

# Supporting Documents for Qualitative Metric 2.6.1



**Submitted to NAAC**

**By**

**Gandhi Institute For Technology (GIFT),  
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## Course Outcomes for all Programmes: 2021-22

Sl.No	Subject code	Subject	Course	Description of Course outcomes
101	C101	Mathematics -1	C101.1	Know first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			C101.2	Comprehend linear differential equation of higher order, homogeneous equation with constant coefficient, Euler - Cauchy equation and solutions by variations of parameter to model electric circuits.
			C101.3	Compute series solutions of differential equations , power series method, Lagenders polynomials and Bessel's function to solve complex engineering problems.
			C101.4	Differentiate first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			C101.5	Understand linear equation and vector space
			C101.6	Explain the asymptote and curvature problems
102	C102	Chemistry	C102.1	A basic idea about chemical reactions, its feasibility, rate, Effect of catalyst on reaction rate.
			C102.2	Know about structure, bonding pattern, property of different atom, molecule, and ion.
			C102.3	Understandthe different types of solids and their diffects.
			C102.4	Apply the knowledge of EMF in case of different types of commercial battery.
			C102.5	Illustrate about the different types of equillibriums and related concepts.
			C102.6	Describe the free energy concepts in detail.
103	C103	Basics of Electronics	C103.1	A basic knowledge of Semiconductor.

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			C103.2	Understand the use of diodes as power supply rectifiers.
			C103.3	Apply the basic operation of OP-AMP circuit.
			C103.4	Analyse functional details and operation of transistors as switching circuits.
			C103.5	Illustrate the main elements of a communication system, and the principles related to its operation.
			C103.6	Summarize the principle and working of different logic gates and the related instruments.
104	C104	Thermodynamics	C104.1	Know about the basic concept and 1 <sup>st</sup> law of Thermodynamics.
			C104.2	Learn about the second law of Thermodynamics and entropy
			C104.3	Know about the properties of pure substance and steam power.
			C104.4	Distinguish between the flow and non-flow processes.
			C104.5	Distinguish between the ideal and real gases.
			C104.6	Learn about the gas mixture.
105	C105	Programming in C	C105.1	Know about the different parts of computer and binary representation of numbers along with their operations.
			C105.2	Understand the structured programming processes and operating systems.
			C105.3	Use and handle the C language fundamentals.
			C105.4	Differentiate between different programmes like monolithic and modular etc.
			C105.5	Apply the different C functions.
			C105.6	Learn about the pointers and file handling

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106	C106	English Communication Skill	C106.1	Well versed with various elements and concepts related to communicative English.
			C106.2	Learn the good interview skills.
			C106.3	Fine tuned their pronunciation and accent by adhering to the rules of phonetics, word stress intonation
			C106.4	Effectively use the various rules of grammar for framing good English.
			C106.5	Communicate fluently and accurately with the four skills: Speaking, Listening, Writing and Reading.
			C106.6	Differentiate between verbal and non verbal communication
107	C107	Chemistry Lab	C107.1	Know the procedure of preparation of some important drug like Aspirine
			C107.2	Understand the knowledge about the principle, reaction, uses of commercial battery.
			C107.3	Estimate the amount of Fe <sup>2+</sup> , Ca <sup>2+</sup> , Total Hardness, Percentage of available Chlorine in a given sample.
			C107.4	Illustrate the procedure of determination of Flash point, fire point, viscosity of lubricating oil and can determine the amount DO level in a sample of water.
			C107.5	Determine the amount of individual alkali present in a mixture.
108	C108	Basics of Electronics Lab	C108.1	Know all active and passive components such as diode, transistors of an electronic circuits
			C108.2	Understand the main elements of a communication system, and the principles related to its operation
			C108.3	Handle all measuring instruments such as CRO, multi meter and use them for any practical

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				necessities.
			C108.4	Record and analyze the output of different developed circuits
			C108.5	Design different circuits using OPAMP, Diode and Transistors.
109	C109	Programming in C lab	C109.1	Write C codes on standard computing devices using conditional, branching and iterative constructs.
			C109.2	To understand modularization concept and write efficient and manageable code using functions
			C109.3	To model real life multi dimensional problems by using multi dimensional structures of C.
			C109.4	To manage various memory fragmentation problems by using dynamic memory concepts.
			C109.5	To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
110	C110	English Communication Skill Lab	C110.1	Write correct English by avoiding common errors of grammar.
			C110.2	Listen to the English speeches with focus on segmental sounds, stress, weak forms and intonations.
			C110.3	Speak English with correct pronunciation
			C110.4	Use the standard dictionary to find the correct pronunciation of words and perform various phonemic transcriptions.
			C110.5	Prepare scenario or topic based writings and would be able to present them as required essentially in carrying out project works.
111	C111	Engineering Workshop	C121.1	Know about various tools and tackles used in workshop.

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			C121.2	Understand practical in fitting job.
			C121.3	Operate the lathe machine.
			C121.4	Analyse the functions of welding machine.
			C121.5	Describe shaper machine, milling machine, drilling machine etc.
112	C112	Mathematics-II	C112.1	Know Laplace Transform to get the solution to differential equation, convolution and Integral equation.
			C112.2	Interpret the concepts of Fourier series, Fourier transform, Fourier Integral
			C112.3	Solve beta function and error function to get solutions of complex real life problem.
			C112.4	Compare the scalar and vector problems.
			C112.5	Evaluate line integral and double integration problems
			C112.6	Know the techniques of combine the problems using Gauss divergence and Stoke's theorem
113	C113	Physics	C113.1	Know the concepts of quantum mechanics.
			C113.2	Understand the basic features of different oscillatory systems, waves and related properties.
			C113.3	Apply vector calculus in electromagnetic waves.
			C113.4	Differentiate between interference and diffraction.
			C113.5	Analyse the application of quantum mechanics to various physical problems.
			C113.6	Produce polarized light, to construct Nicol prism, quarter wave & half wave plate.
114	C114	Basic Electrical Engineering	C114.1	Know about Direct current, voltage, power, sources and analysis of electrical networks

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			C114.2	Understand electromagnetism and electronics measuring instruments.
			C114.3	Apply AC fundamentals and DC transients in electrical circuits.
			C114.4	Compare rotating electrical machines and stationery electrical machine as transformer.
			C114.5	Describe about power supply systems
			C114.6	Relates the industrial applications of Electrical energy
115	C115	Mechanics	C104.1	Understand the fundamentals of Mechanics & compute the equilibrium of rigid bodies.
			C104.2	Learn the concept of parallel forces, moment, Couple & effect of friction on equilibrium.
			C104.3	Locate the Centroid & determine the area/mass moment of inertia of different shapes.
			C104.4	Understand the concept of virtual work and determine the forces in members of trusses
			C104.5	Learn kinematics, kinetics of particle and rigid body, related principles
			C104.6	Solves the numerical on the projectile, D-Alembert's principle and analyze impact of elastic bodies on collision.
116	C116	Data Structure Using C	C116.1	Write C codes on standard computing devices using conditional, branching and iterative constructs.
			C116.2	To understand modularization concept and write efficient and manageable code using functions
			C116.3	To model real life multi dimensional problems by using multi dimensional structures of C.
			C116.4	To manage various memory fragmentation

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				problems by using dynamic memory concepts.
			C116.5	To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
			C116.6	Apply data structure and algorithm for a given contextual problem and develop in C.
117	C117	Business Communication	C117.1	Understand of the essential elements of business communication
			C117.2	Learn the different reading skills
			C117.3	Acquire appreciative level of soft skill
			C117.4	Understand the cross cultural communications, avoidance of racial, gender and other form of bias communication.
			C117.5	Adequate knowledge of effective writing skills
			C117.6	Represent the common forms of oral and written communication
118	C118	Physics Lab	C118.1	Determine acceleration due to gravity by bar pendulum, modulus of rigidity of elastic wire, Young's modulus of wire & surface tension of water.
			C118.2	Summarize the thermal conductivity of bad conductor, grating element of plane diffraction grating.
			C118.3	Relate the wavelength of sodium light by Newton ring & Fresnel's bi-prism method in a well maintained dark.
			C118.4	Identify the characteristic curve of PN diode, Bipolar junction transistor & charge and discharge time of a condenser connected in RC circuit.
			C118.5	Describe a project work on topics having different branches of physics.



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119	C119	Basic Electrical Engineering Lab	C119.1	How to measure the electrical consumption of various devices as well as for DC compound machines.
			C119.2	Distinguish operate and control the speed of DC shunt motor, Three phase induction motor.
			C119.3	Show the characteristics and use of Incandescent lamps and fuses.
			C119.4	Analyze the open circuit characteristics of DC shunt generators
			C119.5	Evaluate current, voltage and power in AC electric circuits
120	C120	Data Structure Using C Lab	C120.1	Identify and implement asymptotic notations of an algorithm to analyze the consumption of resources (time/space).
			C120.2	Generalize knowledge of stack, queue and list ADT to manage the memory using static and dynamic allocations
			C120.3	Apply binary search tree to design applications.
			C120.4	Recognize, analyze, model, and implement code for real life problems like shortest path.
			C120.5	Model and implement comparison-based search algorithms and sorting algorithms.
121	C121	Business Communication lab	C121.1	Make good oral communication in work related situations.
			C121.2	Acquire good reading and writing skill.
			C121.3	Gain appreciative level of soft skill, such that can establish their leadership quality, can make productive contribution in group discussion and brain storming sessions.
			C121.4	Enable them professionally to sustain his/her career

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			C121.5	Equip themselves by learning the nuances of selection process to get into an employment
122	C122	Engineering Drawing Lab	C111.1	Gather knowledge about the tools and tackles used for drawing.
			C111.2	Explain how to draw projection of points and lines.
			C111.3	Show projection of planes and solids.
			C111.4	Construct the cut section and development of points.
			C111.5	Describe isometric view and can able to draw in AUTO CAD.
123	C201	Mechanics of Solids	C201.1	Understand the concept of stress.
			C201.2	Solve problem on biaxial state of stress and strain
			C201.3	Solve problem on Shear force, bending moment and bending of beam.
			C201.4	Analyse and solve problem on deflection of beam.
			C201.5	Analyse theory of column and struts.
			C201.6	Design of helical springs and torsion.
124	C202	Fluid Mechanics & Hydraulics Machines	C202.1	Understand the fundamentals of fluid mechanics and fluids.
			C202.2	Determine the basic equation to find the force on submerged surfaces.
			C202.3	Calculate the centre of buoyancy of floating body, and the, velocity and acceleration of a fluid.
			C202.4	Learn about fluid kinematics and fluid dynamics.
			C202.5	Differentiate between hydraulic turbines and reaction turbines.
			C202.6	Analyze Centrifugal pumps and positive displacement pumps.

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125	C203	Applied Mathematics -III	C203.1	Understand the concepts of Analytic functions, Complex integrations and Cauchy-Riemann equations.
			C203.2	Evaluate real integrals and learn residue integration method.
			C203.3	Explain the errors of numerical results and different types of interpolations.
			C203.4	Implement different Numerical Integration methods and find solution to ordinary differential equations.
			C203.5	Analyse Random variables and different Probability Distributions.
			C203.6	Apply Correlation analysis, Regression Analysis and Statistical hypothesis.
126	C204	Organizational Behaviour	C204.1	Discuss the development of the field of organizational behaviour and explain the micro and macro approaches.
			C204.2	Analyse and compare different models used to explain individual behaviour related to motivation and rewards.
			C204.3	Explain group dynamics and demonstrate skills required for working in groups (team building).
			C204.4	Identify the various leadership styles and the role of leaders in a decision making process.
			C204.5	Explain organizational culture and describe its dimensions and to examine various organizational designs.
			C204.6	Discuss the implementation of organizational change.
127	C205	OOP using JAVA	C205.1	Recall Object oriented programming paradigm.
			C205.2	Apply abstraction using interfaces & packages.

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			C205.3	Develop GUI basics and event driven programming to design interactive user interfaces.
			C205.4	Implement exception handling and collection framework.
			C205.5	Construct web applications using JDBC and networking APIs.
			C205.6	Build industry level applications using MVC, Containers & Layout managers.
128	C206	Environmental Science	C206.1	Idea about ecosystem process and cycle .
			C206.2	details about environmental law and soil chemistry
			C206.3	details about water treatment, and active sludge treatment,pollution and pollutant
			C206.4	Solid waste, Solid Waste Management, Source classification and composition of MSW,Hazardous Waste Management, Hazardous waste and their generation,
			C206.5	Inorganic waste treatment,Hazard Control Measures in integrated steel industry,Occupational Safety and Health Acts
			C206.6	Fire prevention,electrical safety,ppe,safety management,
129	C207	Mechanics of Solids LAB	C207.1	Determine tensile strength , compressive strength , bending strength and double shear test by using a UTM machine.
			C207.2	Determine the impact strength and hardness strength of a material.
			C207.3	Determine the modulus of rigidity modulus and fatigue strength of a given material.
			C207.4	Estimate the spring constant under tension and compression.

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			C207.5	Measurement of stress and strain by using strain gauge & strain rosette.
130	C208	Fluid Mechanics & Hydraulics Machines LAB	C208.1	Determine metacentric height & analyse stability of floating bodies.
			C208.2	Determine Cv & Cd of orifices.
			C208.3	Determine Force exerted on stationary plate held normal to jet.
			C208.4	Estimate performance parameters of a given Centrifugal and Reciprocating pump by conducting test.
			C208.5	Determine performance parameters of a given pelton & Francis turbine and experiments on flow through pipes.
131	C209	OOP using JAVA Lab	C209.1	Find object oriented features, such as abstraction, inheritance, polymorphism for writing an effective program
			C209.2	Understand and compile code under java programming environment
			C209.3	Apply multi threaded applications and can do thread synchronization.
			C209.4	Develop own packages and organize the user defined classes.
			C209.5	Recommend API to design web based as well as standalone applications
132	C210	Evaluation of Internship-I	C210.1	Explore career alternatives prior to graduation.
			C210.2	Integrate theory and practice.
			C210.3	Assess interests and abilities in their field of study.
			C210.4	Develop work habits and attitudes necessary for job success

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			C210.5	Develop communication, interpersonal and other critical skills in the job interview process.
133	C211	Kinematics & Dynamics Machines	C211.1	Understanding the mechanisms with kinematics of motion.
			C211.2	Description of gear terminology and determination of speed ratio of gear train
			C211.3	Determination of inertia and engine force analysis
			C211.4	Calculation of different types of friction effects
			C211.5	Learn about different friction drives for power transmission
			C211.6	Analyze different types of brake and dynamometer
134	C212	Engineering Thermodynamics	C212.1	Knowledge about availability and entropy generation
			C212.2	Solve problem on vapour power cycles.
			C212.3	Analyse and solve problem on gas power cycles.
			C212.4	Solve problem on refrigeration cycle.
			C212.5	Understand the thermodynamic property relations.
			C212.6	Solve problem on reciprocating air compressor.
135	C213	Engineering Economics	C213.1	Understand general concepts of micro and macroeconomic including theory of demand, Law of demand, elasticity of demand etc.
			C213.2	Distinguish between Micro economics and Macro Economics.
			C213.3	Solve cost and revenue based problems using Break Even Analysis approach.
			C213.4	Analyse the functioning of Banks and concepts of Inflation.
			C213.5	Discuss banking structures and various financial

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				systems.
			C213.6	Calculate the depreciation using different methods like Straight line method, Declining balance method.
136	C214	Introduction to Physical Metallurgy & Engineering Materials	C214.1	Understand the classification, Engineering properties, Metallic Bond and common Crystal Structures of Engineering Materials.
			C214.2	Learn about concept of Plastics deformation, Cold Working and Hot working, recrystallization and grain Growth.
			C214.3	Understand the Alloy Formation-Their Types, Solid Solutions and Solubility.
			C214.4	Learn about Allotropic transformation-Lever rule, Interpretation of solidification behaviours and microstructure of different alloys
			C214.5	Analyse Phase diagram, Steel -Cast iron, T.T.T. diagram: concept of heat treatment of steels
			C214.6	Understand Optical properties of Materials, about plastics, ceramics and composite materials.
137	C215	Mechanical Measurement, Metallurgy & Reliability	C215.1	Distinguish between methods of measurement, classification of measuring instruments, Measuring systems.
			C215.2	Understand on Transducer Elements: Analog Transducers, Digital Transducers, Basic detector transducer elements
			C215.3	Knowledge about Measurement of low pressures, Temperature, Force, Power, Speed and Torque Measurement.
			C215.4	Knowledge on Line and End & optical Standards, Measurement of Surface Roughness, Limits, Fits and Gauges.
			C215.5	Distinguish between Limits, Fits, Gauges &

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				geometric tolerances.
			C215.6	Knowledge about the system reliability, reliability improvement, maintainability and availability, Markov model, Life tests, acceptance sampling.
138	C216	Digital system design	C216.1	understand the basics of number system and digital gates
			C216.2	Able to differentiate between combinational and sequential circuit operation.
			C216.3	students will be able to analyse and design combinational circuit
			C216.4	students will be able to analyse and design sequential circuit
			C216.5	students will be able to design transistor level circuit
			C216.6	Learn how to write test-benches and perform verification of the relatively complex digital system.
139	C217	Constitution of India	C217.1	To impart basic knowledge about the Constitution of India.
			C217.2	Inculcate national and patriotic spirit among the students as responsible citizens of the country
			C217.3	To impart knowledge about state and central policies, fundamental duties, electoral process, amendment procedure and emergency provisions.
			C217.4	Impart the ethical values, responsibilities and obligations of the professional to the society and the nation.
			C217.5	To know the preamble of constitution
140	C218	Engineering Thermodynamics LAB	C218.1	Study of cut section 2-stroke and 4-stroke petrol and diesel engine.



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			C218.2	Study of steam power plant, refrigeration system and gas turbine power plant.
			C218.3	Performance analysis of reciprocating air-compressor and centrifugal compressor.
			C218.4	Performance characteristics of gear pump.
			C218.5	Measurement of steam quality using calorimeter.
141	C219	Kinematics & Dynamics Machines LAB	C219.1	Design of working model related to kinematics of Mechanisms and dynamics of machinery.
			C219.2	Determine the radius of gyration of connecting rod and Moment of Inertia of any irregular shaped body by using TRI –FILAR / BI-FILAR System.
			C219.3	Conduct experiment on screw jack and epicyclical gear train.
			C219.4	Conduct experiment on simple / compound/reverted gear train.
			C219.5	Experiment on brake and dynamometer.
142	C220	Mechanical Measurement, Metallurgy & Reliability LAB	C220.1	Calibration of LVDT / CRO & load cell.
			C220.2	Calibration of a Rota meter& thermo couples.
			C220.3	Calibration of Burden Tube Pressure Gauge and measurement of pressure using manometer.
			C220.4	Conduct experiment on Pneumatic trainer & Hydraulic trainer.
			C220.5	Measurement of straightness and flatness & roughness of the surface using slip gauges and sine bar.
143	C301	Design of Machine Elements	C301.1	Knowledge about mechanical engineering design and fundamental of machine design.
			C301.2	Design of joints.
			C301.3	Design of keys, shaft and couplings.

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			C301.4	Design of Mechanical springs.
			C301.5	Design of sliding contact bearing, journal bearing, and foot step bearing.
			C301.6	Knowledge about dynamic and static load rating.
144	C302	Machining Science & Technology	C302.1	Knowledge about the fundamentals of Machining and Machine Tools.
			C302.2	Calculate the cutting force and velocity of a tool.
			C302.3	Knowledge about Conventional machining process and machine tools.
			C302.4	Principles of machine tools.
			C302.5	Knowledge about Production machine tools.
			C302.6	Knowledge about Non-traditional Machining processes.
145	C303	Heat Transfer	C303.1	Basic concept of heat transfer and heat conduction.
			C303.2	Analysis and solve problem of convective heat transfer.
			C303.3	Analysis and solve problem of radiative heat exchange.
			C303.4	Solve problem on Heat transfer for boiling liquids and condensing vapours.
			C303.5	Knowledge about Radiation heat transfer process.
			C303.6	Analyse heat exchangers.
146	C304	Quality Management & Reliability	C304.1	Knowledge about quality assurance, illustrating the concept of quality inspection and identify the costs need to be carried out.
			C304.2	Solve different sampling inspection, OC curve and can explain about producer and consumer risk.
			C304.3	Draw chart related to X, r, np, c and can describe

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				about process capability, graph of signal to noise ratio.
			C304.4	Determine reliability and its factors and different time dependent failure models.
			C304.5	Interpret the economic analysis and life cycle cost and illustrating maintainability and availability.
			C304.6	Knowledge about the quality improvement fundamentals related with philosophy and concept of ISO:9000 series.
147	C305	Human Resources Management	C305.1	Get the concept, scope and objective of HRM.
			C305.2	Knowledge about the Recruitment, selection and tests.
			C305.3	Concept and objective ofof career planning, performance management, management and objectives.
			C305.4	Assess the feedback and Appraisal errors.
			C305.5	Knowledge about the management by objective.
			C305.6	Evaluate the effectiveness of training program.
148	C306	Advance Lab-I	C306.1	Concept of the fundamentalsofAuto CAD Software (Layers, Dimension&Annotations, Assembly Drawing concept, Bill of material etc.)
			C306.2	Draw the Orthographic Drawings of Machine Components.
			C306.3	Draw the Sectional views from Orthographic Drawings of Machine Components.
			C306.4	Draw the Projection of Solids by using Auto CAD Software.
			C306.5	Analyse and drawdifferent machine components (Ex- Screw Fastening, Shaftcoupling, cotter joint etc.)by using Auto CAD.

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149	C307	Design of Machine Elements LAB	C307.1	Design of working model.
			C307.2	Design and drawing of riveted joints, cotter joint.
			C307.3	Design and drawing of knuckle joint and flange coupling.
			C307.4	Design of spring.
			C307.5	Design of bearing.
150	C308	Machining Science & Technology LAB	C308.1	Operate lathe and milling machine.
			C308.2	Operate shaper, slotting and grinding machine.
			C308.3	Determine cutting force using lathe tool dynamometer and drill tool dynamometer.
			C308.4	Knowledge about non-traditional machining process.
			C308.5	Making job on CNC lathe and CNC machining process.
151	C309	Heat Transfer LAB	C309.1	Determination of thermal conductivity of composite lab and heat transfer coefficient in natural/forced convection.
			C309.2	Determination of surface emissivity.
			C309.3	Determination of Critical heat flux during boiling heat transfer.
			C309.4	Performance test on parallel flow and counter flow heat exchanger.
			C309.5	Determination of Efficiency and effectiveness of fins (Natural / Forced convection) and verification of Verification of Stefan Boltzmann's law.
152	C310	Production & Operation Management	C310.1	Describe the concept of operations management and productivity. Differentiate between manufacturing vs service operation.
			C310.2	Design of products and processes.

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			C310.3	Differentiate between work study and method study. Calculate Standard Time.
			C310.4	Understand different methods of Forecasting, Solve and Analyse problems using different forecasting Techniques. Evaluate and rank location and layout.
			C310.5	Develop aggregate capacity plan and Production Schedule. Understand different Dispatching Rules. Able to Balance Assembly Lines.
			C310.6	Calculate EOQ.
153	C311	Refrigeration & Air Conditioning	C311.1	Analyse and solve problem on air refrigeration system, vapour compression system, multi-stage compression and multi evaporator system.
			C311.2	Solve problem on vapour absorption system
			C311.3	Acquire Knowledge about thermoelectric refrigeration and refrigerants.
			C311.4	Obtain Knowledge about different psychometric processes and Solve problem on psychometrics.
			C311.5	Understand about requirement of Comfort air Conditioning.
			C311.6	Acquire knowledge about different types of Air Conditioning systems.
154	C312	Product Design & Production Tooling	C312.1	Acquire knowledge about product design and process planning.
			C312.2	Obtain knowledge about process planning and time & cost estimation.
			C312.3	Design dies for drop forging, upset forging and flash and gutter.
			C312.4	Design die for sheet metal operation, shearing, blanking, piercing, deep drawing operation, progressive and compound sheet metal working.

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			C312.5	Design of jigs and fixtures and gather knowledge on principle of location and clamping and clamping methods.
			C312.6	Design of single point cutting tool, broach and form tool, limit gauges, tooling for turret lathe.
155	C313	Automobile Engineering.	C313.1	Acquire knowledge about the main units of automobile.
			C313.2	Learn about the power for propulsion and breaking systems.
			C313.3	Know about the transmission systems and gear box.
			C313.4	Analyse the front wheel geometry and steering systems.
			C313.5	Gain knowledge about the Front wheel Geometry and steering systems.
			C313.6	Learn about different electrical vehicles and the electrical system of an automobile.
156	C314	Green Technology	C314.1	Understand about the ecosystem process and cycles.
			C314.2	Learn about environmental law and soil chemistry.
			C314.3	Elaborate water treatment, and active sludge treatment, pollution and pollutant.
			C314.4	Discuss Solid Waste Management, MSW, Hazardous Waste Management and their generation.
			C314.5	Gather knowledge about waste treatment & Control Measures and Occupational Safety and Health Acts.
			C314.6	Implement Fire prevention, electrical safety, management.

