: Storage Area Networks

Sub Code: 18CS822

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

CO	Description
C421.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization.
C421.2	Explain components and the implementation Network-Attached Storage NAS.
C421.3	Describe CAS architecture and types of archives and forms of virtualization.
C421.4	Illustrate the storage infrastructure and management activities.

SUB: Project Work Phase - 2

Sub Code: 18CSP83

СО	Description
C424.1	Determine, dissect, and estimate the parameters, required in the solution.
C424.2	Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics.
C424.3	Compile the report and take part in presentation.
C424.4	Formulate and Analyze the problem and determine the scope of the solution chosen
C424.5	Identify a issue and derive problem related to society, environment, economics, energy and technology



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SUB: Technical Seminar

Sub Code: 18CSS84

CSE

NBA

2018 Scheme

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

CO	Description
C425.1	Choose the modern topic, carryout the comprehensive survey & understand the relevance.
C425.2	Analyze and interpret the impact of the topic on the society/Environment/ domain.
C425.3	Build the report with Technical content and communicating it to the audience, following the moral and ethics.
C425.4	Select appropriate Communication and Visual aids for effective presentation

SUB: Internship

Sub Code: 18CSI85

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

CO	Description
C426.1	Adapt easily to the industry environment.
C426.2	Take part in team work.
C426.3	Make use of modern tools.
C426.4	Decide upon project planning and financing.
C426.5	Adapt ethical values.
C426.6	Motivate for lifelong learning.

H.O.D Computer Science & Engg. HIT. Nidasoshi