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157	C315	Industrial Lecture Lab	C315.1	Demonstrate the applications of engineering concepts and principles learned in classroom.
			C315.2	Illustrate processes and products manufactured in the industries.
			C315.3	Improve interpersonal skill by communicating directly with industrial personnel.
			C315.4	Develop awareness of the engineering and technological aspects.
			C315.5	Aware of the roles and ethics of engineers in the industries,
158	C316	Buisness Communication and Skill for InterviewLAB	C316.1	Convey thoughts and ideas with clarity and Communicate effectively.
			C316.2	Make effective presentations.
			C316.3	Write different types of reports.
			C316.4	Face interview & group discussion.
			C316.5	Critically think on a particular problem and Handle Engineering Ethics and Human Values.
159	C317	Production & Operation Management LAB	C317.1	Design the layout of an institute after studying the same for an existing institute.
			C317.2	Do work sampling for any work situation.
			C317.3	Compare different parameters for selecting the location for any given type of Industry.
			C317.4	Determine optimum stock of different Items for a consumer store.
			C317.5	Operate MES software.
160	C318	Refrigeration & Air Conditioning LAB	C318.1	Determine C.O.P on vapour compression system and vapour absorption system.
			C318.2	Performance test of air conditioning test rig of window type.

## Course Outcomes for all Programmes: 2021-22

			C318.3	Performance test of air conditioning test rig of duct type.
			C318.4	Determine C.O.P of Ice plant and heat pump.
			C318.5	Performance analysis of cooling tower.
161	C401	Nano Science & Bio Technology	C401.1	Acquire knowledge about the Nano scale materials with different visualization technique.
			C401.2	Learn about structure, classification and physical properties of CNT.
			C401.3	Understand structural and optical properties of Nano materials molecular electronics etc.
			C401.4	Acquire knowledge about bio Nano device and its applications.
			C401.5	Aware of safety and environment aspects of Nano technology.
			C401.6	Learn Nano technology and impact on society and industries.
162	C402	Mechanical Vibration	C402.1	Know the brief history of Mechanical vibration, SHM, Fourier analysis and concept of DOF.
			C402.2	Learn about undamped free vibration of single degree freedom systems.
			C402.3	Know about damped free vibration of single degree freedom systems.
			C402.4	Understand about the forced vibration of single degree freedom systems.
			C402.5	Learn about multi degree freedom systems.
			C402.6	Identify the vibration like rod ,spring and complex system etc.
163	C403	Robotics	C403.1	Understand the fundamental of robotics and its mathematical modelling.



## Course Outcomes for all Programmes: 2021-22

			C403.2	Learn kinematic modelling, D-H Notation & Transformation matrix of Manipulator.
			C403.3	Learn the forward/Inverse Kinematics & obtain the Jacobian matrix and use it to identify singularities
			C403.4	Identify different types of end effectors and sensors required for specific applications.
			C403.5	Understand the concept of Robot Actuator & generate trajectory planning for motion planning.
			C403.6	Learn about various applications of robots in industry.
164	C404	Marketing Management	C404.1	Get the Concept, Process, Functions and relevance of marketing management.
			C404.2	Operate the Internet and gather information about World Wide Web based Information.
			C404.3	Get knowledge about Market Segmentation, Targeting and Positioning.
			C404.4	Learn about the Concept of IMC.
			C404.5	Students would be able to take decision on Pricing.
			C404.6	Know about Supply Chain Management.
165	C405	Minor Project Lab	C405.1	Identify & undertake projects, which is feasible, cost effective, eco-friendly and safety.
			C405.2	Measure the relation of the project to the literature and how much the project is applicable to the society. (i.e. lab to land)
			C405.3	Plan properly to complete the project within the schedule time.
			C405.4	Conduct all relevant testing after execution of the project and analyse the test results for future research.

## Course Outcomes for all Programmes: 2021-22

			C405.5	Execute any project with proper methodology and in a team spirit.
			C405.6	Write thesis / project report as per standard norm.
166	C406	Seminar	C406.1	Select topics on modern technology; prepare slides for power point presentation.
			C406.2	Able to gain deep knowledge on modern technology by referring the journals/ magazines
			C406.3	Present before a huge audience or any topic without fear and with a voice clarity, good gate up and proper body language
			C406.4	Develop their communication skill.
			C406.5	Write a detail report on any topic related to modern technology in the prescribed format.
			C406.6	Able to attend or deliver in any National or International Seminar.
167	C407	Entrepreneurship Development	C407.1	Get knowledge about the concept of Entrepreneurship.
			C407.2	Know about the Sustain accelerated economic growth by developing entrepreneurial.
			C407.3	Aware of various industries and financial institutions and their role.
			C407.4	Get information to start their own venture.
			C407.5	Learn about various schemes incentives available to start own business.
			C407.6	Aware of relevant industrial law applicable to run a business.
168	C408	Fatigue. Creep and Fracture	C408.1	Grasp the basics of design philosophy & fatigue.
			C408.2	Learn about to reduce fatigue failure through fatigue design & analysis.

## Course Outcomes for all Programmes: 2021-22

			C408.3	Get knowledge about the fracture of metals particularly brittle & ductile fracture.
			C408.4	Understand the mechanical behaviour of materials under the chemically active environment.
			C408.5	Know the fundamentals of creep deformation & failure in materials.
			C408.6	Design the different materials as per fatigue, fracture, creep strength of materials.
169	C409	Seminar	C409.1	Select topics on modern technology; prepare slides for power point presentation.
			C409.2	Able to gain deep knowledge on modern technology by referring the journals/ magazines
			C409.3	Present before a huge audience or any topic without fear and with a voice clarity, good gate up and proper body language
			C409.4	Develop their communication skill.
			C409.5	Write a detail report on any topic related to modern technology in the prescribed format.
			C406.6	Able to attend or deliver in any National or International Seminar.
170	C410	Major Project	C410.1	Identify & undertake projects, which is feasible, cost effective, eco-friendly and safety.
			C410.2	Measure the relation of the project to the literature and how much the project is applicable to the society. (i.e. lab to land)
			C410.3	Plan properly to complete the project within the schedule time.
			C410.4	Conduct all relevant testing after execution of the project and analyse the test results for future research.

## Course Outcomes for all Programmes: 2021-22

			C410.5	Execute any project with proper methodology and in a team spirit.
			C410.6	Write thesis / project report as per standard norm.

### B.TECH-COs - Computer Science & Engineering

Sl.No	Subject code	Subject	Course	Description of Course outcomes
101	C101	Mathematics -1	C101.1	Know first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			C101.2	Comprehend linear differential equation of higher order, homogeneous equation with constant coefficient, Euler - Cauchy equation and solutions by variations of parameter to model electric circuits.
			C101.3	Compute series solutions of differential equations , power series method, Lagenders polynomials and Bessel's function to solve complex engineering problems.
			C101.4	Differentiate first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			C101.5	Understand linear equation and vector space
			C101.6	Explain the asymptote and curvature problems
102	C102	Chemistry	C102.1	A basic idea about chemical reactions, its feasibility, rate, Effect of catalyst on reaction rate.
			C102.2	Know about structure, bonding pattern, property of different atom, molecule, and ion.
			C102.3	Understandthe different types of solids and their diffects.
			C102.4	Apply the knowledge of EMF in case of different

## Course Outcomes for all Programmes: 2021-22

				types of commercial battery.
			C102.5	Illustrate about the different types of equilibriums and related concepts.
			C102.6	Describe the free energy concepts in detail.
<b>103</b>	C103	Basics of Electronics	C103.1	A basic knowledge of Semiconductor.
			C103.2	Understand the use of diodes as power supply rectifiers.
			C103.3	Apply the basic operation of OP-AMP circuit.
			C103.4	Analyse functional details and operation of transistors as switching circuits.
			C103.5	Illustrate the main elements of a communication system, and the principles related to its operation.
			C103.6	Summarize the principle and working of different logic gates and the related instruments.
<b>104</b>	C104	Thermodynamics	C104.1	Know about the basic concept and 1 <sup>st</sup> law of Thermodynamics.
			C104.2	Learn about the second law of Thermodynamics and entropy
			C104.3	Know about the properties of pure substance and steam power.
			C104.4	Distinguish between the flow and non-flow processes.
			C104.5	Distinguish between the ideal and real gases.
			C104.6	Learn about the gas mixture.
<b>105</b>	C105	Programming in C	C105.1	Know about the different parts of computer and binary representation of numbers along with their operations.
			C105.2	Understand the structured programming processes and operating systems.

## Course Outcomes for all Programmes: 2021-22

			C105.3	Use and handle the C language fundamentals.
			C105.4	Differentiate between different programmes like monolithic and modular etc.
			C105.5	Apply the different C functions.
			C105.6	Learn about the pointers and file handling
<b>106</b>	C106	English Communication Skill	C106.1	Well versed with various elements and concepts related to communicative English.
			C106.2	Learn the good interview skills.
			C106.3	Fine tuned their pronunciation and accent by adhering to the rules of phonetics, word stress intonation
			C106.4	Effectively use the various rules of grammar for framing good English.
			C106.5	Communicate fluently and accurately with the four skills: Speaking, Listening, Writing and Reading.
			C106.6	Differentiate between verbal and non verbal communication
<b>107</b>	C107	Chemistry Lab	C107.1	Know the procedure of preparation of some important drug like Aspirine
			C107.2	Understand the knowledge about the principle, reaction, uses of commercial battery.
			C107.3	Estimate the amount of Fe <sup>2+</sup> , Ca <sup>2+</sup> , Total Hardness, Percentage of available Chlorine in a given sample.
			C107.4	Illustrate the procedure of determination of Flash point, fire point, viscosity of lubricating oil and can determine the amount DO level in a sample of water.
			C107.5	Determine the amount of individual alkali present in a mixture.
<b>108</b>	C108	Basics of Electronics Lab	C108.1	Know all active and passive components such as

## Course Outcomes for all Programmes: 2021-22

				diode, transistors of an electronic circuits
			C108.2	Understand the main elements of a communication system, and the principles related to its operation
			C108.3	Handle all measuring instruments such as CRO, multi meter and use them for any practical necessities.
			C108.4	Record and analyze the output of different developed circuits
			C108.5	Design different circuits using OPAMP, Diode and Transistors.
<b>109</b>	C109	Programming in C lab	C109.1	Write C codes on standard computing devices using conditional, branching and iterative constructs.
			C109.2	To understand modularization concept and write efficient and manageable code using functions
			C109.3	To model real life multi dimensional problems by using multi dimensional structures of C.
			C109.4	To manage various memory fragmentation problems by using dynamic memory concepts.
			C109.5	To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
<b>110</b>	C110	English Communication Skill Lab	C110.1	Write correct English by avoiding common errors of grammar.
			C110.2	Listen to the English speeches with focus on segmental sounds, stress, weak forms and intonations.
			C110.3	Speak English with correct pronunciation
			C110.4	Use the standard dictionary to find the correct pronunciation of words and perform various phonemic transcriptions.
			C110.5	Prepare scenario or topic based writings and would

## Course Outcomes for all Programmes: 2021-22

				be able to present them as required essentially in carrying out project works.
111	C111	Engineering Workshop	C121.1	Know about various tools and tackles used in workshop.
			C121.2	Understand practical in fitting job.
			C121.3	Operate the lathe machine.
			C121.4	Analyse the functions of welding machine.
			C121.5	Describe shaper machine, milling machine, drilling machine etc.
112	C112	Mathematics-II	C112.1	Know Laplace Transform to get the solution to differential equation, convolution and Integral equation.
			C112.2	Interpret the concepts of Fourier series, Fourier transform, Fourier Integral
			C112.3	Solve beta function and error function to get solutions of complex real life problem.
			C112.4	Compare the scalar and vector problems.
			C112.5	Evaluate line integral and double integration problems
			C112.6	Know the techniques of combine the problems using Gauss divergence and Stoke's theorem
113	C113	Physics	C113.1	Know the concepts of quantum mechanics.
			C113.2	Understand the basic features of different oscillatory systems, waves and related properties.
			C113.3	Apply vector calculus in electromagnetic waves.
			C113.4	Differentiate between interference and diffraction.
			C113.5	Analyse the application of quantum mechanics to various physical problems.



## Course Outcomes for all Programmes: 2021-22

			C113.6	Produce polarized light, to construct Nicol prism, quarter wave & half wave plate.
114	C114	Basic Electrical Engineering	C114.1	Know about Direct current, voltage, power, sources and analysis of electrical networks
			C114.2	Understand electromagnetism and electronics measuring instruments.
			C114.3	Apply AC fundamentals and DC transients in electrical circuits.
			C114.4	Compare rotating electrical machines and stationery electrical machine as transformer.
			C114.5	Describe about power supply systems
			C114.6	Relates the industrial applications of Electrical energy
115	C115	Mechanics	C104.1	Understand the fundamentals of Mechanics & compute the equilibrium of rigid bodies.
			C104.2	Learn the concept of parallel forces, moment, Couple & effect of friction on equilibrium.
			C104.3	Locate the Centroid & determine the area/mass moment of inertia of different shapes.
			C104.4	Understand the concept of virtual work and determine the forces in members of trusses
			C104.5	Learn kinematics, kinetics of particle and rigid body, related principles
			C104.6	Solves the numerical on the projectile, D-Alembert's principle and analyze impact of elastic bodies on collision.
116	C116	Data Structure Using C	C116.1	Write C codes on standard computing devices using conditional, branching and iterative constructs.
			C116.2	To understand modularization concept and write efficient and manageable code using functions

## Course Outcomes for all Programmes: 2021-22

			C116.3	To model real life multi dimensional problems by using multi dimensional structures of C.
			C116.4	To manage various memory fragmentation problems by using dynamic memory concepts.
			C116.5	To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
			C116.6	Apply data structure and algorithm for a given contextual problem and develop in C.
117	C117	Business Communication	C117.1	Understand of the essential elements of business communication
			C117.2	Learn the different reading skills
			C117.3	Acquire appreciative level of soft skill
			C117.4	Understand the cross cultural communications, avoidance of racial, gender and other form of bias communication.
			C117.5	Adequate knowledge of effective writing skills
			C117.6	Represent the common forms of oral and written communication
118	C118	Physics Lab	C118.1	Determine acceleration due to gravity by bar pendulum, modulus of rigidity of elastic wire, Youngs modulus of wire & surface tension of water.
			C118.2	Summarize the thermal conductivity of bad conductor, grating element of plane diffraction grating.
			C118.3	Relate the wavelength of sodium light by Newton ring & Fresnel's bi-prism method in a well maintained dark.
			C118.4	Identify the characteristic curve of PN diode, Bipolar junction transistor & charge and discharge time of a condenser connected in RC circuit.

## Course Outcomes for all Programmes: 2021-22

			C118.5	Describe a project work on topics having different branches of physics.
119	C119	Basic Electrical Engineering Lab	C119.1	How to measure the electrical consumption of various devices as well as for DC compound machines.
			C119.2	Distinguish operate and control the speed of DC shunt motor, Three phase induction motor.
			C119.3	Show the characteristics and use of Incandescent lamps and fuses.
			C119.4	Analyze the open circuit characteristics of DC shunt generators
			C119.5	Evaluate current, voltage and power in AC electric circuits
120	C120	Data Structure Using C Lab	C120.1	Identify and implement asymptotic notations of an algorithm to analyze the consumption of resources (time/space).
			C120.2	Generalize knowledge of stack, queue and list ADT to manage the memory using static and dynamic allocations
			C120.3	Apply binary search tree to design applications.
			C120.4	Recognize, analyze, model, and implement code for real life problems like shortest path.
			C120.5	Model and implement comparison-based search algorithms and sorting algorithms.
121	C121	Business Communication lab	C121.1	Make good oral communication in work related situations.
			C121.2	Acquire good reading and writing skill.
			C121.3	Gain appreciative level of soft skill, such that can establish their leadership quality, can make productive contribution in group discussion and brain storming sessions.

## Course Outcomes for all Programmes: 2021-22

			C121.4	Enable them professionally to sustain his/her career
			C121.5	Equip themselves by learning the nuances of selection process to get into an employment
122	C122	Engineering Drawing Lab	C111.1	Gather knowledge about the tools and tackles used for drawing.
			C111.2	Explain how to draw projection of points and lines.
			C111.3	Show projection of planes and solids.
			C111.4	Construct the cut section and development of points.
			C111.5	Describe isometric view and can able to draw in AUTO CAD.
123	C201	Mathematics-III	C201.1	Understand the concepts of Analytic functions, Complex integrations and Cauchy-Riemann equations.
			C201.2	Evaluate real integrals and learn residue integration method.
			C201.3	Explain the errors of numerical results and different types of interpolations.
			C201.4	Implement different Numerical Integration methods and find solution to ordinary differential equations.
			C201.5	Analyse Random variables and different Probability Distributions.
			C201.6	Apply Correlation analysis, Regression Analysis and Statistical hypothesis.
124	C202	Organizational Behaviour	C202.1	Discuss the development of the field of organizational behaviour and explain the micro and macro approaches.
			C202.2	Analyse and compare different models used to explain individual behaviour related to motivation and rewards.

## Course Outcomes for all Programmes: 2021-22

			C202.3	Explain group dynamics and demonstrate skills required for working in groups (team building).
			C202.4	Identify the various leadership styles and the role of leaders in a decision making process.
			C202.5	Explain organizational culture and describe its dimensions and to examine various organizational designs.
			C202.6	Discuss the implementation of organizational change.
<b>125</b>	C203	OBJECT ORIENTED PROGRAMMING USING JAVA	C203.1	Gained adequate understanding of Object oriented programming paradigm and Java programming environment.
			C203.2	Learn the fundamental programming structure of java, Inheritance, Packages and Interfaces and exception handling.
			C203.3	Would be able to use multi threading concept, string handling procedures for writing efficient codes using Java.
			C203.4	Would have gained proficiency in using Java I/O, JDBC and networking tools and methods.
			C203.5	Understand the concept of applets, AWT, Java Swing etc.,
			C203.6	Able to use run time memory management using clone() method and cloneable interface.
<b>126</b>	C204	Digital Logic Design	C204.1	Understand the concept of digital and binary systems
			C204.2	Be able to design and analyze combinational logic circuits.
			C204.3	Be able to design and analyze sequential logic circuit
			C204.4	Understand the basic software tools for the design and implementation of digital circuits and systems.
			C204.5	Reinforce theory and techniques taught in the

## Course Outcomes for all Programmes: 2021-22

				classroom through experiments and projects in the laboratory.
			C204.6	Familiar with basic sequential logic components
127	C205	Data Structure	C205.1	Identify and implement asymptotic notations of an algorithm to analyze the consumption of computing resources
			C205.2	Explain and implement stack, queue and list to manage the memory using static and dynamic allocations.
			C205.3	Apply binary search tree to design applications.
			C205.4	Recognize, analyze, model and implement code for real life problems like shortest path and MST using graph theory.
			C205.5	Identify and develop comparison-based search algorithms and sorting algorithms.
			C205.6	Apply data structure and algorithm for a given contextual problem and develop in C.
128	C206	Environment Science	C206.1	Idea about ecosystem process and cycle .
			C206.2	details about environmental law and soil chemistry
			C206.3	details about water treatment, and active sludge treatment, pollution and pollutant
			C206.4	Solid waste, Solid Waste Management, Source classification and composition of MSW, Hazardous Waste Management, Hazardous waste and their generation,
			C206.5	Inorganic waste treatment, Hazard Control Measures in integrated steel industry, Occupational Safety and Health Acts
			C206.6	Fire prevention, electrical safety, ppe, safety management,

## Course Outcomes for all Programmes: 2021-22

<b>129</b>	C207	Evaluation Of Internship-1	C207.1	Explore career alternatives prior to graduation.
			C207.2	Integrate theory and practice.
			C207.3	Assess interests and abilities in their field of study.
			C207.4	Develop work habits and attitudes necessary for job success
			C207.5	Develop communication, interpersonal and other critical skills in the job interview process.
<b>130</b>	C208	Discrete Mathematics	C208.1	Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.
			C208.2	Ability to understand relations, Diagraph and lattice
			C208.3	Ability to reason logically.
			C208.4	Ability to understand use of functions, graphs and their use in programming applications
			C208.5	Understand use of groups and codes in Encoding-Decoding
			C208.6	Apply discrete structures into other computing problems such as formal specification, verification, artificial intelligence, cryptography, Data Analysis and Data Mining etc
<b>131</b>	C209	Design & Analysis of Algorithms	C209.1	Define the various algorithm analysis methods.
			C209.2	Estimate the asymptotic time complexities of various recurrence relations
			C209.3	Choose the appropriate method to solve the recurrence relations
			C209.4	Distinguish and give examples for the different types of algorithm development strategies.
			C209.5	To describe the use of Lower Bound Theory to improve the complexity of an algorithm

## Course Outcomes for all Programmes: 2021-22

			C209.6	Interpret the approximation algorithms, randomized algorithms and string matching algorithms.
132	C210	Computer Organization & Architecture	C210.1	Recall the basic structure and operational concepts of computer.
			C210.2	Summarize the implementation of machine instructions and design of the arithmetic and logic unit.
			C210.3	Design various arithmetic combinational circuits for adder, fast adder, subtractor, multiplier, divisor etc.
			C210.4	Explain the main memory, cache memory and virtual memory management techniques.
			C210.5	Distinguish different input - output mapping techniques.
			C210.6	Contrast between array processing and vector processing.
133	C211	Engineering Economics	C211.1	Understand general concepts of micro and macroeconomic including theory of demand, Law of demand, elasticity of demand etc.
			C211.2	Distinguish between Micro economics and Macro Economics.
			C211.3	Solve cost and revenue based problems using Break Even Analysis approach.
			C211.4	Analyse the functioning of Banks and concepts of Inflation.
			C211.5	Discuss banking structures and various financial systems.
			C211.6	Calculate the depreciation using different methods like Straight line method, Declining balance method.
134	C212	Data Communication	C212.1	Understand the rudiments of how computers communicate



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			C212.2	Be familiar with the architecture of a number of different networks
			C212.3	Understand the principles of protocol layering
			C212.4	Be familiar with modern telecommunications.
			C212.5	understand network protocols and architectures
			C212.6	Understand basics of data communications and computer networks
<b>135</b>	C213	Remote Sensing & Geographic Information System	C213.1	Understand the concepts of Photogrametry and compute the heights of objects
			C213.2	Understand the principles of aerial and satellite remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies
			C213.3	Understand the basic concept of GIS and its applications, know different types of data representation in GIS
			C213.4	Understand and Develop models for GIS spatial Analysis
			C213.5	Apply knowledge of GIS software and able to work with GIS software in various application fields
			C213.6	Apply knowledge of GIS and understand the integration of Remote Sensing and GIS
<b>136</b>	C214	Constitution of India	C214.1	To impart basic knowledge about the Constitution of India.
			C214.2	Inculcate national and patriotic spirit among the students as responsible citizens of the country
			C214.3	To impart knowledge about state and central policies, fundamental duties, electoral process, amendment procedure and emergency provisions.
			C214.4	Impart the ethical values, responsibilities and

## Course Outcomes for all Programmes: 2021-22

				obligations of the professional to the society and the nation.
			C214.5	To know the preamble of constitution
137	C215	Problem Solving & Python Programming Lab	C215.1	Write, Test and Debug Python Programs
			C215.2	Implement Conditionals and Loops for Python Programs
			C215.3	Use functions and represent Compound data using Lists, Tuples and Dictionaries
			C215.4	Read and write data from & to files in Python and develop Application using Pygame
			C215.5	understand the implementation of various applications using python
138	C301	DATA MINING & DATA WAREHOUSING	C301.1	Understand Data Warehouse fundamentals, Data Mining Principles
			C301.2	Design data warehouse with dimensional modelling and apply OLAP operations
			C301.3	Identify appropriate data mining algorithms to solve real world problem
			C301.4	Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
			C301.5	Describe complex data types with respect to spatial and web mining
			C301.6	Benefit the user experiences towards research and innovation. integration
139	C302	ADVANCED COMPUTER ARCHITECTURE	C302.1	Understand pipelining, instruction set architectures, memory addressing
			C302.2	Understand the performance metrics of microprocessors, memory, networks, and disks

## Course Outcomes for all Programmes: 2021-22

			C302.3	Understand the various techniques to enhance a processors ability to exploit Instruction-level parallelism (ILP), and its challenges
			C302.4	Understand multithreading by using ILP and supporting thread-level parallelism (TLP).
			C302.5	Understand the performance and efficiency in advanced multiple-issue processors.
			C302.6	Understand symmetric shared-memory architectures and their performance
140	C303	OPERATING SYSTEMS	C303.1	Define the process life cycle & process scheduling.
			C303.2	Explain inter process communication & process synchronization.
			C303.3	Outline deadlock avoidance, detection & handling strategies.
			C303.4	Analyze memory allocation & virtual memory techniques.
			C303.5	Examine disk scheduling & file system interface.
			C303.6	Discuss the case studies on Windows XP & Linux system.
141	C304	COMPUTER GRAPHICS	C304.1	Understand various graphics systems, their mechanisms and methods used.
			C304.2	Would be well versed with various line drawings and circle drawing algorithms.
			C304.3	Understood the mechanism and apply various clipping and filling algorithms principle of window to view port coordinate transformation and
			C304.4	Gained good understanding of Two dimensional object representation, fractal geometry and three dimensional geometric and modeling transformations
			C304.5	Would have gained good understanding of

## Course Outcomes for all Programmes: 2021-22

				Multimedia and components of Multimedia
			C304.6	Understanding about use of MAT LAB in Graphics
142	C305	ADVANCED JAVA PROGRAMMING	C305.1	Develop error-free, well-documented Java programs
			C305.2	Develop and test Java network, search engine, and web framework programs
			C305.3	Learn how to write, test, and debug advanced-level Object-Oriented programs using Java
			C305.4	Identify major subsystems and interfaces
			C305.5	Resolve defects and revise and adapt existing code
			C305.6	Test and Validate Program
143	C306	COMPUTER NETWORK AND DATA COMMUNICATION	C306.1	Understand and explain the concept of Data Communication and networks, layered architecture and their applications
			C306.2	Analyse and Set up protocol designing issues for Communication networks.
			C306.3	Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction
			C306.4	Apply various network layer techniques for designing subnets and supernets and analyse packet flow on basis of routing protocols.
			C306.5	Estimate the congestion control mechanism to improve quality of service of networking application
			C306.6	Understand and design application layer protocols and internet applications such as network security, Email and DNS,
144	C307	COMPILER DESIGN	C307.1	Understand the major phases of compilation and to understand the knowledge of Lex tool & YACC tool
			C307.2	Develop the parsers and experiment the knowledge

## Course Outcomes for all Programmes: 2021-22

				of different parsers design without automated tools
			C307.3	Construct the intermediate code representations and generation
			C307.4	Convert source code for a novel language into machine code for a novel computer
			C307.5	Apply for various optimization techniques for dataflow analysis
145	C308	WIRELESS SENSOR NETWORKS	C308.1	Understand the he basic concepts of wireless sensor networks, sensing, computing and communication tasks
			C308.2	Describe and explain radio standards and communication protocols adopted in wireless sensor networks
			C308.3	Describe and explain the hardware, software and communication for wireless sensor network nodes
			C308.4	Explain the architectures, features, and performance for wireless sensor network systems and platforms
			C308.5	Describe and analyze the specific requirements of applications in wireless sensor networks for energy efficiency, computing, storage and transmission
146	C309	INTERNET & WEB TECHNOLOGY	C309.1	Analyze a web page and identify its elements and attributes.
			C309.2	Create web pages using XHTML and Cascading Style Sheets.
			C309.3	Build dynamic web pages using JavaScript (Client side programming).
			C309.4	Create XML documents and Schemas.
			C309.5	Build interactive web applications using AJAX.
			C309.6	Understand the concept of Internet & growth of Internet

## Course Outcomes for all Programmes: 2021-22

147	C310	ENVIRONMENTAL SCIENCE & ENGINEERING	C310.1	Understand about the ecosystem process and cycles.
			C310.2	Learn about environmental law and soil chemistry.
			C310.3	Elaborate water treatment, and active sludge treatment, pollution and pollutant.
			C310.4	Discuss Solid Waste Management, MSW, Hazardous Waste Management and their generation.
			C310.5	Gather knowledge about waste treatment & Control Measures and Occupational Safety and Health Acts.
			C310.6	Implement Fire prevention, electrical safety, management.
148	C311	Industrial Lecture	C311.1	Demonstrate the applications of engineering concepts and principles learned in classroom.
			C311.2	Illustrate processes and products manufactured in the industries.
			C311.3	Improve interpersonal skill by communicating directly with industrial personnel.
			C311.4	Develop awareness of the engineering and technological aspects.
			C311.5	Aware of the roles and ethics of engineers in the industries,
149	C312	Business Communication Skill & Interview	C312.1	Convey thoughts and ideas with clarity and Communicate effectively.
			C312.2	Make effective presentations.
			C312.3	Write different types of reports.
			C312.4	Face interview & group discussion.
			C312.5	Critically think on a particular problem and Handle Engineering Ethics and Human Values.
150	C313	YOGA	C313.1	Demonstrate the ability to create and present various yoga sequences.

## Course Outcomes for all Programmes: 2021-22

			C313.2	Understanding of health-related fitness components.
			C313.3	Identify opportunities for participation in yoga activities in the community
			C313.4	Understand and apply the knowledge of basic choreography, and effective group management.
			C313.5	Identify and apply injury prevention principles related to yoga activities.
			C313.6	Understanding of sound nutritional practices as related to health and physical performance.
<b>151</b>	C401	Interent of Things	C401.1	Understand the concepts of Internet of Things
			C401.2	Apply the concepts of IOT
			C401.3	Apply IOT to different applications
			C401.4	Analysis and evaluate protocols used in IOT
			C401.5	Design and develop smart city in IOT
			C401.6	Analysis and evaluate the data received through sensors in IOT
<b>152</b>	C402	Soft Computing	C402.1	Learn about soft computing techniques and their applications
			C402.2	Analyze various neural network architectures
			C402.3	Understand perceptrons and counter propagation networks.
			C402.4	Define the fuzzy systems
			C402.5	Analyze the genetic algorithms and their applications
			C402.6	Evaluate and compare solutions by various soft computing approaches for a given problem.
<b>153</b>	C403	CRYPTOGRAPHY & NETWORK SECURITY	C403.1	Understand system security goals and concepts, classical encryption techniques and acquire fundamental knowledge on the concepts of modular

## Course Outcomes for all Programmes: 2021-22

				arithmetic and number theory.
			C403.2	Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
			C403.3	Evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.
			C403.4	Apply different digital signature algorithms to achieve authentication and design secure applications
			C403.5	Understand network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPsec, and PGP
			C403.6	Analyze and apply system security concept to recognize malicious code.
<b>154</b>	C404	SOFTWARE PROJECT MANAGEMENT	C404.1	Identify the different project contexts and suggest an appropriate management strategy
			C404.2	Practice the role of professional ethics in successful software development
			C404.3	Identify and describe the key phases of project management.
			C404.4	Determine an appropriate project management approach through an evaluation of the business context and scope of the project
			C404.5	Suggesting an efficient management strategy for a business scenario
			C404.6	Demonstrate an ability to present his/her ideas both formally and informally to a group of their peers and the management.
<b>155</b>	C405	Seminar	C405.1	Select topics on modern technology; prepare slides for power point presentation.



## Course Outcomes for all Programmes: 2021-22

			C405.2	Able to gain deep knowledge on modern technology by referring the journals/ magazines
			C405.3	Present before a huge audience or any topic without fear and with a voice clarity, good gate up and proper body language
			C405.4	Develop their communication skill.
			C405.5	Write a detail report on any topic related to modern technology in the prescribed format.
			C405.6	Able to attend or deliver in any National or International Seminar.
<b>156</b>	C406	Minor Project	C406.1	Identify & undertake projects, which is feasible, cost effective, eco-friendly and safety.
			C406.2	Measure the relation of the project to the literature and how much the project is applicable to the society. (i.e. lab to land)
			C406.3	Plan properly to complete the project within the schedule time.
			C406.4	Conduct all relevant testing after execution of the project and analyse the test results for future research.
			C406.5	Execute any project with proper methodology and in a team spirit.
			C406.6	Write thesis / project report as per standard norm.
<b>157</b>	C407	Entrepreneurship Development	C407.1	Get knowledge about the concept of Entrepreneurship.
			C407.2	Know about the Sustain accelerated economic growth by developing entrepreneurial.
			C407.3	Aware of various industries and financial institutions and their role.
			C407.4	Get information to start their own venture.

## Course Outcomes for all Programmes: 2021-22

			C407.5	Learn about various schemes incentives available to start own business.
			C407.6	Aware of relevant industrial law applicable to run a business.
158	C408	EXPERT SYSTEMS	C408.1	Ability to design and develop expert system using Neural Networks
			C408.2	Ability to design and develop expert system using Machine Learning
			C408.3	Ability to design and develop expert system using Fuzzy Logic
			C408.4	Ability to design and develop expert system using Deep Learning
			C408.5	Ability to design and develop Hybrid expert system for real world problems.
			C408.6	Ability to design expert system using AI tools
159	C409	Seminar	C409.1	Students should able to prepare comprehensive report based on literature survey/Topics related to different subjects in the semester
			C409.2	Identify the applicability of modern software tools and technology.
			C409.3	Deliver presentation based on the preparation
			C409.4	Answer queries posed by the listeners.
			C409.5	Correct himself to improve presentation skills
160	C410	Major Project	C410.1	Students are able to Prepare comprehensive report based on literature survey.
			C410.2	Select a suitable problem relevant to power systems with an attention to real life problems faced by the society
			C410.3	Find solution either through simulation or through

## Course Outcomes for all Programmes: 2021-22

				practical work.
			C410.4	Present the results from the work comprehensively through presentation.
			C410.5	Present his/her work in a conference or publish the work in a peer reviewed journal

### B.TECH-COs - Electrical & Electronics Engineering

#### Course Outcomes

First Year			
No	subject name	Subject Code	Course outcomes
1	Mathematics-I	BS1121	C101.1: Know first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			C101.2: Comprehend linear differential equation of higher order, homogeneous equation with constant co-efficient, Euler - Cauchy equation and solutions by variations of parameter to model electric circuits.
			C101.3: Compute series solutions of differential equations, power series method, Lagenders polynomials and Bessel's function to solve complex engineering problems.
			C101.4: Differentiate first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			C101.5: Understand linear equation and vector space.
			C101.6: Explain the asymptote and curvature problems
	Physics – I	BS1122	C 122.1: Know the concepts of quantum mechanics.
			C102.2: Understand the basic features of different oscillatory systems, waves and related properties.
			C102.3: Apply vector calculus in electromagnetic waves.
			C102.4: Differentiate between interference and diffraction.
			C102.5: Analyse the application of quantum mechanics to various physical problems.
			C102.6: Produce polarized light, to construct Nicol prism, quarter wave & half wave plate.

## Course Outcomes for all Programmes: 2021-22

2	Basic Electronics	BE2121	C103.1: A basic knowledge of Semiconductor.
			C103.2: Understand the use of diodes as power supply rectifiers.
			C103.3: Apply the basic operation of OP-AMP circuit.
			C103.4: Analyse functional details and operation of transistors as switching circuits.
			C103.5: Illustrate the main elements of a communication system, and the principles related to its operation.
			C103.6: Summarize the principle and working of different logic gates and the related instruments.
3	Thermodynamics	BE2123	C104.1. Know about the basic concept and 1st law of Thermodynamics
			C104.2. Learn about the second law of Thermodynamics and entropy
			C104.3. Know about the properties of pure substance and steam power.
			C104.4. Distinguish between the flow and non-flow processes.
			C104.5. Distinguish between the ideal and real gasses.
			C104.6. Learn about the gas mixture.
4	English Communication Skills	HM3121	C105.1: Well versed with various elements and concepts related to communicative English.
			C105.2: Learn the good interview skills.
			C105.3: Fine tuned their pronunciation and accent by adhering to the rules of phonetics, word stress intonation
			C105.4: Effectively use the various rules of grammar for framing good English.
			C105.5: Communicate fluently and accurately with the four skills: Speaking, Listening, Writing and Reading.
			C105.6: Differentiate between verbal and non verbal communication
5	Programming in 'C'	BE2125	C106.1: Know about the different parts of computer and binary representation of numbers along with their operations
			C106.2: Understand the structured programming

## Course Outcomes for all Programmes: 2021-22

			processes and operating systems.
			C106.3: Use and handle the C language fundamentals
			C106.4: Differentiate between different programmes like monolithic and modular etc
			C106.5: Apply the different C functions
			C106.6 : Summarize about the pointers and file handling
6	Engineering Drawing	BE7121	C107.1: Gather knowledge about the tools and tacksels used for drawing.
			C107.2: Explain how to draw projection of points and lines.
			C107.3: Show projection of planes and solids.
			C107.4: Construct the cut section and development of points..
			C107.5: Describe isometric view and can able to draw in AUTO CAD.
7	Physics Laboratory	BE7123	C108.1: Know how to find the value of acceleration due to gravity by bar pendulum, modulus of rigidity of elastic wire, Youngs modulus of wire & surface tension of water.
			C108.2: Summarize the thermal conductivity of bad conductor, grating element of plane diffraction grating.
			C108.3: Relate the wavelength of sodium light by Newton ring & Fresnels bi-prism method in a well maintained dark.
			C108.4: Identify the characteristic curve of PN diode, Bipolar junction transistor & charge and discharge time of a condenser connected in RC circuit.
			C108.5: Evaluate current, voltage and power in AC electric circuits
8	Basic Electronics Laboratory	BE7125	C109.1: How to measure the electrical consumption of various devices as well as for DC compound machines.
			C109.2: Distinguish operate and control the speed of DC shunt motor, Three phase induction motor.
			C109.3: Show the characteristics and use of Incandescent lamps and fuses.
			C109.4: Analyze the open circuit characteristics of DC shunt generators

## Course Outcomes for all Programmes: 2021-22

			C109.5: Would have Understood the main elements of a Cmmunication system, and the principles related to its operation
9	'C' Programming Laboratory	BE7127	C110.1: Write C codes on standard computing devices using conditional, branching and iterative constructs.
			C110.2: To understand modularization concept and write efficient and manageable code using functions
			C110.3: To model real life multi dimensional problems by using multi dimensional structures of C.
			C110.4:To manage various memory fragmentation problems by using dynamic memory concepts.
			C110.5:To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
10	Cmmunicative English Lab	HM7121	C111.1: Write correct English by avoiding common errors of grammar.
			C111.2: Listen to the English speeches with focus on segmental sounds, stress, weak forms and intonations.
			C111.3: Speak English with correct pronunciation
			C111.4: Use the standard dictionary to find the correct pronunciation of words and perform various phonemic transcriptions.
			C111.5:Prepare scenario or topic based writings and would be able to present them as required essentially in carrying out project works.
11	Mathematics-II	BS1124	C112.1:Know Laplace Transform to get the solution to differential equation, convolution and Integral equation.
			C112.2:Interpret the concepts of Fourier series, Fourier transform, Fourier Integral
			C112.3: Solve beta function and error function to get solutions of complex real life problem.
			C112.4:Compare the scalar and vector problems.
			C112.5:Evaluate line integral and double integration problems
			C112.6:Know the techniques of combinethe problems using Gauss divergence and Stoke's theorem
12	Chemistry-I	BS1123	C113.1: A basic idea about chemical reactions, its feasibility, rate, Effect of catalyst on reaction rate.

## Course Outcomes for all Programmes: 2021-22

			C113. 2: Know about structure, bonding pattern, property of different atom, molecule, and ion.
			C113. 3: Understand the different types of solids and their diffects.
			C113.4:Apply the knowledge of EMF in case of different types of commercial battery.
			C113.5: Illustrate about the different types of equillibriums and related concepts.
			C113.6: Describe the free energy concepts in detail.
13	Basic Electrical Engineering	BE2122	C 114.1: Know about Direct current, voltage, power, sources and analysis of electrical networks
			C 114.2: Understand electromagnetism and electronics measuring instruments.
			C 114.3: Apply AC fundamentals and DC transients in electrical circuits.
			C 114.4:Compare rotating electrical machines and stationery electrical machine as transformer.
			C114.5:Describe about power supply systems
			C114.6:Relates the industrial applications of Electrical energy
14	Mechanics	BE2124	C115.1: Learn about the two dimensional force system..
			C115.2:Solve problem on trusses and friction.
			C115.3: Solve problem on Centre of gravity and moment of inertia.
			C115.4: Solve problem on Centre of gravity and moment of inertia.
			C115.5:Know about the Kinematics of rigid body and kinetics of rigid body
			C115.6: Know about the Kinematics of rigid body and kinetics of rigid body
15	Business Cmmunication	HM3122	C116.1: Understand of the essential elements of business communication
			C116.2: Understand of the essential elements of business communication
			C116.3: Acquire appreciative level of soft skill

## Course Outcomes for all Programmes: 2021-22

			C116.4: Understand the cross cultural communications, avoidance of racial, gender and other form of bias communication.
			C116.5: Adequate knowledge of effective writing skills
			C116.6: Represent the common forms of oral and written communication
16	Data Structure using 'C'	BE2126	C117.1: Write C codes on standard computing devices using conditional, branching and iterative constructs..
			C117.2: To understand modularization concept and write efficient and manageable code using functions
			C117.3: To model real life multi dimensional problems by using multi dimensional structures of C.
			C117.4: To manage various memory fragmentation problems by using dynamic memory concepts.
			C117.5: To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
			C117.6: To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
17	Workshop Practice	BE7122	C118.1: Know about various tools and tackles used in workshop.
			C118.2: Know about various tools and tackles used in workshop.
			C118.3: Operate the lathe machine.
			C118.4: Analyse the functions of welding machine.
			C118.5: Describe shaper machine, milling machine, drilling machine etc.
18	Chemistry Laboratory	BE7124	C119.1: Know the procedure of preparation of some important drug like Aspirine
			C119.2: Understand the knowledge about the principle, reaction, uses of commercial battery.
			C119.3: Understand the knowledge about the principle, reaction, uses of commercial battery.
			C119.4: Illustrate the procedure of determination of Flash point, fire point, viscosity of lubricating oil and can determine the amount DO level in a sample of water.



## Course Outcomes for all Programmes: 2021-22

			C119.5: Determine the amount of individual alkali present in a mixture.
19	Basic Electrical Engg. Lab	BE7126	C120.1: How to measure the electrical consumption of various devices as well as for DC compound machines.
			C120.2: Distinguish operate and control the speed of DC shunt motor, Three phase induction motor.
			C120.3: Show the characteristics and use of Incandescent lamps and fuses.
			C120.4: Analyze the open circuit characteristics of DC shunt generators
			C120.5: Analyze the open circuit characteristics of DC shunt generators
20	Business Communicative Lab	HM3122	C121.1: Make good oral communication in work related situations.
			C121.2: Acquire good reading and writing skill.
			C121.3: Gain appreciative level of soft skill, such that can establish their leadership quality, can make productive contribution in group discussion and brain storming sessions.
			C121.4: Enable them professionally to sustain his/her career
			C121.5: Equip themselves by learning the nuances of selection process to get into an employment
21	Data Structure using 'C' Lab	BE2126	CO122.1: identify and implement asymptotic notations of an algorithm to analyze the consumption of resources (time/space).
			CO122.2: apply knowledge of stack, queue and list ADT to manage the memory using static and dynamic allocations
			CO122.3: Students will be apply binary search tree to design applications.
			CO122.4: Recognize, analyze, model, and implement code for real life problems like shortest path.
			CO122.5: Students will be able to Model and implement comparison-based search algorithms and sorting algorithms.
<b>Second Year</b>			

## Course Outcomes for all Programmes: 2021-22

No	subject name	Subject Code	Course outcomes
1	Mathematics-III	BSCM1225	CO201.1: Apply knowledge of 1st and 2nd order partial differential equations to solve engineering and real life problems.
			CO201.2: Apply knowledge of linear and non-linear partial differential equations to solve/operate complex problems.
			CO201.3: Identify and analyze complex problems using complex analysis like Laplace equation, complex integration etc.
			CO201.4 Apply knowledge of Power series to summerize complex problems.
			CO201.5: Apply knowledge to evaluate Taylors series, residue integration method to solve complex problems.
			CO201.6: Impliment their knowledge into Power series, Taylors series, residue integration method to solve complex problems in Engineering
2	physics of SemiCnductor devices	BSCP1227	CO 202.1: Learnt about the atomic structure ,energy levels, formation of energy bands, classification of solids, crystal structure of Silicon and etc.
			CO 202.2: got idea about intrinsic & extrinsic semiconductor, quantum state, doping concentration, Fermi energy, no. of charge carriers present in conduction band & valence band.
			CO 202.3: define mobility, drift current, diffusion current, Einstein relation, building block of pn diode, Calculation of field & potential in depletion layer.
			CO 202.4: It has helped to define transistor, modes of operation of BJT, Ebers moll equations.
			CO 202.5: Students have understood about contact of metal with semiconductor, MOS capacitor, MOS transistor, and CMOS technology & also how to get high speed electronic equipments.
			CO202.6: demonstrate the method of getting high speed electronic equipments.
3	Engineering Economics & Costing	HSSM3224	C203. 1:Students will be able to gain good understanding of general concepts of micro and macro economics including theory of demand, Law of demand, elasticity of demand etc.
			C203. 2: work out or calculate various accountancy and costing related calculations such as: simple and compound interest, cash flow and funds flow diagrams

## Course Outcomes for all Programmes: 2021-22

			etc.
			C203. 3: evaluate engineering projects in terms of their present and future worth, Internal Rate of return etc.
			C203.4: understand cost sheets and also gain fair idea about banking structures and various financial systems
			C203.5: prepare cost sheets and also gain fair idea about banking structures and various financial systems
			C203.6: prepare cost sheets and also gain fair idea about banking structures and its schemes to assist Engineering projects.
4	Network Theory	BEES2211	C204. 1: Evaluate the basic theorems and elements of electrical network to solve complex problem.
			C204. 2: Explain steady state and transient behavior of Electrical circuits
			C204. 3: Analyze the property of two ports network, coupled circuit and resonance
			C204. 4: Demonstrate Laplace transform, Fourier series and can apply to get response of circuits.
			C204. 5: Create new network by Synthesize different network.
			C204. 6: Explain different types of filters used in electrical network.
5	C++ & Object Oriented Programming	BECS2212	C205. 1: Realize the object oriented view of the real world problems,
			C205 2: Implement polymorphism and inheritance for solving various generic problems,
			CO3: Analyze the Knowledge about Inheritance, Polymorphism, File Handling and Template.
			C205.4: Evaluate complex problems on static polymorphism such as function overloading and virtual function.
			C205.5: Apply the Knowledge about dynamic polymorphism such as function overloading and virtual function.
			CO205.6: Creat new solutions on complex issues by appling static and dynamic polymorphism such as function overloading and virtual function.
6	Analog Electronics Circuit	PCEC4221	C206.1: Identify and will be able to understand

## Course Outcomes for all Programmes: 2021-22

			<p>fundamentals of BJT,FET, MOSFET.</p> <p>C206.2: Analyze different types of amplifier and their design.</p> <p>C206.3: Compute various circuits by using power amplifiers</p> <p>C206.4: Identify the hardware components of a personal computer</p> <p>C206.5: Understand the hardware components of a personal computer</p> <p>C206.6: The assemble the hardware components of a personal computer</p>
7	Network & Devices Laboratory	BEES7211	<p>C207.1: Comprehends different network theorems.</p> <p>C207.2: Determine different circuit parameters.</p> <p>C207.3: Analyze about the frequency response of different filter circuits.</p> <p>C207.4: Evaluate transient behaviour of electrical Circuit.</p> <p>C207.5: Compile the Resonance of electrical Circuit to find the solution of different complex networks.</p>
8	Analog Electronics Circuit Laboratory	PCEC7221	<p>C208.1: Design amplifier of desired gain using BJT .</p> <p>C208.2: Generalized amplifier of desired gain using FET for problem solving.</p> <p>C208.3: Analyze various oscillatory circuits to generate at desired frequency of oscillation.</p> <p>C208.4: Evaluate by using amplifier having desired bandwidth.</p> <p>C208.5: Modify adder and differentiator circuit using opamp.</p>
9	C++ & Object Oriented Programming Laboratory	BECS7212	<p>C209. 1: Implement class and object concept for solving a problem.</p> <p>C209.2: Evaluate Inheritance and it's various types for solving a problem using object oriented paradigm.</p> <p>C209.3 : Analyze different function in operator overloading.</p> <p>C209.4 : Compare different types of Static polymorphism such as: function overloading and virtual functions.</p>

## Course Outcomes for all Programmes: 2021-22

			C209.5 : Reconstruct a new network by using Dynamic polymorphism such as: function overloading.
10	Electromagnetic Field & Waves	PCEC4225	C210.1: Identifying of Maxwell's equations and be able to manipulate and apply them to problems.
			C210.2 Formulate and analyze problems involving lossy media with planar boundaries using uniform plane waves.
			C210.3 Derive steady state transmission line equations to the design of simple distributed circuit components.
			C210.4 Analyze and design basic microwave circuits using microwave network parameters.
			C210.5 Evaluate simple antennas derive fundamental antenna parameters starting from Maxwell's equations .
			C210.6 : Recorganizes fundamental antenna parameter in the design of rudimentary wireless communications systems.
11	Material science and Engineering	BSMS1213	C211. 1: Prepare lists of different types of manufacturing of new materials or modify the existing materials.
			C211. 2: Distinguishes materials like Superconductor materials, Magnetic materials, Optical materials, Polymeric materials, Ceramics materials, by studying material science.
			C211.3: Analyze about materials like Composites, SMART materials, Nano phase materials, by studying material science.
			C211.4: Classify engineering materials used in Engineering studies.
			C211.5: Evaluate engineering properties of materials, selection of materials, Mechanical properties of materials.
			C211.6: Create new Products by using different Mechanical properties of materials and their testing procedure.
12	Organisational Behaviour	HSSM3225	C212. 1: Define various aspects of individual behavior such as Learning, perceptions, Motivations etc.,
			C212. 2: Appreciate the role of Communication, Effective team building principles, Leadership development mechanisms for achieving the goal at individual as well organizational level.
			C212. 3: Differentiate the nature of conflicts and compare various mechanisms for conflict resolution.

## Course Outcomes for all Programmes: 2021-22

			C212. 4: Explain importance of organizational culture and effectiveness thereof.
			C212. 5: Analyze working principles of Human Resource Management and various functions
			C212. 6: Summarize different aspects on International organizational Behavior, International Business trends, Individual and Interpersonal Behavior in Global Perspective.
13	Electrical Machine-1	PCEE4223	C213.1: Define working principle & characteristics of D.C. machines.
			C213.2: Analyze the working principle & characteristics of A.C. machines.
			C213.3: Applying his knowledge to design single phase Transformer in day to day life
			C213.4: Evaluate the amount of Current in different connections of three phase transformer.
			C213.5: Calculate the efficiency of transformer without loading.
			C213.6: Control the speed of D.C. motor by Matching with output load.
14	Electrical & Electronic Measurement	PCEE4224	C214.1: Define working principle, construction & application of all the electrical measuring instruments
			C214.2: Compare the error between theoretical & practical value
			C214.3: Demonstrate different electronic instruments for measuring basic parameters.
			C214.4: Evaluate the output Power of a three phase power by using two wattmeters
			C214.5: Create the B-H curve using CRO.
			C214.6: Categorized different calibration of indicating type of instrument with the help of different methods.
15	Digital Electronics Circuit	BSCM1225	C215.1: Differentiate between combinational and sequential circuit operation.
			C215.2: Design a counter having a specified count sequence using state diagrams and state table
			C215.3: Analyze HDL for all digital circuits.
			C215.4: Evaluate and draw layout of various digital circuit.

## Course Outcomes for all Programmes: 2021-22

			C215.5: Construct digital circuits, use standard laboratory instrumentation to verify the operation of the circuits.
			C215.6: Apply his knowledge on PC-based electronic circuit simulation software.
16	Electrical Machine lab	PCEE7223	C216.1: Determine the critical resistance and critical speed from no load test of a DC shunt generator
			C216.2: Control the Speed of DC shunt motor by armature control and flux control method
			C216.3: Conduct parallel operation of single phase transformers.
			C216.4: Analyze the Efficiency by Open Circuit and Short Circuit test on single phase transformer
			C216.5: Perform back to back test on two numbers of transformer and find out the various losses.
17	Digital Electronics Circuit lab.	PCEC7222	C217.1: Verify the truth table of basic gates, universal gates and exclusive gates.
			C217.2: Implement various Boolean Expression using universal gates.
			C217.3: Design various combinational and sequential circuit operations like latch and flip-flop.
			C217.4: Analyze and write HDL code for various combinational circuit
			C217.5: Perform test on various combinational and sequential circuit operations like latch and flip-flop.
18	Electrical & Electronic Measurement Laboratory	PCEE7224	C218.1: Recognize and measure resistance, inductance and capacitance using Kelvin's Double Bridge.
			C218.2: Understand the operation of spectrum analyser.
			C218.3: Apply his knowledge to measure the iron loss from B-H Curve .
			C218.4: Analyze and measure the power and power factor in 3-phase & 1-Phase AC circuit.
			C218.5: Evaluate a problem relating to measure three phase power using two wattmeters.
19	Communication & Interpersonal skills for Corporate Readiness Laboratory	HSSM7223	C219.1: Analyze a complex problem and make students prepared to confidently face the challenges in the corporate or the business world.
			C219.2: Evaluate and pass through a smooth transition

## Course Outcomes for all Programmes: 2021-22

			<p>from a student to an early career professional in the corporate world.</p> <p>C219.3: Make them acclimatized with the duties and responsibilities of a professional entering into an initial employment, prove their mettle for sustainability and improve upon their etiquettes and conduct after getting the employment.</p> <p>C219.4:- Prove their mettle for sustainability and improve upon their etiquettes and conduct after getting the employment.</p> <p>C219.5: Apply the techniques of preparing CV, writing Job Application, Interviews, Techniques of GD, Memos, Welcoming New Entrants, expressing competent and equipped for day to day transactions.</p>
<b>Third Year</b>			
No	subject name	Subject Code	Course outcomes
1	Enviromental Engineering & safety	HSSM3323	C301.1: Develop the basic concept about Ecological concept, Environmental law, Water treatment, Noise pollution and its control.
			C301.2: Impliment his idea on Waste water treatment, Air pollution and its control, solid waste management, Hazardous waste management.
			C301.3: Analyze the basic knowledge about Occupational safety and Health acts.
			C301.4: Develop the basic knowledge about Safety procedure, Types of Accidents, Safety management.
			C301.5: Apply his basic knowledge about management for personal protective equipments.
			C301.6: Demonstrate different types of Accidents occurs and their Safety management & personal protective equipments.
2	Cntrol System Engineering	PCEC4323	CO302.1: Differentiate open loop and closed loop control system and representation of different mechanical and electrical system into block diagram.
			C302. 2: Analyze 1st and 0nd order system in time domain using different technique like root locus, RH criteria etc.
			C302.3: Evaluate 1storder system in frequency domain using different technique like Bode Plot, Nyquist Plot etc.
			C302. 4: Analyze 0nd order system in frequency domain



## Course Outcomes for all Programmes: 2021-22

			using different technique like Polar Plot, Nyquist Plot etc.
			C302. 5: Evaluate problems arising on Bode Plot, Polar Plot, Nyquist Plot etc.
			C3002 6: analyze proposnal integral derivative controler in linear time invariant system.
3	Power Electronics	PCEL4321	C303.1: Understand the fundamental principles and applications of power electronics circuits
			C303.2: Conversant with the operating principle of semiconductor power electronic switches and its switching techniques.
			C303.3: Proficiency in the usage of power electronic converters to design inverters and rectifiers
			C303.4: Analyze UPS, SMPS and Battery chargers
			C303.5: Evaluate complex problems on Electronic Ballast, Static VAR compensator.
			C303.6: Understand about UPS, SMPS, Battery chargers, Electronic Ballast, Static VAR compensators
4	ELECTRICAL MACHINES-2	PCEL4322	C304.1: Understand the construction and types of windings used in synchronous generators
			C304.2: Appreciate the performance of Three Phase Synchronour Generators under loaded and unloaded condition
			C304.3: Study the steady state, dynamic and transient behaviour of three phase alternators.
			C304.4: Analyze synchronisation of three phase alternators.
			C304.5: Implement the knowledge on load sharing in parallel operation of three phase alternators.
			C304.6: Analyze operation of steady state synchronous motor
5	Renewable Energy Systems	PEEL5322	C305.1: Summerize the importance, scope and potential of renewable energy sources for future scope energy demand.
			C305.2: Devlop a fundamental background for solving numerical problems & research.
			C305.3: Analyze the applications of non-conventional energy sources

## Course Outcomes for all Programmes: 2021-22

			C305.4 :Evaluate MPPT in solar PV system.
			C305.5 :Analyze Wind Energy and use of wind turbine.
			C305.6: Demonstrate and implement their knowledge for developing hybrid energy system.
6	Data Base Management Systems	FEEC6321	C306. 1: Analyze the basic concepts and architecture associated with DBMS
			C306. 0 : Evaluate normalization steps in database design and removal of data anomalies
			C306. 3 : Describe the characteristics of database transactions.
			C306. 4 : Summarize the characteristics of database transactions and how they affect database integrity.
			C306. 5 : Categorized the characteristics of database transactions and how they affect database integrity and consistency.
			C306. 6 : Create, maintain and manipulate a relational database using SQL.
7	Control & Instrumentation Lab	PCEC7323	C307.1: Observe the time response of a second order process with P, PI and PID control and apply PID control to servomotor
			C307.2: Analyze characteristics of a relay and analyse the relay control system
			C307.3: Evaluate and plot the displacement-voltage characteristics of the given LVDT
			C307.4:Design the stepper motor and its application.
			C307.5:Distinguish resistance -voltage characteristics of thermister.
8	Power Electronics Lab	PCEL7321	C308.1:Understand the characteristics of different semiconductor switches used in power electronic systems
			C308.2: Analyze different triggering circuit of semiconductor devices
			C308.3: Analyse, design and apply different power electronic converters, chopper circuits.
			C308.4: Create different power electronic converters, chopper circuits in motor drives
			C308.5: Evaluate operation of different isolated converter.

## Course Outcomes for all Programmes: 2021-22

9	ELECTRICAL MACHINE-2 Lab	PCEL7322	C309.1: Conduct tests on different AC electrical machines.
			C309.2: Analyze the operation of electric machines under different loading conditions
			C309.3: Evaluate the synchronisation process of two alternators.
			C309.4: Perform the test of parallel operation of two alternators.
			C309.5: Measure losses and efficiency of different types of machines.
10	Microprocessors and microController	PCEL4323	C310.1: Identify the basic element and functions of microprocessor
			C310.2: Describe the architecture of microprocessor and its peripheral devices
			C310.3: Demonstrate fundamental understanding on the operation between the microprocessor and its interfacing devices.
			C310.4: Evaluate fundamental understanding on the operation between the microprocessor and microcontroller.
			C310.5: Create program in 8286.
			C310.6: Apply the programming techniques in developing the assembly language program for microprocessor And Microcontroller application.
11	Digital Signal Processing	PCEC4324	C311.1: Represent discrete-time signals analytically and visualize them in the time domain.
			C311.2: Analyze meaning and implications of the properties of systems and signals.
			C311.3: Understand the Transform domain and its significance.
			C311.4: Compute Transform domain and its significance and problems related to computational complexity.
			C311.5: Evaluate different types of complex problems related to signal processing..
			C311. 6: Design various types of filters.
12	Communication Engineering	PCEE4324	C312.1: Understand modulation schemes and provide an insight to analog communication

## Course Outcomes for all Programmes: 2021-22

			C312.2: understand modulation schemes and provide an insight to digital communication
			C312.3: Identify and describe different theoretical terms related to TV transmission and reception
			C312.4: Analyze mechanism used in radar and satellite systems
			C312.5: Implement their knowledge in communication engineering using analog systems
			C312.6: implement their knowledge in communication engineering using digital systems
13	Electric Drives	PEEL5323	C313.1: Understand different characteristics of electrical machines used in industry
			C313.2: Analyze Model electric drives based on energy efficiency
			C313.3: Understand the speed control techniques implemented in electric drives using conventional methods.
			C313.4: Evaluates the problems in different types of drives used in industries.
			C313.5: Apply his knowledge on speed control techniques implemented in electric drives using solid state power electronics
			C313.6: Appreciate the different closed loop control schemes applied in electric drives
14	Optimization In Engineering	HSSM3322	C314.1: Identify Engineering Optimization problems.
			C314.2: Analyze Engineering Optimization problems, classification of optimization algorithm.
			C314.3: Develop the basic concept about Transportation problems and Assignment problems and integer programming.
			C314.4: Evaluate constrained optimization with equality constrain.
			C314.5: Create idea about Queuing models.
			C314.6: Explain constrained optimization with inequality constrain.
15	Operating System	PCCS4324	C315. 1: Understand the architecture and various functional modules of operating system such as: Process Management,

## Course Outcomes for all Programmes: 2021-22

			<p>C315. 2: Impliment their knowledge for Memory Management, I/O Management.</p>
			<p>C315. 3: Analuze and compare their knowledge for File Management.</p>
			<p>C315. 4: Interpret the concept of Operating system in development of any software system, so as to build robust and scalable systems.</p>
			<p>C315. 5: Understand the architecture and various functional modules of operating system such as: Process Management,</p>
			<p>C315. 6: Apply knowledge of the functional modules of operating system in future scope management system.</p>
16	Microprocessor and MicroCntroller Lab	PCEL7323	<p>C316.1: Knows about 8285 Microprocessor</p>
			<p>C316.2: Design and develop a microcontroller-based system with peripheral devices interface using 8251 Microcontroller</p>
			<p>C316.3: Write program to run in 8285 Microprocessor</p>
			<p>C316.4: Acquire knowledge to design 8225 using 8251 microcontroller</p>
			<p>C316.5: Creat work effectively in given tasks and assignment as individual or in group</p>
17	Digital Signal Processing Lab	PCEC7324	<p>C317.1: Creat a prorgam on how design algorithms for implementation.</p>
			<p>C317.2: Understand how digital to analog (D/A) converters work.</p>
			<p>C317.3: Operate on a signal and be able to model these operations mathematically.</p>
			<p>C317.4: Analyze how Analog to digital (A/D) converters work.</p>
			<p>C317.5: Use Z transforms and discrete time Fourier transforms to synthesize a digital system</p>
18	Cmmunication Engineering lab	HSSM3421	<p>C318.1 Analyze the process of frequency division multiplexing and design of Am modulation and demodulation.</p>
			<p>C318.2 Analyze and evaluate the performance of Fm modulation and process of PAM for determination of Quantization of noise.</p>
			<p>C318.3 Design and implement basic modulator and</p>

## Course Outcomes for all Programmes: 2021-22

			demodulation in PCM and delta modulation and by using this modulation software can simulate AM and FM modulation.
			C318.4 Design and implement their knowledge for multiplexing 2-4 PAM/PPM and PWM signals and able to analyse frequency for AM and FM signal by using MATLAB.
			C318.5: Design and implement their knowledge for multiplexing 2-4 PAM/PPM and PWM signals and able to analyse frequency for AM and FM signal by using MATLAB.
<b>Fourth Year</b>			
No	subject name	Subject Code	Course outcomes
1	Entrepreneurship Development	PCEE4421	C401.1: Define Building up entrepreneurial abilities
			C401.2: Analyze sustain accelerated economic growth by developing entrepreneurial spirit.
			C401.3: Aware of various industries and financial institutions working towards encouraging innovation.
			C401.4: Create awareness and inspirations for new scheme, Informing about various schemes.
			C401.5: awareness and inspirations for new Guidance for patents.
			C401.6: Create awareness and inspirations for new scheme, Informing about various schemes & Guidance for patents.
2	Electrical power transmission and Distribution	PCEE4421	C402.1: Identify Transmission Line Parameter & their performance.
			C402.2: Calculate resistance, inductance and capacitance of 1-phase and 3-phase lines.
			C402.3: Analyze about HVDC transmission line.
			C402.4: Construct different types of insulators used in transmission and distribution system.
			C402.5: Explain different types of substations.
			C402.6: Evaluate problems of different types of grounding methods
3	Flexible AC Transmission System	PEEE5429	C403.1: Understand transmission interconnections, power flow in AC system and limits of loading capability.

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			C403.2: Know static shunt compensator and static series compensator.
			C403.3: Analyze voltage stability using STATCOM.
			C403.4: Analyze voltage stability using SSSC.
			C403.5: Applying his knowledge for controlling the UPFC in combined compensator.
			C403.6: Applying his knowledge for controlling the IPFC in combined compensator.
4	Power system operation and Control	PCEL4421	C404.1: Conversant with the engineering and economic involvement in the planning, operation and control of power generation and transmission systems in electric utilities
			C404.2: Understand the subtle concepts of energy exchanges between different power systems
			C404.3: Analyze load flow problem in power system network.
			C404.4:- Evaluate the load frequency control in complex power system network.
			C404.5: Defend Power system stability problem and its solution.
			C404.6: Analyse control area system and modeling of Tie line.
5	Mechatronics	PEME5427	C405.1: know the relation between mechanics and Electronics.
			C405.2: Compare between electrical and mechanical actuation system.
			C405.3: Demonstrate pneumatic and hydrolic Actuation system
			C405.4: Control the closed loop controller and Programmable loop controller
			C405.5-Implement Various controllers to get optimum result.
			C405.6- Analyze the difference between PID controller and PLC.
6	Power system lab	PCEE7421	C406.1: Evaluate the key aspects of a power system and address its performance, cost effectiveness, reliability and stability

## Course Outcomes for all Programmes: 2021-22

			C406.2: Analyze performance and parameters of Transmission line.
			C406.3: Evaluate Y-Bus matrix and load flow diagram using MATLAB.
			C406.4: Compute ferranty effect in long transmission line when lightly loaded.
			C406.5: Create new transmission line by calculating voltage distribution in long , short and medium line.
7	Minor Project	PCEE7422	C407.1: Solve research problems using appropriate techniques, tools and skills
			C407.2: Analyze System integration skills, Documentation skills, Project management skills, Problem solving skills and develop professionalism
			C407.3: Design different electrical and electronics model.
			C407.4: Implement their knowledge about usefulness of matlab for future scope solution.
			C407.5- Analyze and estimate the economy of the Project.
8	Seminar	PCEE7423	C408.1: Prepare and deliver a seminar to improve the confidence level.
			C408.2: Able to come across various researches going in Electrical Engineering.
			C408.3: Improve the knowledge of internet, power point presentation
			C408.4: Communicate effectively and will be able to understand technical aspect for participation of leadership.
			C408.5- Expose to team work for productivity of an organization.
9	Power System Protection	PCEE4422	C409.1: Understand the working principle and functioning of all power system devices.
			C409.2: Analyze the construction and characteristics of protective devices in a complex power system network.
			C409.3: Imbibe the functioning of protective relays of generators, transformers and feeders
			C409.4:- Evaluate different types of faults occurring in a complex power system.



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			C409.5: Apply their knowledge to protect instruments during over-current and over-voltage condition.
			C409.6:-Creat idea on numerical relay and switchgears.
10	Advanced Power Electronics	PEEE5412	C410.1: Understand modern day semiconductor devices, their characteristics and control.
			C410.2: Analyse operation and analysis of power electronics devices.
			C410.3: Evaluate power electronics system simulation and advanced control methods
			C410.4: Creat advanced power electronics circuit like Buck converter, Boost converter etc.
			C410.5: Compare different types of convereters like Flyback, Forward ,Push _pull converter.
			C410.6: Categorized static applications of advanced power electronics devices like UPS, HVDC.
11	Power Station Engineering and Econmy	FEEC6421	C411.1: Know various sources of electrical energy.
			C411.2: create computational models for analysis of both symmetrical and unsymmetrical conditions in power systems
			C411.3: Design and modify Power System requirements.
			C411.4: Understand different types of loads and its effect.
			C411.5: know about the depreciation cost and the revenue generation..
			C411.6: Analyze different types of load and control method using economic power generation.
12	MAJOR PROJECT	PCEE7424	C412.1: Impliment technical knowledge gained from previous course
			C412.2: Function as a mock laboratory technician in the electronics industry who is expected to design, build, and test electronic circuitry.
			C412.3: Apply project management skills (scheduling work, procuring parts, and documenting expenditures and working within the confines of a deadline).
			C412.4: Develop and demonstrate troubleshooting ability in electronic technology.
			C412.5: Communicate technical information by means of written and oral reports

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			C412.6: Work as a team leader to manage multi disciplinary environment and can develop confidence for self education and for future research .
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### B.TECH-COs - Electronics & Communication Engineering

SI.No	Course code	course	Course Outcomes
101	BS1101	Mathematics-I	<b>CO1:</b> Apply first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			<b>CO2:</b> Apply linear differential equation of higher order, homogeneous equation with constant co-efficient, Euler - Cauchy equation and solutions by variations of parameter to model electric circuits.
			<b>CO3:</b> Apply series solutions of differential equations , power series method, Lagenders polynomials and Bessel's function to solve complex engineering problems.
			<b>CO4:</b> Apply matrices, vectors, Eigen values and eigen vectors and complex matrices to develop and solve different mathematical models.
102	BS1102	Physics – I	<b>CO 1:</b> Students would have understood the basic features of different oscillatory systems, waves, superposition of waves, Huygens principle.
			<b>CO2:</b> Students would be able to define interference, their types, interference due to thin films, bending property of light, Zone plate behaved like convex lens, grating, diffraction spectra & finding wavelength of light.
			<b>CO 3:</b> Would be able to produce polarized light, to construct Nicol prism, quarter wave & half wave plate.
			<b>CO 4:</b> Students would have understood about vector calculus, electro-magnetism, Maxwells electromagnetic equation, transverse nature of of em waves, poynting theorem.

## Course Outcomes for all Programmes: 2021-22

			CO 5: Students would be able to understand: why is the sky blue, light is a transverse wave, the colorful appearance of soap bubble, em waves cannot propagate in the ionized medium, dual property of matter & lastly difference between classical physics & quantum physics etc.
103	BE2101	Basic Electronics	<b>CO1:</b> Would have gained basic knowledge of Semiconductor.
			<b>CO2:</b> Would have Understood the use of diodes as power supply rectifiers.
			<b>CO3:</b> Would have Understood the basic operation of OP-AMP circuit.
			<b>CO4:</b> Would have Understood the functional details and operation of transistors as switching circuits.
			<b>CO5:</b> Would have Understood the main elements of a communication system, and the principles related to its operation.
104	BE2103	Thermodynamics	<b>CO 1.</b> Student will be to demonstrate the idea about thermodynamic behavior of matter, thermodynamic systems & its types, properties, processes, cycles & thermodynamic equilibrium.
			<b>CO 2.</b> Student would have understood zeroth law of thermodynamics, temperature measurements & different types of thermometers.
			<b>CO 3.</b> Student will have sound idea about work transfer, heat transfer & about first law of thermodynamics application to closed system.
			<b>CO 4.</b> Student will have sound idea about application of 1 <sup>st</sup> law to control volumes or upon flow processes.
			<b>CO 5.</b> Student will have adequate idea about second law of thermodynamics, entropy & its principles.
			<b>CO 6.</b> Students will be able know about steam, its types, different property diagrams of steam & use of steam table.
105	HM3101	English Communication	<b>CO1:</b> Students would be well versed with various elements

## Course Outcomes for all Programmes: 2021-22

		Skills	<p>and concepts related to communicative English.</p> <p><b>CO 2:</b> Students would be able to communicate fluently and accurately with the four skills: Speaking, Listening, Writing and Reading.</p> <p><b>CO 3:</b> Students would have fine tuned their pronunciation and accent by adhering to the rules of phonetics, word stress intonation</p> <p><b>CO 4:</b> Students would be able to effectively use the various rules of grammar for framing good English.</p>
106	BE2105	Programming in 'C'	<p><b>CO 1:</b> At the end of the course, student should gain the ability to analyze a real life mathematical or string related problems and build a logical sequence of instructions and program it correctly into a standard computing device.</p> <p><b>CO 2:</b> Should able to write code adhering to standard coding practices and make them aligned with the industrial expectations by using modularization concepts by using functions and documentation standard</p> <p><b>CO 3:</b> Would be able to model multi dimensional problems into multi dimensional structures and reduce them into the efficient coding.</p> <p><b>CO 4:</b> Would be able to overcome memory fragmentation problems and understand memory management related issues while preparing a program for any real life problems by using dynamic memory management techniques.</p> <p><b>CO 5:</b> Would have gained adequate understanding of I/O operations and File handling concepts in C language and should be able to effectively build file and data bases for permanent storage of data.</p>
107	BE7101	Engineering Drawing	<p><b>CO 1:</b> Student would be able to sketch &amp; understand different Engg. drawings.</p> <p><b>CO 2:</b> Student would be able to provide dimension of different parameters of an Engg. drawing.</p>

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			<p><b>CO 3:</b> Student would be able to draw orthographic projection of different objects.</p>
			<p><b>CO 4:</b> Student would be able to draw the interior portion of objects.</p>
			<p><b>CO 5:</b> Student would be able to develop the different surfaces of solids.</p>
108	BE7103	Physics Laboratory	<p><b>CO 1:</b> Students can find the value of acceleration due to gravity by bar pendulum, modulus of rigidity of elastic wire, Youngs modulus of wire &amp; surface tension of water.</p>
			<p><b>CO 2:</b> They can determine the thermal conductivity of bad conductor, grating element of plane diffraction grating.</p>
			<p><b>CO 3:</b> Students would able to determine the wavelength of sodium light by Newton ring &amp; Fresnels bi-prism method in a well maintained dark.</p>
			<p><b>CO 4:</b> Students can plot the characteristic curve of PN diode, Bipolar junction transistor &amp; charge and discharge time of a condenser connected in RC circuit.</p>
			<p><b>CO 5:</b> Students can do a project work on topics having different branches of physics.</p>
109	BE7105	Basic Electronics Laboratory	<p><b>CO 1:</b> Would be able to identify all active and passive components such as diode, transistors of an electronic circuits</p>
			<p><b>CO 2:</b> Would be able to handle all measuring instruments such as CRO, multi meter and use them for any practical necessities.</p>
			<p><b>CO 3:</b> Would be able to design different circuits using OPAMP, Diode and Transistors.</p>
			<p><b>CO 4:</b> Would be able to record and analyze the output of different developed circuits.</p>
110	BE7107	'C' Programming Laboratory	<p><b>CO 1:</b> Would be able to analyze and write C codes on standard computing devices using conditional, branching and iterative constructs.</p>

## Course Outcomes for all Programmes: 2021-22

			<p><b>CO 2:</b> Would be able to implement modularization concept and write efficient and manageable code using functions</p>
			<p><b>CO 3:</b> Would be able to model real life multi dimensional problems by using multi dimensional structures of C.</p>
			<p><b>CO 4:</b> Would be able to manage various memory fragmentation problems by using dynamic memory concepts.</p>
			<p><b>CO 5:</b> Would be able to implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.</p>
111	HM7101	Communicative English Lab	<p><b>CO 1:</b> Students would be able to use the standard dictionary to find the correct pronunciation of words and perform various phonemic transcriptions.</p>
			<p><b>CO 2:</b> Can be able to listen to the English speeches with focus on segmental sounds, stress, weak forms and intonations.</p>
			<p><b>CO 3:</b> Can be able to speak English with correct pronunciation</p>
			<p><b>CO 4:</b> Would be able to write correct English by avoiding common errors of grammar.</p>
			<p><b>CO 5:</b> Students would be able to prepare scenario or topic based writings and would be able to present them as required essentially in carrying out project works.</p>
112	BS1104	Mathematics-II	<p><b>CO1:</b> Identify engineering problems where they can apply Laplace Transform to get the solution to differential equation, convolution and Integral equation.</p>
			<p><b>CO2:</b> Apply the concept of Fourier series, Fourier transform, Fourier Integral, beta function and error function to solve complex real life problem.</p>
			<p><b>CO3:</b> Identify the problems where they can use Vector differential calculus and vector integral calculus.</p>
113	BS1103	Chemistry-I	<p><b>CO 1:</b> Students will have a basic idea about chemical reactions, its feasibility, rate, Effect of catalyst on reaction rate.</p>
			<p><b>CO 2:</b> Engineering students can know about structure, bonding</p>

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			<p>pattern, property of different atom, molecule, and ion.</p> <p><b>CO 3:</b> Students can gain the knowledge about the principle, reaction, uses of commercial battery.</p>
114	BE2102	Basic Electrical Engineering	<p><b>CO 1:</b> After the Completion of course, the student would have gained good understanding of various Ideal and Practical sources of Electric Energy and conversion details.</p> <p><b>CO 2:</b> Would have gained good understanding of DC Network , Magnetic Circuits, categories and their mechanisms.</p> <p><b>CO 3:</b> Would have gained understanding of Magnetic Circuits and D.C. Machines.</p> <p><b>CO 4:</b> Would have gained good understanding of Single and three phase AC circuits, their underlying principles and mechanisms.</p> <p><b>CO 5:</b> Would have gained good understanding of principles and mechanisms of single phase and three phase Induction motors</p> <p><b>CO 6:</b> Would have gained good understanding of Various electrical measuring machines and their working principles.</p>
115	BE2104	Mechanics	<p><b>CO 1:</b> After the course student would have understood composition and resolution of forces.</p> <p><b>CO 2:</b> Understood the method of projection, methods of moment and friction etc.,</p> <p><b>CO 3:</b> Would be able to estimate centroid and derive moment of inertia for composite areas</p> <p><b>CO 4:</b> Understood momentum, impulse, work and energy - impact</p> <p><b>CO 5:</b> Understood the principles of kinematics and dynamics.</p> <p><b>CO 6:</b> Understood principles of curvilinear translation and kinetics of rotation of rigid body</p>
116	HM3102	Business	<p><b>CO 1:</b> Students would have the adequate understanding of the</p>

## Course Outcomes for all Programmes: 2021-22

		Communication	<p>essential elements of business communication such as cross cultural communications, avoidance of racial, gender and other form of bias communication.</p> <p><b>CO 2:</b> Would have gained adequate reading and writing skills</p> <p><b>CO 3:</b> Would have acquired appreciative level of soft skill</p>
117	BE2106	Data Structure using 'C'	<p><b>CO1:</b> Identify and implement asymptotic notations of an algorithm to analyze the consumption of computing resources .</p> <p><b>CO2:</b> Explain and implement stack, queue and list to manage the memory using static and dynamic allocations.</p> <p><b>CO3:</b> Apply binary search tree to design applications.</p> <p><b>CO4:</b> Recognize, analyze, model and implement code for real life problems like shortest path and MST using graph theory.</p> <p><b>CO5:</b> Identify and develop comparison-based search algorithms and sorting algorithms.</p> <p><b>CO6:</b>Apply data structure and algorithm for a given contextual problem and develop in C.</p>
118	BE7102	Workshop Practice	<p><b>CO 1:</b> Workshop Practice Course is designed to train the students in metal joining process like fitting &amp; welding.</p> <p><b>CO 2:</b> It will impart skill with emphasis on cultivating safety first aspects in handling of tools and equipments.</p> <p><b>CO 3:</b> On completion of this course, the students will be able to perform welding, Fitting &amp; various operations on Lathe Machine.</p>
119	BE7104	Chemistry Laboratory	<p><b>CO 1:</b> Students can estimate the amount of <math>Fe^{2+}</math>, <math>Ca^{2+}</math>, Total Hardness, Percentage of available Chlorine in a given sample.</p> <p><b>CO 2:</b> Students can know the procedure of preparation of some important drug like Aspirine.</p> <p><b>CO 3:</b> Students can determine the amount of individual alkali present in a mixture.</p>



## Course Outcomes for all Programmes: 2021-22

			<p><b>CO 4:</b> Engineering students can know the procedure of determination of Flash point, fire point, viscosity of lubricating oil and can determine the amount DO level in a sample of water.</p>
120	BE7106	Basic Electrical Engg. Lab	<p><b>CO 1:</b> Would be able to measure the electrical consumption of various devices as well as for DC compound machines.</p>
			<p><b>CO 2:</b> Would be able to operate and control the speed of DC shunt motor, Three phase induction motor.</p>
			<p><b>CO 3:</b> Would have understood the characteristics and use of Incandescent lamps and fuses.</p>
			<p><b>CO 4:</b> Would be able to determine the open circuit characteristics of DC shunt generators</p>
			<p><b>CO 5:</b> Would be able to calculate current, voltage and power in AC electric circuits</p>
			<p><b>CO 6:</b> Would be able to calculate no load losses of a single phase transmitter.</p>
121	HM7102	Business Communicative Lab	<p><b>CO 1:</b> Would be able to make good oral communication in social and work related situations.</p>
			<p><b>CO 2:</b> Would have acquired good reading and writing skill.</p>
			<p><b>CO 3:</b> Would have gained appreciative level of soft skill, such that can establish their leadership quality, can make productive contribution in group discussion and brain storming sessions.</p>
122	BE7108	Data Structure using 'C' Lab	<p><b>CO1:</b> Identify and implement asymptotic notations of an algorithm to analyze the consumption of resources (time/space).</p>
			<p><b>CO2:</b> Apply knowledge of stack, queue and list ADT to manage the memory using static and dynamic allocations</p>
			<p><b>CO3:</b> Apply binary search tree to design applications.</p>
			<p><b>CO4:</b> Recognize, analyze, model, and implement code for real life problems like shortest path.</p>

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			<p><b>CO5:</b> Model and implement comparison-based search algorithms and sorting algorithms.</p>
			<p><b>CO6:</b> Apply appropriate data structure and algorithm for a given contextual problem and develop programs using graph theory.</p>
123	BSCM1205	Mathematics – III	<p><b>CO1:</b> Can apply knowledge of 1st and 2nd order partial differential equations to solve engineering and real life problems.</p>
			<p><b>CO2:</b> Can apply knowledge of linear and non-linear partial differential equations to solve complex problems.</p>
			<p><b>CO3:</b> Can identify and analyze complex problems using complex analysis like Laplace equation, complex integration etc.</p>
			<p><b>CO4:</b> Can apply knowledge of power series, Taylors series, residue integration method to solve complex problems.</p>
124	HSSM3204	Engineering Economics & Costing	<p><b>CO 1:</b> Would have gained good understanding of general concepts of micro and macro economics including theory of demand, Law of demand, elasticity of demand etc.</p>
			<p><b>CO 2:</b> Would be able to work out or calculate various accountancy and costing related calculations such as: simple and compound interest, cash flow and funds flow diagrams etc.</p>
			<p><b>CO 3:</b> Would be able to evaluate engineering projects in terms of their present and future worth, Internal Rate of return etc.</p>
			<p><b>CO 4:</b> Would be able to understand and prepare cost sheets</p>
			<p><b>CO 5:</b> Would have gained fair idea about banking structures and various financial systems</p>
125	BSMS1213	Material Science & Engineering	<p><b>CO 1:</b> Engineers either manufacture new materials or modify the existing materials. They will have the basic knowledge about materials like Superconductor materials, Magnetic materials, Optical materials, Polymeric materials, Ceramics, Composites, SMART materials, Nano phase materials, by studying material science.</p>
			<p><b>CO2:</b> Can classify engineering materials, can know about</p>

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			engineering properties of materials, selection of materials, Mechanical properties of materials and their testing procedure.
126	BEES2211	Network Theory	<b>CO 1:</b> Students would have understood the basic theorems and elements of electrical network
			<b>CO 2:</b> Students would be able to explain steady state and transient behavior of Electrical circuits
			<b>CO 3:</b> Students would be able to explain the property of two ports network,coupled circuit and resonance
			<b>CO 4:</b> Students would be able to solveLaplace transform, Fourier series and can apply to get response of circuits.
			<b>CO 5:</b> students would be able to synthesize different network.
			<b>CO 6:</b> students would be able to explain different types of filters used in electrical network.
127	PCEE4204	Electrical & Electronic Measurement	<b>CO1:</b> To know the working principle, construction & application of all the electrical measuring instruments
			<b>CO2:</b> To compare the error between theoretical & practical value
			<b>CO3:</b> To able different electronic instruments for measuring basic parameters.
128	PCEC4201	Analog Electronics Circuit	<b>CO1:</b> Students will be able to identify and understand fundamentals of BJT,FET, MOSFET.
			<b>CO2:</b> Students will be able to Analyze different types of amplifier and their design.
			<b>CO3:</b> Students will be able to analyze various power amplifiers
			<b>CO4:</b> Students will be able to identify and understand the hardware components of a personal computer
129	BEES7211	Network & Devices Laboratory	<b>CO1:</b> To verify different network theorems.
			<b>CO2:</b> To determine different circuit parameters.
			<b>CO3:</b> To study about the frequency response of different filter

## Course Outcomes for all Programmes: 2021-22

			circuits.
130	PCEC7201	Analog Electronics Circuit Laboratory	<b>CO1:</b> Students will able to design amplifier of desired gain using BJT and FET.
			<b>CO2:</b> Students will able to design various oscillatory circuits to generate at desired frequency of oscillation.
			<b>CO3:</b> Students will able to design amplifier having desired bandwidth.
			<b>CO4:</b> Students will able to design adder, differentiator and integrator circuit using opamp.
131	PCEE7204	Electrical & Electronic Measurement Laboratory	CO1: Students will able to measure resistance, inductance and capacitance of Kelvin's Double Bridge.
			CO2: student will able to determination of Sensitivity and Galvanometer Constants of a Galvanometer
			CO3: Able to understand the operation of spectrum analyser.
132	PCEC4205	Electromagnetic Field & Waves	<b>CO1:</b> Have an understanding of Maxwell's equations and be able to manipulate and apply them to problems.
			<b>CO2</b> Formulate and analyze problems involving lossy media with planar boundaries using uniform plane waves.
			<b>CO3</b> Able to derive and apply the steady state transmission line equations to the design of simple distributed circuit components.
			<b>CO4</b> Analyze and design basic microwave circuits using microwave network parameters.
			<b>CO5</b> For simple antennas derive fundamental antenna parameters starting from Maxwell's equations and be able to use these in the design of rudimentary wireless communications systems.
133	HSSM3205	Organisational Behaviour	<b>CO 1:</b> After completion of course, the student would have gained good understanding about various aspects of individual behavior such as Learning, perceptions, Motivations etc.,

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			<p><b>CO 2:</b> Would be able appreciate the role of Communication, Effective team building principles, Leadership development mechanisms for achieving the goal at individual as well organizational level.</p>
			<p><b>CO 3:</b> Would have gained good understanding of nature of conflicts and various mechanisms for conflict resolution.</p>
			<p><b>CO 4:</b> Would have understood the importance of organizational culture and effectiveness thereof.</p>
			<p><b>CO 5:</b> Would have understood working principles of Human Resource Management and various functions</p>
			<p><b>CO 6:</b> Would have gain understanding of International organizational Behavior, International Business trends, Individual and Interpersonal Behavior in Global Perspective.</p>
134	BSCP1207	Physics of Semiconductor Devices	<p><b>CO 1:</b> Students would have learnt about the atomic structure ,energy levels, formation of energy bands, classification of solids, crystal structure of Silicon and etc.</p>
			<p><b>CO 2:</b> Students would have got idea about intrinsic &amp; extrinsic semiconductor, quantum state, doping concentration, Fermi energy, no. of charge carriers present in conduction band &amp; valence band.</p>
			<p><b>CO 3:</b> Would be able to define mobility, drift current, diffusion current, Einstein relation, building block of pn diode, Calculation of field &amp; potential in depletion layer.</p>
			<p><b>CO 4:</b> It has helped to define transistor, modes of operation of BJT, Ebers moll equations.</p>
			<p><b>CO 5:</b> Students have understood about contact of metal with semiconductor, MOS capacitor, MOS transistor, and CMOS technology &amp; also how to get high speed electronic equipments.</p>
135	BEEC	Energy Conversion Devices	<p><b>CO1:</b> Able to know the working principle &amp; characteristics of D.C. machines.</p>
136			<p><b>CO2:</b> Able to know the working principle &amp; characteristics of</p>

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			A.C. machines.
137	2214		<b>CO3:</b> Able to know the different tests of different types of machines.
138	BECS 2212	C++ & Object Oriented Programming	CO 1: Student should be able to realize the object oriented view of the real world problems,
			CO 2: Student should be able to understand characteristics of object oriented paradigms such as Abstraction, Encapsulation etc.,
			<b>CO3:</b> Ability to apply the Knowledge about Inheritance, Polymorphism, File Handling and Template.
			CO 3: Student should be able to seamlessly use the concept of constructor and destructor.
			CO 4: Student should be able to implement polymorphism and inheritance for solving various generic problems,
			CO 5: Would be able to apply dynamic memory management techniques for creating, copying and destroying objects.
			CO 6: Would be able to apply Standard Template Library, Namespaces etc., while designing a object oriented program.
139	PCEC	Digital Electronics Circuit	<b>CO1:</b> Able to differentiate between combinational and sequential circuit operation.
			<b>CO2:</b> Design a counter having a specified count sequence using state diagrams and state table
			<b>CO3:</b> Able to write HDL for all digital circuits.
			<b>CO4:</b> Able to draw layout of various digital circuit.
			<b>CO5:</b> Construct digital circuits, use standard laboratory instrumentation to verify the operation of the circuits, and use PC-based electronic circuit simulation software.
140	BEEC7214	Energy Conversion Devices Laboratory	<b>CO1:</b> Able to determination of critical resistance and critical speed from no load test of a DC shunt generator

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			<p><b>CO2:</b> Able to control the Speed of DC shunt motor by armature control and flux control method</p> <p><b>CO3:</b> Able to determination of Efficiency by Open Circuit and Short Circuit test on single phase transformer</p>
141	PCEC7202	Digital Electronics Circuit lab.	CO1: Students will be able to verify the truth table of basic gates, universal gates and exclusive gates.
			CO2: Students will able to implement various Boolean Expression using universal gates.
			CO3: Students will be able to design and test various combinational and sequential circuit operations like latch and flip-flop.
			CO4: Students will be able to write HDL code for various combinational and sequential circuit
142	BECS7212	C++ & Object Oriented Programming Laboratory	CO 1: Would be able to Implement class and object concept for solving a problem.
			CO2: Would be able to implement Inheritance and it's various types for solving a problem using object oriented paradigm.
			CO3 : Would be able to implement Static and Dynamic polymorphism such as: function overloading and virtual functions.
			CO4: Would be able to use dynamic memory management techniques for creation, copy and destruction of objects.
			CO5: Apply namespaces, exceptions, and preprocessor instructions to develop code.
			CO 6: Would be able to apply the concept of exception handling and template functions.
143	HSSM7203	Communication & Interpersonal skills for Corporate Readiness Laboratory	CO1: Make students prepared to confidently face the challenges in the corporate or the business world.
			CO2: Help students pass through a smooth transition from a student to an early career professional in the corporate world.

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			<p><b>CO3:</b> To make them acclimatized with the duties and responsibilities of a professional entering into an initial employment, prove their mettle for sustainability and improve upon their etiquettes and conduct after getting the employment.</p>
			<p><b>CO4:</b> Apply the techniques of preparing CV, writing Job Application, Interviews, Techniques of GD, Memos, Welcoming New Entrants, expressing competent and equipped for day to day transactions.</p>
			<p><b>CO5:</b> Apply ideas in writing and speaking to produce messages suitably tailored for the topic, objectives, audience, communication medium and context.</p>
144	HSSM3303	Environmental Engineering & Safety	<p><b>CO1:</b> To develop the basic concept about Ecological concept, Environmental law, Water treatment, Noise pollution and its control.</p>
			<p><b>CO2:</b> To have an idea about Waste water treatment, Air pollution and its control, solid waste management, Hazardous waste management.</p>
			<p><b>CO3:</b> To develop the basic knowledge about Occupational safety and Health acts, Safety procedure, Types of Accidents, Safety management, personal protective equipments.</p>
145	PCEC4303	Control System Engineering	<p>CO 1: Able to differentiate open loop and closed loop control system and representation of different mechanical and electrical system into block diagram.</p>
			<p>CO 2: Able to analyze 1<sup>st</sup> and 2<sup>nd</sup> order system in time domain using different technique like root locus, RH criteria etc.</p>
			<p>CO 3:Able to analyze 1<sup>st</sup> and 2<sup>nd</sup> order system in frequency domain using different technique like Bode Plot, Polar Plot, Nyquist Plot etc.</p>
146	PCEC4301	Microprocessors	<p><b>CO1:</b> Students should be able to identify the basic element and functions of microprocessor</p>
			<p><b>CO2:</b> Students should be able to describe the architecture of microprocessor and its peripheral devices</p>



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			<p><b>CO3:</b>Students should be able to demonstrate fundamental understanding on the operation between the microprocessor and its interfacing devices.</p>
			<p><b>CO4:</b> Students should be able to apply the programming techniques in developing the assembly language program for microprocessor application.</p>
147	PCEC4302	Analog Communication Techniques	<p><b>CO1:</b>Apply Fourier analysis to communication signals derive the energy or power spectral density of signals.</p>
			<p><b>CO2:</b> Sketch the spectrum of amplitude modulated signals, given the baseband spectrum.</p>
			<p><b>CO3:</b>Explain the difference between narrow-band and wide-band angle modulation.</p>
			<p><b>CO4:</b> Determine the number of levels in a quantize given signal-to-noise ratio and maximum input voltage describe the different types of line codes.</p>
148	PEEC4301	PEEC4301 Advanced Electronic Circuits	<p><b>CO1:</b> Able to design various active filter with desired cut-off frequency.</p>
			<p><b>CO2:</b> Able to generate various square wave with appropriate duty cycle.</p>
			<p><b>CO3:</b> Able to design PLL,with desired lock frequency.</p>
149	FEEC6301	Data Base Management Systems (DBMS)	<p><b>CO 1:</b> Analyze the basic concepts and architecture associated with DBMS</p>
			<p><b>CO 2 :</b> Apply normalization steps in database design and removal of data anomalies</p>
			<p><b>CO 3 :</b> Describe the characteristics of database transactions and how they affect database integrity and consistency.</p>
			<p><b>CO 4 :</b> Create, maintain and manipulate a relational database using SQL.</p>
			<p><b>CO 5:</b> Employ the conceptual and relational models to design large database Systems.</p>

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150	PCEC7303	Control & Instrumentation Lab.	<b>CO1:</b> To observe the time response of a second order process with P, PI and PID control and apply PID control to servomotor
			<b>CO2:</b> To study the characteristics of a relay and analyse the relay control system
			<b>CO3:</b> To plot the displacement-voltage characteristics of the given LVDT
151	PCEC7301	Microprocessor Lab.	<b>CO1:</b> Students should be able to apply the programming techniques in developing the assembly language program for microprocessor application.
			<b>CO2:</b> Students should be able to interface microprocessor with various peripheral devices
			<b>CO3:</b> Students should be able to develop microprocessor based system.
152	PCEC7302	Analog Communication Lab	<b>CO1:</b> Design Analog communication systems to meet desired needs.
			<b>CO2:</b> Convert analog signals to digital while satisfying certain specs.
			<b>CO3:</b> Evaluate fundamental communication system parameters, such as bandwidth, power, signal to quantization noise ratio, and data rate.
			<b>CO4:</b> Understand practical implementation issues such as aliasing and inter-symbol- interference (ISI).
			<b>CO5 :</b> Comprehend operations of digital transmission systems.
153	HSSM3301	Principles of Management	CO 1: After completion of the course student would be able to realize sufficient requirement of managerial skills while accomplishing engineering jobs within any work environment.
			CO 2: Would have gained good understanding of various components of management such as: planning, organizing, directing, staffing and controlling.
			CO 3: Would have understood the role of marketing management in understanding the influence of customers

## Course Outcomes for all Programmes: 2021-22

			<p>preference in designing an successful product.</p> <p>CO 4: Would be able to apply the knowledge of finance management for appraising a project and in taking crucial decisions.</p> <p>CO 5: Would be able to appreciate the role of Human resource management in finding a suitable staff for a given job, forming a right team for successful accomplishment of Job, means to appraise the performance of each staff, training and Grievance Handling etc.,</p>
154	PCEC4304	Digital Signal Processing	<p><b>CO1:</b> Represent discrete-time signals analytically and visualize them in the time domain.</p> <p>CO2: Understand the meaning and implications of the properties of systems and signals.</p> <p>CO3: Understand the Transform domain and its significance and problems related to computational complexity.</p>
155	PCEC4305	Digital Communication Techniques	<p><b>CO1</b> Ability to mathematically model digital communication techniques; components, and degrading factors in communication systems</p> <p><b>CO2</b> Ability to analyze and evaluate the performance of basic communication techniques, and to design communication system components to satisfy given requirements</p> <p><b>CO3</b> Ability to design and implement basic modulator and demodulator circuits, simulate modulation and demodulation techniques, and their performance in noise</p>
156	PEEC5304	Antennas and Wave Propagation	<p><b>CO1:</b> student will able to find how an antenna radiates and capture radio wave energy from the concepts of radiation by dynamic currents and charges, and retarded potentials</p> <p><b>CO2:</b> Distinguish the properties and parameters of antenna such as radiation pattern, radiation impedance, directivity, antenna gain, effective area</p> <p><b>CO3:</b> Apply the Friss transmission expression and reciprocity principle effectively to predict the receive power in a system</p>

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			<p>consisting of transmit and receive antenna</p> <p><b>CO4:</b> Design an antenna system, including the shape of the antenna, feed property, the requirement on the arrangement of the radiating elements in an array, given the radiation parameters such as radiation pattern, gain, operating frequency, transmit/receive power</p>
157	PEEC5301	Information Theory and Coding	<p><b>CO1:</b> apply the basics of information theory to calculate channel capacity and other measures</p> <p><b>CO2:</b> design specific data compression techniques and calculate the compression achieved</p> <p><b>CO3:</b> apply and control specific coding methods and be able to calculate the rate and error probabilities achieved</p> <p><b>CO4:</b> understand the basic concepts and complexity of cryptographic security methods and their practical applications.</p>
158	PCCS4304	Operating System	<p><b>CO 1:</b> Would have gained In-depth understanding of architecture and various functional modules of operating system such as: Process Management, Memory Management, I/O Management and File Management etc.</p> <p><b>CO 2:</b> Enable the student to interpret the concept of Operating system while development of any software system, so as to build robust and scalable systems.</p> <p><b>CO 3:</b> Apply knowledge of the functional modules of operating system in solving problems.</p>
159	PCEC7304	Digital Signal Processing Lab.	<p><b>CO1</b> Program a DSP chip to filter signals using either assembly language or a C compiler for the chip. This filter could be a FIR or IIR filter. The student should understand how design algorithms for implementation.</p> <p><b>CO2</b> Understand how digital to analog (D/A) and analog to digital (A/D) converters</p>

## Course Outcomes for all Programmes: 2021-22

			operate on a signal and be able to model these operations mathematically.
			<b>CO3</b> Use Z transforms and discrete time Fourier transforms to analyze a digital system
160	PCEC7306	Communication Engineering Lab.	<b>CO1</b> Students will be familiar with the techniques involved in the transfer of information in the field of Radio communication
			<b>CO2</b> Students will be able to detect and correct the errors that occur due to noise during transmission
			<b>CO3</b> Students will be able to understand the concepts of Facsimile, Television, Cellular and Satellite Communication.
161	PCEC7305	Digital Communication Lab.	<b>CO1:</b> Able to identify blocks of a basic digital communication system (simulation, modeling, test, and measurement of sub-system and system performance)
			<b>CO2</b> : Use of modern test and measurement tools and their relation with software-defined-radio (SDR)
			<b>CO3</b> Various system measurement techniques, methods, and tools
			<b>CO4</b> Simulation and performance evaluation of various digital modulations with several pulse shaping techniques
			<b>CO5</b> Theory and practical usage of Time-Frequency (TF) analysis. Using TF analysis to understand and evaluate the communication system behavior
162	HSSM3401	Entrepreneurship Development	<b>CO1:</b> Building up entrepreneurial abilities
			<b>CO2:</b> Sustain accelerated economic growth by developing entrepreneurial spirit.
			<b>CO3:</b> Making students aware of various industries and financial institutions working towards encouraging innovation.
			<b>CO4:</b> Creating awareness and inspirations
			<b>CO5:</b> Informing about various schemes.

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			<b>CO6:</b> Guidance for patents.
163	PCEC4401	VLSI Design	<b>CO1:</b> An ability to extract the analog parasitic elements from the layout and analyze the circuit.
			<b>CO2:</b> An ability to build a cell library to be used by other chip designers.
			<b>CO3:</b> An ability to analyze VLSI circuit timing using Logical Effort analysis.
			<b>CO4:</b> An ability to estimate and compute the power consumption of a VLSI chip.
164	PEEC5404	Digital Switching & Telecom Networks	CO1: Students should be able to calculate , No. of links in a network, Probability of blocking, Gain
			CO2: Able to design various models in telephone transmission and different switching system models.
			CO3: student should able to know Multiplexing techniques and Different switching systems.
165	PEEI5401	Microcontroller & Applications	<b>CO1:</b> Describe the microcontroller's architecture and peripheral subsystem of PIC16F877A.
			<b>CO2:</b> Modify internal registers and interrupt functions to perform input/output tasks.
			<b>CO3:</b> Assemble a program efficiently in C programming language for the microcontroller.
			<b>CO4:</b> Design and develop a microcontroller-based system with peripheral devices interface.
			<b>CO5:</b> Work effectively in given tasks and assignment as individual or in group
166	FECE6402	Principles of Mobile Computing	CO 1: Would have gained adequate understanding GSM,CDMA architecture and basis of networking signaling
			CO 2: Will have gained adequate understanding of mobile internet standards and protocols,

## Course Outcomes for all Programmes: 2021-22

			CO 3: Would be able to describe the features of 3G service architecture and WCDMA
			CO 4: Would be able to describe about the Global mobile systems, blue tooth technology and associated protocols
167	PCEC7401	VLSI Design Laboratory	<b>CO1:</b> Student will able to design digital systems.
			<b>CO2:</b> Student will able to synthesis and simulate various digital circuits along with FPGA implementation.
			<b>CO3:</b> Student will able to Draw the layout of various digital circuits along with parasitic extraction.
168	PCEC7402	Minor Project	<b>CO1:</b> Identification of real world problems
			<b>CO2:</b> Awareness of design methodologies & its implementation
			<b>CO3:</b> Advanced programming techniques
			<b>CO4:</b> Technical report writing.
169	PCEC7403	Seminar	<b>CO1:</b> To explore new research from a range of academic disciplines which sheds light on the questions outlined above.
			<b>CO2:</b> The overall aim of the seminar series is to help develop an emerging field at the intersection of multi-disciplinary understandings of culture and education.
			<b>CO3:</b> It will build on the existing body of work on education and culture, but its aim is explore and develop new perspectives in this area.
170	PCEC4402	Microwave Engineering	<b>CO1:</b> Gain knowledge and understanding of microwave analysis methods.
			<b>CO2:</b> Have knowledge of how transmission and waveguide structures and how they are used as elements in impedance matching and filter circuits
			<b>CO3:</b> Have knowledge of basic communication link design; signal power budget, noise evaluation and link carrier to noise ratio.

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			<b>CO4;</b> Know how to model and determine the performance characteristics of a microwave circuit or system using computer aided design methods.
171	PEEC5406	Satellite Communication Systems	<b>CO1:</b> Identify the fundamentals of orbital mechanics, the characteristics of common orbits used by communications and other satellites, and be able to discuss launch methods and technologies.
			<b>CO2:</b> Understand the systems required by a communication satellite to function and the trade-offs and limitations encountered in the design of a communication satellite system.
			<b>CO3:</b> Understand the radio propagation channel for Earth station to satellite and satellite to satellite communication links, and the basics of designing
			antenna systems to accommodate the needs of a particular satellite system.
			<b>CO4:</b> Be able to calculate an accurate link budget for a satellite or other wireless communication link
172	PECS5407	Wireless Sensor Networks	<b>CO1:</b> Analyze the technology trends for next generation wireless sensor networks with various multiple access techniques
			<b>CO2:</b> Exemplify and implement how the IEEE 802.1X standards can be used to build an authentication
			<b>CO3:</b> Understands the advancements in sensor and assess its performance in communication
			<b>CO4:</b> Implement an algorithm to connect nearby Bluetooth devices and predict their activity required for transmission of data.
173	PCCS7402	Microwave Engineering Laboratory	<b>CO1</b> Gain knowledge and understanding of microwave analysis methods.
			<b>CO2</b> Be able to apply analysis methods to determine circuit properties of passive/active microwave devices.



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			<p><b>CO3</b> Know how to model and determine the performance characteristics of a microwave circuit or system</p>
			<p><b>CO4</b> Have knowledge of basic communication link design; signal power budget, noise evaluation and link carrier to noise ratio.</p>
			<p><b>CO5:</b> Have knowledge of how transmission and waveguide structures and how they are used as elements in impedance matching and filter circuits.</p>
174	PCEC7404	Project (50% External Evaluation)	<p><b>CO1:</b> Identification of real world problems</p>
			<p><b>CO2:</b> Awareness of design methodologies &amp; its implementation</p>
			<p><b>CO3:</b> Advanced programming techniques</p>
			<p><b>CO4:</b> Technical report writing</p>
175	PCEC7405	Comprehensive Viva-Voce (External Evaluation)	<p><b>CO1:</b>To get information about students overall fundamental knowledge.</p>
			<p><b>CO2:</b> To get information about the students expertise of different core subjects.</p>
			<p><b>CO3:</b> To get information about the communication skills.</p>
			<p><b>CO4:</b> To get information about there command in technical skills</p>

### B.TECH-COs - Civil Engineering

Sl.No	Subject code	Subject	Course	Description of Course outcomes
101	C101	Mathematics -1	C101.1	Know first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			C101.2	Comprehend linear differential equation of higher order, homogeneous equation with constant coefficient, Euler - Cauchy equation and solutions by

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				variations of parameter to model electric circuits.
			C101.3	Compute series solutions of differential equations , power series method, Lagenders polynomials and Bessel's function to solve complex engineering problems.
			C101.4	Differentiate first-order differential equation, linear differential equation and Bernoulli's equation to find solution for electrical circuits.
			C101.5	Understand linear equation and vector space
			C101.6	Explain the asymptote and curvature problems
<b>102</b>	C102	Chemistry	C102.1	A basic idea about chemical reactions, its feasibility, rate, Effect of catalyst on reaction rate.
			C102.2	Know about structure, bonding pattern, property of different atom, molecule, and ion.
			C102.3	Understandthe different types of solids and their diffects.
			C102.4	Apply the knowledge of EMF in case of different types of commercial battery.
			C102.5	Illustrate about the different types of equillibriums and related concepts.
			C102.6	Describe the free energy concepts in detail.
<b>103</b>	C103	Basics of Electronics	C103.1	A basic knowledge of Semiconductor.
			C103.2	Understand the use of diodes as power supply rectifiers.
			C103.3	Applythe basic operation of OP-AMP circuit.
			C103.4	Analyse functional details and operation of transistors as switching circuits.
			C103.5	Illustratethe main elements of a communication system, and the principles related to its operation.

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			C103.6	Summarize the principle and working of different logic gates and the related instruments.
<b>104</b>	C104	Thermodynamics	C104.1	Know about the basic concept and 1 <sup>st</sup> law of Thermodynamics.
			C104.2	Learn about the second law of Thermodynamics and entropy
			C104.3	Know about the properties of pure substance and steam power.
			C104.4	Distinguish between the flow and non-flow processes.
			C104.5	Distinguish between the ideal and real gasses.
			C104.6	Learn about the gas mixture.
<b>105</b>	C105	Programming in C	C105.1	Know about the different parts of computer and binary representation of numbers along with their operations.
			C105.2	Understand the structured programming processes and operating systems.
			C105.3	Use and handle the C language fundamentals.
			C105.4	Differentiate between different programmes like monolithic and modular etc.
			C105.5	Apply the different C functions.
			C105.6	Learn about the pointers and file handling
<b>106</b>	C106	English Communication Skill	C106.1	Well versed with various elements and concepts related to communicative English.
			C106.2	Learn the good interview skills.
			C106.3	Fine tuned their pronunciation and accent by adhering to the rules of phonetics, word stress intonation
			C106.4	Effectively use the various rules of grammar for

## Course Outcomes for all Programmes: 2021-22

				framing good English.
			C106.5	Communicate fluently and accurately with the four skills: Speaking, Listening, Writing and Reading.
			C106.6	Differentiate between verbal and non verbal communication
<b>107</b>	C107	Chemistry Lab	C107.1	Know the procedure of preparation of some important drug like Aspirine
			C107.2	Understand the knowledge about the principle, reaction, uses of commercial battery.
			C107.3	Estimate the amount of Fe <sup>2+</sup> , Ca <sup>2+</sup> , Total Hardness, Percentage of available Chlorine in a given sample.
			C107.4	Illustrate the procedure of determination of Flash point, fire point, viscosity of lubricating oil and can determine the amount DO level in a sample of water.
			C107.5	Determine the amount of individual alkali present in a mixture.
<b>108</b>	C108	Basics of Electronics Lab	C108.1	Know all active and passive components such as diode, transistors of an electronic circuits
			C108.2	Understand the main elements of a communication system, and the principles related to its operation
			C108.3	Handle all measuring instruments such as CRO, multi meter and use them for any practical necessities.
			C108.4	Record and analyze the output of different developed circuits
			C108.5	Design different circuits using OPAMP, Diode and Transistors.
<b>109</b>	C109	Programming in C lab	C109.1	Write C codes on standard computing devices using conditional, branching and iterative constructs.

## Course Outcomes for all Programmes: 2021-22

			C109.2	To understand modularization concept and write efficient and manageable code using functions
			C109.3	To model real life multi dimensional problems by using multi dimensional structures of C.
			C109.4	To manage various memory fragmentation problems by using dynamic memory concepts.
			C109.5	To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
<b>110</b>	C110	English Communication Skill Lab	C110.1	Write correct English by avoiding common errors of grammar.
			C110.2	Listen to the English speeches with focus on segmental sounds, stress, weak forms and intonations.
			C110.3	Speak English with correct pronunciation
			C110.4	Use the standard dictionary to find the correct pronunciation of words and perform various phonemic transcriptions.
			C110.5	Prepare scenario or topic based writings and would be able to present them as required essentially in carrying out project works.
<b>111</b>	C111	Engineering Workshop	C121.1	Know about various tools and tackles used in workshop.
			C121.2	Understand practical in fitting job.
			C121.3	Operate the lathe machine.
			C121.4	Analyse the functions ofwelding machine.
			C121.5	Describe shaper machine, milling machine, drilling machine etc.
<b>112</b>	C112	Mathematics-II	C112.1	Know Laplace Transform to get the solution to differential equation, convolution and Integral

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				equation.
			C112.2	Interpret the concepts of Fourier series, Fourier transform, Fourier Integral
			C112.3	Solve beta function and error function to get solutions of complex real life problem.
			C112.4	Compare the scalar and vector problems.
			C112.5	Evaluate line integral and double integration problems
			C112.6	Know the techniques of combinetheproblems using Gauss divergence and Stoke's theorem
113	C113	Physics	C113.1	Know the concepts of quantum mechanics.
			C113.2	Understand the basic features of different oscillatory systems, waves and related properties.
			C113.3	Apply vector calculus in electromagnetic waves.
			C113.4	Differentiate between interference and diffraction.
			C113.5	Analyse the application of quantum mechanics to various physical problems.
			C113.6	Produce polarized light, to construct Nicol prism, quarter wave & half wave plate.
114	C114	Basic Electrical Engineering	C114.1	Know about Direct current, voltage, power, sources and analysis of electrical networks
			C114.2	Understand electromagnetism and electronics measuring instruments.
			C114.3	Apply AC fundamentals and DC transients in electrical circuits.
			C114.4	Compare rotating electrical machines and stationery electrical machine as transformer.
			C114.5	Describeabout power supply systems

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			C114.6	Relates the industrial applications of Electrical energy
115	C115	Mechanics	C104.1	Understand the fundamentals of Mechanics & compute the equilibrium of rigid bodies.
			C104.2	Learn the concept of parallel forces, moment, Couple & effect of friction on equilibrium.
			C104.3	Locate the Centroid & determine the area/mass moment of inertia of different shapes.
			C104.4	Understand the concept of virtual work and determine the forces in members of trusses
			C104.5	Learn kinematics, kinetics of particle and rigid body, related principles
			C104.6	Solves the numerical on the projectile, D'Alembert's principle and analyze impact of elastic bodies on collision.
116	C116	Data Structure Using C	C116.1	Write C codes on standard computing devices using conditional, branching and iterative constructs.
			C116.2	To understand modularization concept and write efficient and manageable code using functions
			C116.3	To model real life multi dimensional problems by using multi dimensional structures of C.
			C116.4	To manage various memory fragmentation problems by using dynamic memory concepts.
			C116.5	To implement I/O concepts and file handling concepts for managing the data and storing it in non-volatile mediums.
			C116.6	Apply data structure and algorithm for a given contextual problem and develop in C.
117	C117	Business Communication	C117.1	Understand of the essential elements of business communication

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			C117.2	Learn the different reading skills
			C117.3	Acquire appreciative level of soft skill
			C117.4	Understand the cross cultural communications, avoidance of racial, gender and other form of bias communication.
			C117.5	Adequate knowledge of effective writing skills
			C117.6	Represent the common forms of oral and written communication
<b>118</b>	C118	Physics Lab	C118.1	Determine acceleration due to gravity by bar pendulum, modulus of rigidity of elastic wire, Young's modulus of wire & surface tension of water.
			C118.2	Summarize the thermal conductivity of bad conductor, grating element of plane diffraction grating.
			C118.3	Relate the wavelength of sodium light by Newton ring & Fresnel's bi-prism method in a well maintained dark.
			C118.4	Identify the characteristic curve of PN diode, Bipolar junction transistor & charge and discharge time of a condenser connected in RC circuit.
			C118.5	Describe a project work on topics having different branches of physics.
<b>119</b>	C119	Basic Electrical Engineering Lab	C119.1	How to measure the electrical consumption of various devices as well as for DC compound machines.
			C119.2	Distinguish operate and control the speed of DC shunt motor, Three phase induction motor.
			C119.3	Show the characteristics and use of Incandescent lamps and fuses.
			C119.4	Analyze the open circuit characteristics of DC shunt generators



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			C119.5	Evaluate current, voltage and power in AC electric circuits
120	C120	Data Structure Using C Lab	C120.1	Identify and implement asymptotic notations of an algorithm to analyze the consumption of resources (time/space).
			C120.2	Generalize knowledge of stack, queue and list ADT to manage the memory using static and dynamic allocations
			C120.3	Apply binary search tree to design applications.
			C120.4	Recognize, analyze, model, and implement code for real life problems like shortest path.
			C120.5	Model and implement comparison-based search algorithms and sorting algorithms.
121	C121	Business Communication lab	C121.1	Make good oral communication in work related situations.
			C121.2	Acquire good reading and writing skill.
			C121.3	Gain appreciative level of soft skill, such that can establish their leadership quality, can make productive contribution in group discussion and brain storming sessions.
			C121.4	Enable them professionally to sustain his/her career
			C121.5	Equip themselves by learning the nuances of selection process to get into an employment
122	C122	Engineering Drawing Lab	C111.1	Gather knowledge about the tools and tackles used for drawing.
			C111.2	Explain how to draw projection of points and lines.
			C111.3	Show projection of planes and solids.
			C111.4	Construct the cut section and development of points.

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			C111.5	Describe isometric view and can able to draw in AUTO CAD.
123	C201	Mathematics-III	C201.1	Students will be able to formulate and solve partial differential equations.
			C201.2	Students will be able to have thorough knowledge in Fourier series.
			C201.3	Students will be able to familiar with applications of partial differential equations.
			C201.4	Students will be able to gain good knowledge in the application of Fourier transform.
			C201.5	Students will be able to learn about Z- transforms and its applications.
			C201.6	Students will be able to equip themselves familiar with the functions of several variables.
124	C202	ORGANIZATIONAL BEHAVIOUR	C202.1	Students will be able to analyze individual and group behaviour, and understand the implications of organizational behaviour on the process of management.
			C202.2	Students will be able to identify different motivational theories and evaluate motivational strategies used in a variety of organizational settings.
			C202.3	Students will be able to evaluate the appropriateness of various leadership styles and conflict management strategies used in organizations.
			C202.4	Students will be able to describe and assess the basic design elements of organizational structure and evaluate their impact on employees.
			C202.5	Students will be able to explain how organizational change and culture affect working relationships within organizations.

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			C202.6	Students will be able to critically evaluate the potential effects of important developments in the external environment (such as globalisation and advances in technology) on organisational behaviour.
125	C203	C++ AND OOPS	C203.1	Students will be able to describe the important concepts of object oriented programming like object and class, Encapsulation, inheritance and polymorphism.
			C203.2	Students will be able to write the skeleton of C++ program.
			C203.3	Students will be able to write the simple C++ programs using the variables, operators, control structures, functions and I/O objects cin and cout.
			C203.4	Students will be able to write the simple object oriented programs in C++ using objects and classes.
			C203.5	Students will be able to use features of C++ like type conversion, inheritance, polymorphism, I/O streams and files to develop programs for real life problems.
			C203.6	Students will be able to use advance features like templates and exception to make programs supporting reusability and sophistication.
126	C204	Mechanics of solids	C204.1	Students will be able to determine the stresses and strains in the bars with varying sections, tapering sections, composite members etc.
			C204.2	Students will be able to determine the stresses on oblique sections when the direct stresses and shear stresses are given.
			C204.3	Students will be able to sketch the shear force and bending moment diagrams for beams with different support conditions and different load conditions.

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			C204.4	Students will be able to analyse symmetrical sections subjected to bending stress.
			C204.5	Students will be able to solve problems of columns and struts using different methods such as Euler's theory, lateral buckling etc.
			C204.6	Students will be able to analyse both solid and hollow shafts subjected to torsion.
127	C205	Building material & Building construction	C205.1	Students will be able to identify various building materials and select suitable type of building material for given situation.
			C205.2	Students will be able to Understand the manufacturing process of bricks and cement
			C205.3	Students will be able to know th suitable types of foundations and construction.
			C205.4	Students will be able to aware of the brick masonry, stone masonry and cavity wall.
			C205.5	Students will be able to select suitable type of flooring, plastering, DPC, stairs etc.
			C205.6	Students will be able to aware of maintenance of building.
128	C206	Fluid mechanics & hydraulic machines	C206.1	Students will be able to convert units of any parameter between three systems of units, understand the physical properties and characteristic behaviour of fluids, and the basic principles of fluid mechanics.
			C206.2	Students will be able to describe and interpret the behaviour and performance of fluid at rest.
			C206.3	Students will be able to describe and interpret the behaviour and performance of fluid in motion.
			C206.4	Students will be able to describe the behaviour and performance of fluid when the fluid is flowing through the pipe.

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			C206.5	Students will be able to apply similitude and modelling principles and techniques to solve problems in hydraulics
			C206.6	Students will be able to calculate performance analysis in turbines and pumps and can be used in power plants.
129	C207	C++ and object oriented programming LAB	C207.1	To explain the principles of the object oriented programming paradigm specifically including abstraction, encapsulation, inheritance and polymorphism
			C207.2	To use an object oriented programming language, and associated class libraries, to develop object oriented programs
			C207.3	To design, develop, test, and debug programs using object oriented principles in conjuncture with an integrated development environment
			C207.4	To construct appropriate diagrams and textual descriptions to communicate the static structure and dynamic behavior of an object oriented solution
			C207.5	To integrate robustness, reusability, and portability into large-scale software development
			C207.6	To describe and explain the factors that contribute to a good object oriented solution, reflecting on your own experiences and drawing upon accepted good practices.
			130	C208
C208.2	Display competence in oral, written, and visual communication.			
C208.3	Apply communication theories.			
C208.4	Show an understanding of opportunities in the field of communication.			
C208.5	Use current technology related to the			

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				communication field.
			C208.6	Respond effectively to cultural communication differences.
131	C209	Civil engg drawing lab	C209.1	Students will be able to understand the plan, elevation and section view of building.
			C209.2	Students will be able to draw the plans, elevation and section for load bearing wall and framed structures.
			C209.3	Students will be able to draw the detail of door and window.
			C209.4	Students will be able to draw several types of footing, brick work staircases, masonry etc.
			C209.5	Students will be able to draw the detailing of floor, wall joints and types steel roof truss
			C209.6	Students will be able to know the project on establishments.
132	C210	Mathematics-4	C210.1	Use numerical techniques to solve ordinary and simultaneous differential equation with initial conditions.
			C210.2	Construct analytic functions and apply this concept to solve fluid flow problems.
			C210.3	Explain geometrical approach of conformal mapping and compute complex line integrals using Cauchy's theorem.
			C210.4	Compute the series solution of Bessel and Legendre differential equations also produce recurrence relations and solve problems associated with them.
			C210.5	Apply the method of least square to produce the best fitting curve for a given data and solve problems associated with discrete probability distribution.

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			C210.6	Solve problems associated with continuous probability distribution, discrete joint distribution and Markov chain using transition probability matrix.
133	C211	Engg economics and costing	C211.1	Understand the terminology used in engineering economic analysis.
			C211.2	Understand time-value-of-money concepts such as net present worth analysis, equivalent uniform annual worth analysis, benefit/cost analysis, internal rate of return analysis, loans, leveraging, and fixed-income investment analysis.
			C211.3	Understand the criteria for making economic-based decisions.
			C211.4	Analyze before-tax and after-tax cash flows.
			C211.5	Understand economic risk analysis techniques.
			C211.6	Conduct minimum life cycle cost tradeoffs between initial and repair costs.
134	C212	Structural analysis-1	C212.1	Students will be able to understand the determinate and indeterminate structure.
			C212.2	Students will be able to analyse the indeterminate structure using different methods.
			C212.3	Students will be able to understand the internal effects produced due to moving loads.
			C212.4	Students will be able to analyze arches, cables and suspension bridges.
			C212.5	Students will be able to understand the basic strength and energy theorems of structural mechanics and its applications.
			C212.6	Students will be able to study deformations of bodies caused by externally applied forces
135	C213	Surveying -1	C213.1	Students will be able develop knowledge of the basic and conventional surveying instruments,

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				principle behind them and working of the instruments.
			C213.2	Students will be able to develop knowledge regarding plotting of the area from the field measurements and determination of the area.
			C213.3	Students will be able to become familiar with the theory behind curves.
			C213.4	Students will be able to understand the range of calculations that can be made with surveying data and understand the linkages between surveying data and engineering design.
			C213.5	Students will be able to estimate measurement errors and apply corrections
			C213.6	Students will be able to interpret survey data and compute areas and volumes
<b>136</b>	C214	Geotechnical engg	C214.1	Students will be able to learn the common terminology used in the field of Geotechnical Engineering.
			C214.2	Students will be able to understand the interaction between water and soil.
			C214.3	Students will be able to understand the compressibility and consolidation of soils.
			C214.4	Students will be able to understand the behaviour of stresses and stress conditions in soils.
			C214.5	Students will be able to understand the shear strength of soil.
			C214.6	Students will be able to become familiar with deformation and settlement characteristics of soils,
<b>137</b>	C215	Database management systems	C215.1	After completion of course, the student should have acquainted with basic concepts and terms related to data base systems



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			C215.2	Would b have gained adequate knowledge about database system architecture schemas, Data Independence, Object oriented data model etc.,
			C215.3	Student would have gained adequate understanding about storage strategies.
			C215.4	Would have understood relation algebra and gained ability to apply various query languages such as SQL for extracting desired data from the data base.
			C215.5	Would be able to perform normalization on forms and also able to optimizing the query processing
			C215.6	Would have gained understanding about transaction processing and concurrency control mechanisms.
<b>138</b>	C216	Material testing lab	C216.1	Students will be able to learn about properties of civil engineering materials.
			C216.2	Students will be able to Evaluate the strength and properties of brick.
			C216.3	Students will be able to evaluate the physical properties of cement such as Fineness, Soundness, Specific gravity, consistency, initial and final setting times cement.
			C216.4	Students will be able to evaluate the strength and fineness of coarse and fine aggregate samples.
			C216.5	Students will be able to determine the strength of mortar
			C216.6	Students will be able to Evaluate the strength and strain of cast iron.
<b>139</b>	C217	Hydraulics lab	C217.1	Students will be able to apply dimensional analysis for design of experimental procedures
			C217.2	Students will be able to calibrate flow measuring devices used in pipes, channels and tanks
			C217.3	Students will be able to determine fluid and flow

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				properties
			C217.4	Students will be able to characterize laminar and turbulent flows
			C217.5	Students will be able to get practical knowledge in calibration of Venturimeter, Orifice meter, water meter and notches
			C217.6	Students will be able to determining performance characteristics of turbines and pumps
140	C218	Survey field work -1	C218.1	Students will be able to develop knowledge of the basic and conventional surveying instruments, principle behind them and working of the instruments.
			C218.2	Students will be able to become familiar with linear and angular measurements.
			C218.3	Students will be able to Gain the ability to use survey equipment to measure heights and distances.
			C218.4	Students will be able to gain a practical knowledge in different aspects of Theodolite Surveying.
			C218.5	Students will be able to different aspects of Tachometry.
			C218.6	Students will be able to setting out of curves and setting out of building plans
142	C301	ENVIRONMENTAL ENGINEERING AND SAFETY	C301.1	Students will be able to get idea on various resources.
			C301.2	Students will be able to understand the concept of ecosystem.
			C301.3	Students will be able to study about various environmental pollution and nuclear hazards.
			C301.4	Students will be able to understand the social issues of environment and study about various

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				environmental acts.
			C301.5	Students will be able to understand the concept of population growth and explosion.
			C301.6	Students will be able to know the role of information technology in environment and human health.
143	C302	AMOS	C302.1	Students will be able to understand the fundamental concepts of mechanics of materials.
			C302.2	Students will be able to understand the stresses and strains of two dimensional and three dimensional problems.
			C302.3	Students will be able to acquire knowledge on torsion of prismatic bars.
			C302.4	Students will be able to get knowledge on curved flexural members.
			C302.5	Students will be able to get knowledge on thick cylinder.
			C302.6	Students will be able to understand the experimental stress analysis.
144	C303	Transportation Engg-1	C303.1	Students will be able to carry out surveys involved in planning and highway alignment
			C303.2	Students will be able to design cross sectional elements, sight distance, horizontal and vertical alignment
			C303.3	Students will be able to implement traffic studies, traffic regulations and control, and intersection design
			C303.4	Students will be able to determine the characteristics of pavement materials
			C303.5	Students will be able to design flexible and rigid pavements as per IRC.

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			C303.6	Students will be able to get idea on mass transit system.
145	C304	DESIGN OF CONCRETE STRUCTURES	C304.1	Students will be able to understand the general mechanical behaviour of reinforced concrete.
			C304.2	Students will be able to analyze and design reinforced concrete flexural members.
			C304.3	Student will be able to analyze and design reinforced concrete compression members.
			C304.4	Students will be able to analyze and design simple connections of reinforced concrete members
			C304.5	Students will be able to identify and apply the applicable industry design codes relevant to the design of reinforced concrete members.
			C304.6	Students will be able to analyze transfer and development length of concrete reinforcement
146	C305	Survey-2	C305.1	Students will be able to learn about surveying applications in setting out of curves, buildings, culverts and tunnels.
			C305.2	Students will be able to understand the basics and elements of different types of curves on roads and their preliminary study of survey
			C305.3	Students will be able to get idea on different geodetic methods of survey such as triangulation, trigonometric leveling
			C305.4	Students will be able to learn about errors in measurements and their adjustments in a traverse
			C305.5	Students will be able to understand the application of modern advanced surveying techniques involved such as Total station and Photogrammetric etc
			C305.6	Students will be able to learn about concept of field astronomy and GPS

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<b>147</b>	C306	COMPUTER ORGANIZATION	C306.1	Understand how to implement memory chips, boards, modules and caches
			C306.2	Understand the basics of hardwired and micro-programmed control of the CPU.
			C306.3	Learn about various I/O devices and the I/O interface
			C306.4	Estimate the performance of various classes of machines, memories, pipelined architectures etc.
			C306.5	Design an instruction encoding scheme for an ISA.
			C306.6	Build large memories using small memories for better performance.
<b>148</b>	C307	CONCRETE AND STRUCTURAL ENGINEERING LABORATORY	C307.1	Students will be able to determine workability of a concrete
			C307.2	Students will be able to calculate axial stresses and longitudinal strain of concrete cube.
			C307.3	Students will be able to compute tensile strength.
			C307.4	Students will be able to find out modulus of rupture of concrete.
			C307.5	Students will be able to design concrete mix.
			C307.6	Students will be able to trace the failure of RC beam.
<b>149</b>	C308	GEOTECHNICAL ENGINEERING LABORATORY	C308.1	Students will be able to implement laboratory methods for determining the physical properties of soil
			C308.2	Students will be able to determine the index properties of soil
			C308.3	Students will be able to measure the dry density, relative density of disturbed and undisturbed soil samples.

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			C308.4	Students will be able to evaluate the shear strength parameters of soil
			C308.5	Students will be able to determine the permeability and consolidation properties of soil.
			C308.6	Students will be able to evaluate the CBR for soil
150	C309	DESIGN AND DETAILING OF CONCRETE STRUCTURE LABORATORY	C309.1	Students will be able to calculate various parameters in design of beams.
			C309.2	Students will be able to analyze compression members.
			C309.3	Students will be able to design slab of a load bearing residential building.
			C309.4	Students will be able to design footings.
			C309.5	Students will be able to design stair case of a residential building.
151	C310	PRINCIPLES OF MANAGEMENT	C310.1	Describe the concept of operations management and productivity. Differentiate between manufacturing vs service operation.
			C310.2	Design of products and processes.
			C310.3	Differentiate between work study and method study. Calculate Standard Time.
			C310.4	Understand different methods of Forecasting, Solve and Analyse problems using different forecasting Techniques. Evaluate and rank location and layout.
			C310.5	Develop aggregate capacity plan and Production Schedule. Understand different Dispatching Rules. Able to Balance Assembly Lines.
			C310.6	Calculate EOQ.
152	C311	OPTIMIZATION IN ENGINEERING	C311.1	Understanding the main concepts of optimization and the benefits in using optimization in engineering design.

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			C311.2	Familiarization with different optimization methods and the way they can be used to solve various problems in the field of engineering
			C311.3	Able to convert engineering minima/maxima problems into optimization framework.
			C311.4	Learn to solve transportation problems and assignment problems
			C311.5	Learn numerical methods to find optimum point and value of a function .
			C311.6	Understand the essential features and scope of optimization techniques
153	C312	STRUCTURAL ANALYSIS - II	C312.1	Students will be able to analyze beams and portal frames using plastic theory
			C312.2	Students will be able to implement upper bound and lower bound theorems in analysis of structures.
			C312.3	Students will be able to analyze continuous beams using displacement methods
			C312.4	Students will be able to analyze redundant plane truss and frames using displacement methods.
			C312.5	Students will be able to analyse two hinged and fixed arches for different loading condition
			C312.6	Students will be able to utilize matrix methods for simple trusses and frames.
154	C313	IRRIGATION ENGINEERING	C313.1	Students will be able to estimate consumptive use of water and water requirements for irrigation purpose.
			C313.2	Students will be able to design canal using various methods.
			C313.3	Students will be able to analyze reclamation of water logged and saline soil.

## Course Outcomes for all Programmes: 2021-22

			C313.4	Students will be able to prepare irrigation scheduling and water distribution for various crops.
			C313.5	Students will be able to design different cross drainage and diversion head works.
			C313.6	Students will be able to analyze and design of various types dam and spillways.
155	C314	DESIGN OF STEEL STRUCTURE	C314.1	Students will be able to familiarized with the fundamental aspects and structural behavior of steel structures.
			C314.2	Students will be able to acquire knowledge about various types of connections such as riveted, welded, bolted and pinned.
			C314.3	Students will be able to assess tension members.
			C314.4	Students will be able to describe compression members and evaluate lacing, battening, column bases, and foundation bolts.
			C314.5	Students will be able to understand the design of beams subjected to buckling, crippling and shear.
			C314.6	Students will be able to compute various elements of plate girder.
156	C315	TRANSPORTATION ENGINEERING - II	C315.1	Understand the various concepts in railway design and components of railway track
			C315.2	Analyse the construction process, maintenance and operation of railway track
			C315.3	Evaluate the design of airport, cost estimation and geometric design of airport
			C315.4	Understand the various components of airports, planning concepts and air traffic controls
			C315.5	Understand the various terms in harbor engineering and its classification.



## Course Outcomes for all Programmes: 2021-22

			C315.6	selection of type of cross drainage works- Canal design Concep
157	C316	DESIGN AND DETAILING OF STEEL STRUCTURE LABORATORY	C316.1	Students will be able to design and detail steel roof trusses and industrial buildings.
			C316.2	Students will be able to design column and column base.
			C316.3	Students will be able to design plate girder.
			C316.4	Students will be able to calculate the details of steel connection.
			C316.5	Students will be able to evaluate frame connection.
158	C317	ENVIRONMENTAL ENGINEERING LABORATORY	C317.1	Students will be able to Perform common environmental experiments relating to water and wastewater quality.
			C317.2	Students will be able to calculate various oxygen demand for waste water.
			C317.3	Students will be able to analyse the permissible limit of air pollutants.
			C317.4	Students will be able to measure the noise pollution.
			C317.5	Students will be able to perform the microbiological analysis of water.
159	C318	TRANSPORTATION ENGINEERING LABORATORY- I	C318.1	Students will be able to perform various physical tests for categorizing aggregates.
			C318.2	Students will be able to evaluate physical properties of bitumen as per the specified standards.
			C318.3	Students will be able to determine the strength of soil subgrade by CBR method.
			C318.4	Students will be able to design Bituminous mix by Marshall test.
			C318.5	Students will be design GSB and WMM course.

## Course Outcomes for all Programmes: 2021-22

				Students will be able to get acquainted with advanced equipment for characterization of pavement materials.
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### M.TECH-COs -Mechanical Engineering

Sl.No	Subject code	Subject	Course	Description of Course outcomes
401	P1ESBC03	WATER SUPPLY ENGINEERING	P1ESBC03.1	Estimate water demand
			P1ESBC03.2	Analyze water quality
			P1ESBC03.3	Design conventional water treatment systems
			P1ESBC03.4	Design treatment systems for removal of dissolved solids
			P1ESBC03.5	Analyze and design water distribution systems
			P1ESBC03.6	An understanding of water quality criteria and standards, and their relation to public health. Student can apply knowledge of basic water chemistry to solve problems associated with drinking water treatment
402	P1ESBC04	WASTE WATER ENGINEERING	P1ESBC04.1	Categorise terminology and parameters frequently used in wastewater management
			P1ESBC04.2	Appraise different parameters involved in the design of wastewater treatment plants
			P1ESBC04.3	Interpret and illustrate the basics of wastewater treatment methods
			P1ESBC04.4	Design aerobic and anaerobic wastewater treatment plants
			P1ESBC04.5	Solve the routine problems in operations, control and management of wastewater treatment plants
			P1ESBC04.6	Understand the role of each unit process within typical treatment process trains, their interaction and the context of when they are applied
403	P1ESBC05	ENVIRONMENTAL CHEMISTRY & MICROBIOLOGY	P1ESBC05.1	Understand the fundamentals aspects of chemistry valuable for solving environmental problems.

## Course Outcomes for all Programmes: 2021-22

			P1ESBC05.2	Interpret the chemistry of air, soil and water pollution enabling them to work on its treatment
			P1ESBC05.3	Design and carry out environmental quality management projects
			P1ESBC05.4	Relate the concepts of environmental microbiology in aspects related to public health
			P1ESBC05.5	Classify and analyze the microorganisms & microbes for wastewater treatment .
			P1ESBC05.6	Understand the processes in biological treatment systems
404	P1PGCC01	COMPUTATIONAL METHODS AND TECHNIQUES	P1PGCC01.1	Solve a set of algebraic equations representing steady state models formed in engineering problems
			P1PGCC01.2	Apply optimization techniques to real life problems.
			P1PGCC01.3	Predict the system dynamic behavior through solution of ODEs modeling the system
			P1PGCC01.4	Solve PDE models representing spatial and temporal variations in physical systems through numerical methods
			P1PGCC01.5	Acquire and use knowledge of genetic algorithm to optimize real life problems.
			P1PGCC01.6	Learn and apply fuzzy logic & neural network prediction algorithm to solve engineering problems
405	P1PGCC02	INTERNET OF THINGS	P1PGCC02.1	Understand the concepts of Internet of Things
			P1PGCC02.2	Apply the concepts of IOT
			P1PGCC02.3	Apply IOT to different applications
			P1PGCC02.4	Analysis and evaluate protocols used in IOT
			P1PGCC02.5	Design and develop smart city in IOT
			P1PGCC02.6	Analysis and evaluate the data received through sensors in IOT
406	P2EVCC01	AIR & NOISE POLLUTION	P2EVCC01.1	Able to identify air pollution problems and interpret air quality data

## Course Outcomes for all Programmes: 2021-22

			P2EVCC01.2	Identify sampling techniques and analyze air quality.
			P2EVCC01.3	Able to recognize various meteorological condition and their effects in air pollutant dispersal.
			P2EVCC01.4	Able to identify modern equipment usage in air pollution control.
			P2EVCC01.5	Able to analyse the causes of vehicular emission and the need for technological advancement for control and able to conduct investigations for monitoring and control of noise pollution.
			P2EVCC01.6	Design air pollution control systems and evaluate their efficiency
407	P2EVCC02	SOLID WASTE MANAGEMENT	P2EVCC02.1	Able to review the components and characteristics of a solid waste management system.
			P2EVCC02.2	Able to identify the various collection, transfer and transport mechanisms of municipal solid waste management.
			P2EVCC02.3	Able to design and operate various processing, material and energy recovery facilities.
			P2EVCC02.4	Able to design and operate solid waste landfill.
			P2EVCC02.5	Able to identify the different industrial solid waste pollutants and their minimisation and recovery technologies.
408	P2EVCC03	HAZARDOUS WASTE MANAGEMENT	P2EVCC03.1	Understanding the concept of hazardous wastes and their treatment strategies.
			P2EVCC03.2	Understanding the principles of regulatory framework for the treatment and disposal of hazardous wastes.
			P2EVCC03.3	Examine physical and chemical composition of hazardous wastes
			P2EVCC03.4	Analyze activities associated with the management of hazardous waste
			P2EVCC03.5	Understand method to recover materials, conserve products, and to generate energy from solid and hazardous wastes.

## Course Outcomes for all Programmes: 2021-22

			P2EVCC03.6	Design and locate waste containment systems as per regulatory standards
409	P2EVCC07	ENVIRONMENTAL IMPACT ASSESSMENT	P2EVCC07.1	Identify environmental attributes for the EIA study.
			P2EVCC07.2	Identify methodology and prepare EIA reports.
			P2EVCC07.3	Specify methods for prediction of the impacts.
			P2EVCC07.4	Formulate environmental management plans.
			P2EVCC07.5	Analyse and document environmental projects and prepare management plan
			P2EVCC07.6	Understand and apply the concepts of environmental audits and Clean development initiatives.
410	P2EVCC13	APPLICATION OF REMOTE SENSING & GIS FOR ENVIRONMENTAL ENGINEERING	P2EVCC13.1	Apply basic principles of remote sensing for resource mapping and evaluation
			P2EVCC13.2	Develop geospatial database of water resources and environmental engineering systems
			P2EVCC13.3	Apply GIS models for hydrological simulation
			P2EVCC13.4	Apply GIS models for planning environmental engineering systems
			P2EVCC13.5	To develop applications of environmental remote sensing which can directly enhance service delivery on land use management, ground water management/prospects, agriculture, forestry, food and water security, disaster management, etc.
			P2EVCC13.6	Knowledge on concepts and applications leading to modeling of earth resources management using Remote Sensing.
411	P2EVBL02	SEMINAR / PROJECT	P2EVBL02.1	Select a topic relevant to planning, analysis and design of a Environmental Engineering systems
			P2EVBL02.2	Undertake a critical review of the literature on the chosen topic
			P2EVBL02.3	Prepare and present a technical report
412	P3PGCC01	RESEARCH METHODOLOGY	P3PGCC01.1	Understand and Describe importance of research.

## Course Outcomes for all Programmes: 2021-22

			P3PGCC01.2	Classify and select appropriate resources for Research
			P3PGCC01.3	Analyze the contents of literature and identify further scope
			P3PGCC01.4	Develop & formulate a research plan.
			P3PGCC01.5	Develop effective written and oral Presentation skills.
			P3PGCC01.6	Validate the improvements in a methodical manner.
413	P3PGCC02	IPR (INTELLECTUAL PROPERTY RIGHTS)	P3PGCC02.1	Enumerate and demonstrate fundamental terms such as copy-rights ,Patents ,Trademarks etc.,
			P3PGCC02.2	Interpret and follow Laws of copy-rights, Patents, Trademarks and various IP registration Processes to register own project research.
			P3PGCC02.3	Exhibit the enhance capability to do economic analysis of IP rights, technology and innovation related policy issues and firms' commercial strategi
			P3PGCC02.4	Develop awareness at all levels (research and innovation) of society to develop patentable technologies
			P3PGCC02.5	Apply trade mark law, copy right law, patent law and also carry out intellectual property audits
			P3PGCC02.6	Manage and safeguard the intellectual property and protect it against unauthorized use
414	P3ESBL01	PRE DISSERTATION WORK EVALUATION	P3ESBL01.1	Students will identify a practical problem from industry or research problem.
			P3ESBL01.2	An extensive literature review will help them in understanding the latest happenings in the field.
			P3ESBL01.3	Students will understand how to analyze the problem.
			P3ESBL01.4	Conduct independent research to formulate and solve the chosen problem
			P3ESBL01.5	Prepare a report as per recommended format and defend the work

## Course Outcomes for all Programmes: 2021-22

			P3ESBL01.6	Prepare technical report on the study carried out and publish the results
415	P4CTBL01	DISSERTATION EVALUATION AND OPEN DEFENCE	P4CTBL01.1	Identify and define a topic relevant to planning, analysis and design of a environmental engineering systems based on the social, economical and environmental considerations
			P4CTBL01.2	Make a critical review of the available literature on the topic
			P4CTBL01.3	Conduct independent research to formulate and solve the chosen problem
			P4CTBL01.4	Prepare a report as per recommended format and defend the work
			P4CTBL01.5	Prepare technical report on the study carried out and publish the results

### COs –MBA

Sl.No	Subject code	Subject	Course	Description of Course outcomes
201	18MBA101	MANAGERIAL ECONOMICS	18MBA101.1	To make the students aware of role of managerial economics in business decision making.
			18MBA101.2	To understand the importance of elasticity measures in the business decision making process.
			18MBA101.3	To make the students acquainted with the empirical estimation of cost function and the concepts of economies of scale and scope.
			18MBA101.4	To make the students aware about price and output determination in different types of market structure.
			18MBA101.5	To make the students aware of the fiscal policy, monetary policy and industrial finance.
			18MBA101.6	To understand and the practical aspects of National Income using GDP and GNP.
202	18MBA102	MARKETING	18MBA102.1	To understand the marketing evolution and its concepts.

## Course Outcomes for all Programmes: 2021-22

		MANAGEMENT		to sensitize the students to the dynamic nature of marketing management.
			18MBA102.2	To be able to apply the theories and practices of marketing. to expose students to a systematic frame work of marketing & implementations and to highlight need for different marketing approaches for services, goods and for house hold, consumers, organizational buyers.
			18MBA102.3	To be able to understand the individual and corporate buying behaviour to introduce the concept of marketing mix as a frame work for marketing decision making.
			18MBA102.4	To be able to understand the pricing strategies and to be able to frame the same
			18MBA102.5	To be able to make strategies for promotions understanding brand and to be able to create the same
			18MBA102.6	To be able to understand the future of marketing and dynamics of marketing
203	18MBA103	ORGANIZATIONAL BEHAVIOUR	18MBA103.1	To understand the origin and fundamentals of organization behavior. To develop an understanding of the behavior of individuals and groups inside organizations.
			18MBA103.2	To be familiar with the determinants that shapes individual behavior in organizational setting that ultimately enhance skills of the manager to understand, direct and control individuals, interpersonal, and group process to increase the effectiveness in the organizations.
			18MBA103.3	To develop theoretical and practical insights and problem-solving capabilities in understanding different motivational theories and strategies used in variety of organizational settings.
			18MBA103.4	To understand the function of group, team and leadership to organizational behavior.
			18MBA103.5	To understand the sustaining and developing culture along with the organizational change in the business



## Course Outcomes for all Programmes: 2021-22

				organization.
			18MBA103.6	To increase the insight of application of different theories of organizational behavior through analyzing different case studies
204	18MBA104	MANAGEMENT PRINCIPLES	18MBA104.1	To make the students understand various management concepts, contemporary management practices and its implication in the dynamic business environment.
			18MBA104.2	The students will be able to learn the different types of skill set necessary to manage the diversified, multi ethnic workforce nationally and globally.
			18MBA104.3	The students will understand the important management principles and functions and its intigration to management practices.
			18MBA104.4	The students will be able to learn, develop and apply a systematic/structured approach to diagonise management problems and its solutions.
			18MBA104.5	The Students will be able to learn the importance of change in organization and change management practices.
			18MBA104.6	The students will be able to develop their problem solving skill, analytical skill, decision making skills in complex situations while confronting the risk and uncertainty.
205	18MBA105	DECISION SCIENCE	18MBA105.1	Describe central tendency and dispersion.
			18MBA105.2	Classify regression and correlation
			18MBA105.3	Solve bayes theorem and use distribution
			18MBA105.4	Analyse linear programming problem
			18MBA105.5	Reframe transportation model
			18MBA105.6	Design markov chain and simulation techniques
206	18MBA106	BUSINESS	18MBA106.1	understanding of effective business writing

## Course Outcomes for all Programmes: 2021-22

		COMMUNICATION	18MBA106.2	understanding of effective business communications
			18MBA106.3	understanding of research approaches and information collection
			18MBA106.4	understanding of developing and delivering effective presentations
			18MBA106.5	understanding of effective interpersonal communications
			18MBA106.6	understanding of skills that maximise team effectiveness
207	18MBA107	FINANCIAL ACCOUNTING AND ANALYSIS	18MBA107.1	To provide a broad overview of financial accounting focusing on different practical purpose in general.
			18MBA107.2	To be familiar with different standards of Accounting.
			18MBA107.3	To provide the knowledge of double entry system and financial statements which are used in different organizations.
			18MBA107.4	To encourage the students how to deal with corporate terms and annual reports of the company.
			18MBA107.5	To provide the extensive idea about the evaluation of financial data utilizing various financial statement analysis techniques.
			18MBA107.6	To assess managerial accounting decision-making techniques and evaluate managerial accounting performance techniques by practicing practical cases
208	18MBA108	BUSINESS LAW	18MBA108.1	The students will learn different types of business laws based on principles and regulations being established by the government and applicable to the people, which is enforced by judicial decision.
			18MBA108.2	The students will acquire a sound understanding of the legal aspects of law affecting business and have a basic knowledge of the laws relating to Contract, Performance and Discharge of Contract and Remedies for Breach of Contract. The students will also be able to determine the legality of business transactions and also the rights and duties of the parties to thereto.

## Course Outcomes for all Programmes: 2021-22

			18MBA108.3	The students will learn the fundamental principles of the Special Contracts and become aware about important legislations of Contract of Agency, Contract of Bailment and Pledge and Contract of Sale of Goods.
			18MBA108.4	The students will be able to understand the provisions under the Consumer Protection Act, Right of Consumers and will get familiar with the detailed procedure to file a consumer complaint, process of approaching a Consumer Forum, Redressal Mechanism and relief available to the consumers.
			18MBA108.5	The students will have an understanding of the economic function of the company as a legal structure of business, the legal nature and significance of the limited liability of a company, the price paid for limited liability, the legal nature of the role of the board of directors of a company and of the legal relationships between a company's management and its various stakeholders.
209	18MBA109	BUSINESS ENVIRONMENT & ETHICS	18MBA109.1	Familiarize with the nature of business environment and its components
			18MBA109.2	The students will be able to demonstrate and develop conceptual framework of business environment and generate interest in international business
			18MBA109.3	Understand the definition of ethics and the importance and role of ethical behavior in the business world today.
			18MBA109.4	Evaluate theories of the firm, and explain how they are relevant to the diverse range of ownership structures that exist in reality
			18MBA109.5	Discuss the moral and social responsibility dimensions of corporate governance
			18MBA109.6	Describe why systematic way failure of corporate governance can lead to failure of confidence that could spread from individual firms to entire markets or economies
210	18MBA201	CORPORATE	18MBA201.1	To study the concept ,techniques and tools of Finance

## Course Outcomes for all Programmes: 2021-22

		FINANCE		Management.
			18MBA201.2	To analyse and improve the knowledge of Financial Management practices of an organisation.
			18MBA201.3	To understand about the decisions taken by a Finance Manager.
			18MBA201.4	To understand the concept of Working capital requirement.
			18MBA201.5	To make the student understood about Inventory Management
			18MBA201.6	To make the student understood practically credit policy with the help of case study.
211	18MBA202	INDIAN FINANCIAL SYSTEMS AND SERVICES	18MBA202.1	Explain the concept of fundamental financial concepts, especially time value of money.
			18MBA202.2	Apply capital budgeting projects using traditional methods
			18MBA202.3	Analyze the main ways of raising capital and their respective advantages and disadvantages in different circumstances
			18MBA202.4	Integrate the concept and apply the financial concepts to calculate ratios and do the capital budgeting
			18MBA202.5	Develop knowledge on the allocation, management and funding of financial resources.
			18MBA202.6	Enhancing student's ability in dealing short-term dealing with day-to-day working capital decision
212	18MBA203	HUMAN RESOURCES MANAGEMENT	18MBA203.1	The students will enrich their knowledge in understanding the concepts and practices of Human Resource Management as well as the importance of human resources in the growth and development of Organization.
			18MBA203.2	The students will learn about the techniques used for employee selection, importance of employee training and development in the career progression of the workforce.

## Course Outcomes for all Programmes: 2021-22

			18MBA203.3	The students will understand the objective and importance of employee performance assessment in the process of enhancing employee performance and its relation with developing and establishing an effective compensation management system to reward the employees.
			18MBA203.4	The students will acquire knowledge on how to maintain a healthy relationship among the workers, employers and the government in the industry also the role of trade unions in the industrial set-up.
			18MBA203.5	The students will learn human resource management practices in multi national corporations carrying out business activities in globalised market and subsequently learn about the challenges of HR practices in dynamic business environment.
			18MBA203.6	The students will be able to develop analytical, problem solving and decision making skill to solving the complex problems in the area of human resource management.
213	18MBA204	BUSINESS RESEARCH	18MBA204.1	To equip the student with the basic understanding of the Research Methodology.
			18MBA204.2	To make the student understood about research design.
			18MBA204.3	To make the student understood about data analysis with the help of Parametric and Non Parametric test.
			18MBA204.4	To make the student understood about ANOVA and its applications.
			18MBA204.5	To make the Student understood about Factor analysis
			18MBA204.6	To prepare the student to write and presentation of a Report with the help of case study
214	18MBA205	OPERATIONS MANAGEMENT	18MBA205.1	To understand the operations in manufacturing and service and also the design of manufacturing and service processes.
			18MBA205.2	To make the students understand and critically analyze about the factory location, layout and capacity planning

## Course Outcomes for all Programmes: 2021-22

				using different numerical techniques.
			18MBA205.3	To understand project management using network diagrams like CPM and PERT in order to find out the critical path and solving the numerical for the same.
			18MBA205.4	To equip the students with the concepts of supply chain management.
			18MBA205.5	To solve different problems in operations management using statistical quality control and different type of control charts.
			18MBA205.6	To solve the real world cases regarding effective implementation of ISO 9000 and 14000 standards in corporate and industries.
215	18MBA206	INTERNATIONAL BUSINESS	18MBA206.1	To Learn The Fundamentals of Managerial communication In English.
			18MBA206.2	Highlighting The Importance of Team Work
			18MBA206.3	To Learn The Nuances of Business Presentation.
			18MBA206.4	To Develop The Writing Skills For Effective Organizational Communication.
			18MBA206.5	Discussing The Nuances of Soft skills.
			18MBA206.6	Analyzing The Various Cases of Managerial Communication.
216	18MBA207	FUNDAMENTALS OF ERP	18MBA207.1	Identify the important business functions provided by typical business software such as enterprise resource planning and customer relationship management .
			18MBA207.2	Describe basic concepts of erp systems for manufacturing or service companies.
			18MBA207.3	Analyze the technical aspect of telecommunication systems, internet and their roles in business environment
			18MBA207.4	Develop skills necessary for building and managing relationships with customers, and stakeholders

## Course Outcomes for all Programmes: 2021-22

			18MBA207.5	Find the relationship between Business Engineering and IT
			18MBA207.6	Relate BRP, ERP and IT
217	18MBA208	CORPORATE STRATEGY	18MBA208.1	Understand the strategic decisions that organisations make and have an ability to engage in strategic planning.
			18MBA208.2	Explain the basic concepts, principles and practices associated with strategy formulation and implementation.
			18MBA208.3	Integrate and apply knowledge gained in basic courses to the formulation and implementation of strategy from holistic and multi-functional perspectives.
			18MBA208.4	Analyze and evaluate critically real life company situations and develop creative solutions, using a strategic management perspective.
			18MBA208.5	Conduct and present a credible business analysis in a team setting.
			18MBA208.6	Understand the crucially important role that the HRM function plays in the setting and implementation of an organisation's strategy
218	18MBA209	ENTREPRENEURSHIP DEVELOPMENT	18MBA209.1	Concept of entrepreneurship and intrapreneurship, types,nature and importance ,Traits and skills,Entrepreneurial Motivation and achievement, Entrepreneurial Personality.
			18MBA209.2	TO SENSITIZE THE STUDENTS TO UNDERSTAND ENTREPRENEURSHIP AS A CAREER AND PROVIDE KNOWLEDGE ON ENTREPRENEURIAL ENVIRONMENT
			18MBA209.3	TO PROVIDE KNOWLEDGE ON SKILLS REQUIRED TO BE AN ENTREPRENEUR AND TO GIVE INFORMATION ON RELATED ISSUES.
			18MBA209.4	TO ENCOURAGE LEARNER TO TAKE ENTREPRENEURSHIP AS A PROFESSION
			18MBA209.5	TO ENCOURAGE LEARNER TO PARTICIPATE IN

## Course Outcomes for all Programmes: 2021-22

				BUSINESS INCUBATION
			18MBA209.6	TO HELP THE STUDENTS IN CREATING A BETTER ECONOMY THROUGH TAKING UP ENTREPRENEURSHIP
219	18MBA301A	Consumer Behaviour	18MBA301A.1	To understand different approach of consumer behavior and its influences on customer choice and the process of human decision making in a marketing context.
			18MBA301A.2	To critically analyzedifferent theories of consumer behavior, target market and determine the positioning strategy based on consumer characteristics
			18MBA301A.3	To identify and analyze individual and social determinant that influences consumer behavior and to examine the consumer decision making process.
			18MBA301A.4	To understand the influence and Impact of cultural and family factors in purchasing decisions, and to know about the cross cultural dynamics of consumer behavior.
			18MBA301A.5	To get a insight on different models of consumer behavior and its implications in decision making.
			18MBA301A.6	To establish the relevance of consumer behavior theories and concepts through various case analysis
220	18MBA301B	Security Analysis & Portfolio Management	18MBA301B.1	To provide a broad overview of investment management, focusing on the application of finance theory to the issue faced by portfolio managers and investors in general.
			18MBA301B.2	To be familiar with different investment models which enables student to become a good investment analyst.
			18MBA301B.3	To provide the knowledge of equity investment, and fixed income investment in various markets in the case of individual securities and issues related to portfolio optimization and performance evaluation.
			18MBA301B.4	To encourage the students how to deal with the risk management instruments used to manage the risk in equity market.



## Course Outcomes for all Programmes: 2021-22

			18MBA301B.5	To provide the extensive idea about the mutual fund investment and develops general portfolio management tools which are applicable when managing portfolios with any of all asset classes.
			18MBA301B.6	To provide a theoretical and practical background in the field of investments.
221	18MBA302A	Sales & Distribution Management	18MBA302A.1	To develop understanding of the sales processes and the roles and responsibilities of sales manager.
			18MBA302A.2	Familiarization of concepts, approaches and the practical aspects of the key decision making variables in sales force and distribution
			18MBA302A.3	To acquaint the student with the concepts which are helpful in developing a sound sales and distribution policy and in organizing and managing sales force and marketing channels.
			18MBA302A.4	To describe and formulate strategies to effectively manage company's sales operations
			18MBA302A.5	To illustrate the fundamentals of distribution channels, logistics and supply chain management.
			18MBA302A.6	To understand and apply the international channels of distribution and cross countries customer expectations and to develop an ethical approach towards the subject.
222	18MBA302B	Financial Derivatives	18MBA302B.1	To enable the students about the fundamental aspects of derivative concept.
			18MBA302B.2	To provide the student with the necessary skills to value and to employ options, futures, and related financial contracts.
			18MBA302B.3	To stress the fundamentals and to explore the topics at a technical level.
			18MBA302B.4	To aware about the valuation of futures contracts on stock indices.
			18MBA302B.5	To familiar about the valuation of option contracts, pricing

## Course Outcomes for all Programmes: 2021-22

				and terminologies.
			18MBA302B.6	To provide the knowledge of valuation of options, empirical evidence, strategies with respect to these assets, dynamic asset allocation strategies, or which portfolio insurance is an example, swaps, and the use (and misuse) of derivatives in the context of corporate applications.
223	18MBA303A	Digital Marketing	18MBA303A.1	Analyse the confluence of marketing, operations, and human resources in real-time delivery.
			18MBA303A.2	Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities
			18MBA303A.3	Explain emerging trends in digital marketing and critically assess the use of digital marketing tools by applying relevant marketing theories and frameworks.
			18MBA303A.4	Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked.
			18MBA303A.5	Interpret the traditional marketing mix within the context of a changing and extended range of digital strategies and tactics
			18MBA303A.6	Comprehend the importance of conversion and working with digital relationship marketing.
224	18MBA303B	Advanced Management Accounting	18MBA303B.1	TO UNDERSTAND THE ROLE AND FUNCTIONS OF COST AND MANAGEMENT ACCOUNTING IN ACHIEVING THE OBJECTIVES OF AN ORGANISATION.
			18MBA303B.2	TO UNDERSTAND THE BASIC CONCEPTS AND PROCESSES USED TO DETERMINE PRODUCT COSTS.
			18MBA303B.3	TO BE ABLE TO ANALYZE AND EVALUATE INFORMATION FOR COST ASCERTAINMENT, PLANNING, CONTROL AND DECISION MAKING.

## Course Outcomes for all Programmes: 2021-22

			18MBA303B.4	TO BE ABLE TO INTERPRET COST ACCOUNTING STATEMENTS AND GO FOR APPROPRIATE ANALYSIS.
			18MBA303B.5	TO DEVELOP THE ABILITY TO COLLECT, ANALYZE, AND COMMUNICATE QUANTITATIVE AND NON-QUANTITATIVE INFORMATION TO ASSIST MANAGEMENT IN MAKING MORE EFFECTIVE PLANNING AND CONTROL DECISIONS
			18MBA303B.6	TO MAKE THE STUDENTS PRACTICALLY ANALYSE THE COST STATEMENTS OF VARIOUS COMPANIES AND CORPORATES.
225	18MBA304A	Service Marketing	18MBA304A.1	To explain the unique challenges of services marketing, including the elements of product, price, place, promotion, processes, physical evidence, and people
			18MBA304A.2	To describe how customer relationship marketing (crm), including retention strategies, creates an environment that achieves excellence in customer service.
			18MBA304A.3	To design service quality measurements to build customer loyalty and evaluate the effectiveness and efficiency of customer service offerings.
			18MBA304A.4	To explain service blueprinting, the integration of new technologies, and other key issues facing today`s customer service providers and service managers.
			18MBA304A.5	To discuss the influences of the multicultural marketplace, business ethics, and socially responsible marketing on services marketing.
			18MBA304A.6	To integrate course concepts into individual performance to become better customers service representatives in the service environment.
226	18MBA304B	Project Appraisal and Financing	18MBA304B.1	To learn about the characteristics of a project, attributes required for a successful project manager and preparation of detailed feasibility study report

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			18MBA304B.2	To get acquainted about the different types of project appraisals and critically examine each of them
			18MBA304B.3	To learn about estimating the project cost, project financing and risks involved in the project.
			18MBA304B.4	To have a detailed understanding about the approaches to various infrastructure projects.
			18MBA304B.5	To get well versed about methods of monitoring, controlling and termination of project.
			18MBA304B.6	To learn about the practical aspects about Government and social projects by analyzing various cases.
227	18MBA305	Internship	18MBA305.1	To understand through an intensive experience the theories of management at workplaces and their associated values, routines and cultures.
			18MBA305.2	To apply business concepts and theories to real-world decision-making.
			18MBA305.3	To develop and refine the professional capacity and improve the business skills.
			18MBA305.4	To develop awareness and understanding about the specific roles and responsibilities in the subject specializations and to effectively participate in them,
			18MBA305.5	To develop rewarding relationships with professional role models and potential mentors who can provide guidance, feedback, and support and enhance networking abilities.
			18MBA305.6	To demonstrate an understanding of professional and ethical practices

### COs –MCA

SI.No	Subject code	Subject	Course	Description of Course outcomes
301	MCA101	PROBLEM SOLVING AND	MCA101.1	Identify the different electrical equipment

## Course Outcomes for all Programmes: 2021-22

		PROGRAMMING USING C		with their characteristics
			MCA101.2	Understand the basics of programming using Datatypes.
			MCA101.3	Develop conditional and iterative statements to write C programs
			MCA101.4	Exercise user defined functions to solve real time problems
			MCA101.5	Inscribe C programs that use Pointers to access arrays, strings and functions.
			MCA101.6	Exercise user defined data types including structures and unions to solve Problems.
302	MCA102	COMPUTER ORGANIZATION AND ARCHITECTURE	MCA102.1	Recall the basic structure and operational concepts of computer.
			MCA102.2	Summarize the implementation of machine instructions and design of the arithmetic and logic unit.
			MCA102.3	Design various arithmetic combinational circuits for adder, fast adder, subtractor, multiplier, divisor etc.
			MCA102.4	Explain the main memory, cache memory and virtual memory management techniques.
			MCA102.5	Distinguish different input - output mapping techniques.
			MCA102.6	Contrast between array processing and vector processing.
303	MCA103	BUSINESS INFORMATION SYSTEM	MCA103.1	Understand the basic concepts and technologies used in the field of management information systems
			MCA103.2	Understand the processes of developing and implementing information

## Course Outcomes for all Programmes: 2021-22

			MCA103.3	Be aware of the ethical, social, and security issues of information systems"
			MCA103.4	Understand the role of information systems in organizations, the strategic management processes, and the implications for the management.
			MCA103.5	Learn about the importance of managing organizational change associated with information systems implementation.
			MCA103.6	Able to know about security issues of the BIS.
304	MCA104	COMPUTER ORIENTED NUMERICAL METHODS	MCA104.1	Recognize the error in the number generated by the solution
			MCA104.2	Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Rapshon method.
			MCA104.3	Apply method of interpolation and extrapolation for prediction.
			MCA104.4	Recognize elements and variable in statistics and summarize qualitative and quantitative data.
			MCA104.5	Calculate mean, median and mode for individual series.
			MCA104.6	Outline properties of correlation and compute Karl-Pearson's coefficient of correlation
305	MCA105	ENGINEERING ECONOMICS	MCA105.1	Understand general concepts of micro and macro economic including theory of demand, Law of demand, elasticity of demand etc
			MCA105.2	Distinguish between Micro economics and

## Course Outcomes for all Programmes: 2021-22

				Macro Economics.
			MCA105.3	Solve cost and revenue based problems using Break Even Analysis approach.
			MCA105.4	Analyze the functioning of Banks and concepts of Inflation.
			MCA105.5	Discuss banking structures and various financial systems.
			MCA105.6	Calculate the depreciation using different methods like Straight line method, Declining balance method.
306	MCA106	BUSINESS COMMUNICATION	MCA106.1	Apply business communication strategies and principles to prepare effective communication for domestic and international business situations
			MCA106.2	Identify ethical, legal, cultural, and global issues affecting business communication.
			MCA106.3	Utilize analytical and problem solving skills appropriate to business communication.
			MCA106.4	Participate in team activities that lead to the development of collaborative work skills
			MCA106.5	Select appropriate organizational formats and channels used in developing and presenting business messages
			MCA106.6	Communicate via electronic mail, Internet, and other technologies.
307	MCA201	DATA STRUCTURE USING C	MCA201.1	Identify and implement asymptotic notations of an algorithm to analyze the consumption of computing resources
			MCA201.2	Explain and implement stack, queue and list to manage the memory using static and dynamic allocations.

## Course Outcomes for all Programmes: 2021-22

			MCA201.3	Apply binary search tree to design applications.
			MCA201.4	Recognize, analyze, model and implement code for real life problems like shortest path and MST using graph theory.
			MCA201.5	Identify and develop comparison-based search algorithms and sorting algorithms.
			MCA201.6	Apply data structure and algorithm for a given contextual problem and develop in C.
308	MCA202	OBJECT ORIENTED PROGRAMMING USING C++	MCA202.1	Student should be able to understand characteristics of object oriented paradigms such as Abstraction, Encapsulation etc.
			MCA202.2	Ability to apply the Knowledge about Inheritance, Polymorphism, File Handling and Template.
			MCA202.3	Student should be able to seamlessly use the concept of constructor and destructor.
			MCA202.4	Student should be able to implement polymorphism and inheritance for solving various generic problems.
			MCA202.5	Would be able to apply dynamic memory management techniques for creating, copying and destroying objects.
			MCA202.6	Would be able to apply Standard Template Library, Namespaces etc., while designing a object oriented program.
309	MCA203	OPERATING SYSTEMS	MCA203.1	Define the process life cycle & process scheduling.
			MCA203.2	Explain inter process communication & process synchronization.
			MCA203.3	Outline deadlock avoidance, detection & handling strategies.



## Course Outcomes for all Programmes: 2021-22

			MCA203.4	Analyze memory allocation & virtual memory techniques.
			MCA203.5	Examine disk scheduling & file system interface.
			MCA203.6	Discuss the case studies on Windows XP & Linux system.
310	MCA204	PRINCIPLES AND PRACTICE OF MANAGEMENT	MCA204.1	Discuss and communicate the management evolution and how it will affect future managers.
			MCA204.2	Observe and evaluate the influence of historical forces on the current practice of management.
			MCA204.3	Identify and evaluate social responsibility and ethical issues involved in business situations and logically articulate own position on such issues.
			MCA204.4	Explain how organizations adapt to an uncertain environment and identify techniques managers use to influence and control the internal environment Practice the process of management's four function
			MCA204.5	Identify and properly use vocabularies within the field of management to articulate one's own position on a specific management issue and communicate effectively with varied audiences Evaluate leaders
			MCA204.6	Gather and analyze both qualitative and quantitative information to isolate issues and formulate best control methods.
311	MCA205	GREEN IT	MCA205.1	Understand what Green IT is and How it can help improve environmental Sustainability
			MCA205.2	Understand the principles and practices of Green IT.

## Course Outcomes for all Programmes: 2021-22

			MCA205.3	Understand how Green IT is adopted or deployed in enterprises.
			MCA205.4	Design Data Centre IT Infrastructure
			MCA205.5	Understand Energy Efficiency, IT Infrastructure Management
			MCA205.6	Understand Business Dimensions for Green IT Transformation and Multilevel Sustainable Information
312	MCA206	MATHEMATICAL COMPUTING	MCA206.1	Students can know logic behind the research topic
			MCA206.2	Students can count the bigger thing by using the counting principle
			MCA206.3	Students can understand the concept of dm to apply in different area.
			MCA206.4	Student can know to solve the recurrence relations.
			MCA206.5	Demonstrate different traversal methods for trees and graphs.
			MCA206.6	Model problems in Computer Science using graphs and trees.
313	MCA301	DESIGN ANALYSIS AND ALGORITHMS	MCA301.1	Define the various algorithm analysis methods.
			MCA301.2	Estimate the asymptotic time complexities of various recurrence relations
			MCA301.3	Choose the appropriate method to solve the recurrence relations
			MCA301.4	Distinguish and give examples for the different types of algorithm development strategies.
			MCA301.5	To describe the use of Lower Bound Theory

## Course Outcomes for all Programmes: 2021-22

				to improve the complexity of an algorithm
			MCA301.6	Interpret the approximation algorithms, randomized algorithms and string matching algorithms.
314	MCA302	THEORY OF COMPUTATION	MCA302.1	Describe the mathematical foundation of computation and theory of formal languages and automata.
			MCA302.2	Illustrate mathematical proofs for computation and algorithms.
			MCA302.3	Develop concept of finite automata, pushdown automata, Turing machines, formal languages, and grammars.
			MCA302.4	Analyze key notions, such as algorithm, computability, decidability, and complexity through problem solving.
			MCA302.5	Evaluate the relevance of the Church-Turing thesis.
			MCA302.6	Design finite automata, push down automata, Turing machines, formal languages & grammars.
315	MCA303	COMPUTER NETWORKS	MCA303.1	Analyze and implement Network protocol simulation using NetSim, NS2.
			MCA303.2	Compare the throughput and normalized throughput for token ring and token bus for different transmitting nodes.
			MCA303.3	Compare the CSMA/CD vs. CSMA/CA protocols for a fixed number of transmitting nodes.
			MCA303.4	Verify some protocols like STOP-and – WAIT, Go-Back-N and implement distance vector and link state routing algorithms.
			MCA303.5	Apply socket programming techniques.

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			MCA303.6	Would have good understanding of mechanism of UDP, TCP congestion control and concept of Quality Of Service (QoS).
316	MCA304	DATABASE MANAGEMENT SYSTEMS	MCA304.1	Outline the basic concepts related to data base systems. And to relate with real time applications.
			MCA304.2	Distinguish different data base architecture schemas and data models.
			MCA304.3	Comprehend understanding about storage strategies.
			MCA304.4	Understand relational algebra and to apply various query languages such as SQL for performing database operations.
			MCA304.5	Apply normalization on relations and appraise optimizing the query processing.
			MCA304.6	Compile and analyze transaction processing and concurrency control mechanisms.
317	MCA305	QUANTITATIVE TECHNIQUES (OR & SM)	MCA305.1	Define simplex metod
			MCA305.2	Define Transportation Problem
			MCA305.3	Able to explain Queueing model.
			MCA305.4	Sheduling a project with PERT/CPM
			MCA305.5	Decision analysis: Decision making without experimentations
			MCA305.6	Understand utility theory.
318	MCA306	ADVANCE OS	MCA306.1	Understand the design approaches of advanced operating systems
			MCA306.2	Analyze the design issues of distributed operating systems.
			MCA306.3	Evaluate design issues of multi processor

## Course Outcomes for all Programmes: 2021-22

				operating systems.
			MCA306.4	Identify the requirements of database operating systems.
			MCA306.5	Formulate the solutions to schedule the real time applications.
			MCA306.6	Design a Protection and security model of the access matrix
319	MCA307	MINOR PROJECT	MCA307.1	Practical application of theoretical knowledge gained in order to develop real time software applications.
			MCA307.2	To explore the industrial line of work and corporate work culture
			MCA307.3	Deep understanding regarding a particular domain or software platform
			MCA307.4	To explore challenging work areas in their area of interest
			MCA307.5	Enhancing the presentation skills of an individual by project presentation
320	MCA401	PROGRAMMING WITH JAVA	MCA401.1	Gained adequate understanding of Object oriented programming paradigm and Java programming environment.
			MCA401.2	Learn the fundamental programming structure of java, Inheritance, Packages and Interfaces and exception handling.
			MCA401.3	Would be able to use multi threading concept, string handling procedures for writing efficient codes using Java.
			MCA401.4	Would have gained proficiency in using Java I/O, JDBC and networking tools and methods.
			MCA401.5	Understand the concept of applets, AWT,

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				Java Swing etc.,
			MCA401.6	Able to use run time memory management using clone() method and cloneable interface.
321	MCA402	COMPUTER GRAPHICS AND MULTIMEDIA	MCA402.1	Understand various graphics systems, their mechanisms and methods used.
			MCA402.2	Would be well versed with various line drawings and circle drawing algorithms.
			MCA402.3	Understood the mechanism and apply various clipping and filling algorithms principle of window to view port coordinate transformation.
			MCA402.4	Gained good understanding of Two dimensional object representation, fractal geometry and three dimensional geometric and modeling transformations
			MCA402.5	Would have gained good understanding of Multimedia and components of Multimedia
			MCA402.6	Understanding about use of MAT LAB in Graphics
322	MCA403	SOFTWARE ENGINEERING	MCA403.1	Identify the requirement of software engineering in designing, development, testing and deployment of a real life software project.
			MCA403.2	Understand software life cycle model for systematic development of a project.
			MCA403.3	Analyze the basic issues in software development process.
			MCA403.4	Model object oriented software design.
			MCA403.5	Recommend various coding standards and code review techniques.

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			MCA403.6	Understand various types of testing and formulate their practical implementation strategies.
323	MCA404	COMPILER DESIGN AND LANGUAGE PROCESSOR	MCA404.1	Ability to design, develop, and implement a compiler for any language.
			MCA404.2	Able to use LEX and YACC tools for developing a scanner and a parser
			MCA404.3	Design and implement LL and LR parsers.
			MCA404.4	Design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.
			MCA404.5	Ability to design algorithms to generate machine code
			MCA404.6	Understand syntax directed translation schemes
324	MCA406A	EMBEDDED SYSTEM	MCA406A.1	To Understand embedded system, processor and embedded architecture
			MCA406A.2	To understand distributed embedded systems architecture.
			MCA406A.3	Will able to Design Hardware and Software Components, System Integration
			MCA406A.4	ARM processor-processor and memory organization
			MCA406A.5	Will able to designing with microprocessor development and debugging Component interfacing
			MCA406A.6	Network-Based design- Communication Analysis, system performance Analysis, Hardware platform design
325	MCA405	PERSONALITY AND SOFT	MCA405.1	Develop listening skills

## Course Outcomes for all Programmes: 2021-22

		SKILL DEVELOPMENT	MCA405.2	Making presentation skills effective
			MCA405.3	Sharpen business writing skills
			MCA405.4	Developing interview skills
			MCA405.5	Ability to conceptualize fundamental of personal interview skills and effective group discussion strategies
			MCA405.6	Ability to prepare effective resume
326	MCA407	GROUP DISCUSSION/SEMINAR	MCA407.1	Improve the mass communication
			MCA407.2	An opportunity to exercise their rights to Express them
			MCA407.3	To enhance understanding skills of students
			MCA407.4	To improve convincing power of students