1.1.1- **Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which are reflected in Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) of the various Programmes offered by the Institution.**

The curricula developed have relevance to the regional/national/global developmental needs with well-defined learning objectives and outcomes at programme and course level. The department and the institute are guided and monitored in the preparation of course curriculum by two bodies, namely Board ofStudies and Academic Council and typically undergoes with the following: The Institute follows the guidelines issued by the regulatory bodies such as UGC, AICTE, affiliated university JNTUA, Anatapuram and Andhra Pradesh State Council of Higher Education (APSCHE) while designing the curricula. A series of all faculty meetings are conducted in correlation to the statedProgramme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs). The set of courses which require modifications (deletion/addition) are prepared and programme curricula adopted at other leading academic institutes in India and abroad are compared.

The Institute hosts reunion meets of Alumni. During such meets the institute takes the initiative of eliciting their views and suggestions in respect of required changes in curriculum. Several Memoranda of Understandings (MoUs) with local and national industries relevant to programs have been signed to make students acceptable at local, national and global level. In order to have right mix of curriculum, pedagogy and assessment to achieve the desired course and program outcomes, curriculum development and approval involves deliberations at various levels through relevant committees such as Department Advisory Board, Program Assessment Committee and Board of Studies.

For the effective design of curriculum structure feedback is collected from students, faculty, alumni, parents and employers. Also by conducting workshops, seminars and conferences periodically, faculties get an opportunity to interact with the academic and industrial experts which helps to design the curriculum more effectively. The recommendations of these committees are put up to Board of Studies with detailed programme structure, curricula and syllabi and further recommendations of BoS are put up for the approval of Academic Council.

The Institute introduced Choice Based Credit System (CBCS) and selflearning courses using MOOCs platform through SWAYAM, Coursera and some industry offered courses for undergraduate programmes and utilizes Learning Management System (LMS) for effective learning process. Value added courses to enhance communication, employability and entrepreneurship skills are included in the curriculum. Internship and live projects are also undertaken by students to enhance employability. The Institute established Centre for Innovation, andEntrepreneurship (CIIE) that helps in developing entrepreneurshipskills among the students through their interaction with successfulentrepreneurs and other related bodies. The Institute encourages thefaculty and students to work in emerging areas by involving localindustry. Curriculum revision is a continuous process with respectto elective and laboratory courses as per the need of the industryand regulatory bodies from time to time even though the normal cycleof revision is 3 years.

SRI VENKATESWARA COLLEGE OF ENGINEERING
(Autonomous)
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Approved by AICTE, New Delhi permanently affiliated to JNTUA, Ananthapuram.

VISION OF THE DEPARTMENT

To impart knowledge with global perspectives in pursuit of excellence in Mechanical Engineering Education, Entrepreneurship and Innovation

MISSION OF THE DEPARTMENT

M1: To inculcate students with leadership skills with high level of integrity & ethical values for team building and team work

M2: To mold the young dynamic potential minds into full-fledged future professionals through effective teaching-learning techniques & industry – institute collaboration

M3: To serve the society through innovation and excellence in teaching and research

HEAD
DEPARTMENT OF MECHANICAL ENGINEERING
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PROGRAMME OUTCOMES (POs)

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive.

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PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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PROGRAMME EDUCATIONAL OBJECTIVES

PEO No.	Programme Educational Objectives
PEO1	Graduates can demonstrate technical competence in Mechanical Engineering domain as they apply problem solving skills to conceive, analyze, design and develop products, processes and systems.
PEO2	Graduates can actively embrace leadership roles and strive hard to achieve professional and organizational goals with adherence to professional and ethical values, team expectations and sensitivities of cultural diversity.
PEO3	Graduates are committed to practice engineering strategies in industry and government organizations to meet the growing expectations of the stake holders and also contribute to the societal development.

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DEPARTMENT OF MECHANICAL ENGINEERING
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Program Specific Outcomes

❖ **PSO1:** Ability to apply the knowledge in Thermal Sciences, Design and Manufacturing processes towards the improvement of engineering systems considering productivity, quality and cost.

❖ **PSO2:** Ability to analyze and apply the acquired Mechanical Engineering Knowledge for the sustainable growth of society and self.

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DEPARTMENT OF MECHANICAL ENGINEERING

R20 Course Outcomes - 2020- 2024 Batch

S. No	Course Name	CO No.	Course Outcome
1	**C111** **Linear Algebra and Calculus** **(MA20ABS101)**	C111.1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications. (L6)
		C111.2	Utilize mean value theorems to real life problems. (L3)
		C111.3	Familiarize with functions of several variables which are useful in optimization. (L3)
		C111.4	Apply multiple integrals to find the area and volumes for different functions.(L3)
		C111.5	Analyze the concepts of Beta and Gamma special function for different functions. (L4)
2	**C112** **Engineering Chemistry** **(CH20ABS101)**	C112.1	Demonstrate the corrosion prevention methods and factors affecting corrosion. (L2)
		C112.2	Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers. (L2)
		C112.3	Explain calorific values, octane number, refining of petroleum and cracking of oils. (L2)
		C112.4	Explain the setting and hardening of the cement. (L2)
		C112.5	Summarize the concepts of colloids, micelle and nanomaterials. (L2)
3	**C113** **Problem Solving using C** **(CS20AES101)**	C113.1	Solve computational problems (L3).
		C113.2	Select the features of C language appropriate for solving a problem (L4)
		C113.3	Design computer programs for real world problems (L6)
		C113.4	Organize the data which is more appropriated for solving a problem (L6)
4	**C114** **Basic Electrical & Electronics Engineering** **(EE20AES101)**	C114.1	Apply concepts of KVL/KCL in solving DC circuits
		C114.2	Illustrate working principles and operation of DC and AC Machines
		C114.3	Describe working principles of various power systems and distribution systems
		C114.4	Explain the theory, construction, and operation of electronic devices
		C114.5	Analyze the applications of various Electronic Devices
		C114.6	Explain the working of Op Amp and its applications based on Op-Amps

5	**C115 Engineering Workshop (ME20AES101)**	C115.1	Identify tools, work material, measuring instruments useful for domestic applications (L3).	
		C115.2	Apply wood working skills in real world applications. (L3)	
		C115.3	Build different parts with metal sheets in real world applications. (L3)	
		C115.4	Apply fitting operations in various applications for good strength. (L3)	
		C115.5	Analyze different types of basic electric circuit connections. (L4)	
		C115.6	Demonstrate soldering and brazing in joining circuits. (L2)	
		C115.7	Make moulds for sand casting using standard equipment. (L3)	
		C115.8	Develop different weld joints for various metals. (L3)	
		C115.9	Inspect various parts of machine components. (L4)	
		C115.10	Make plastic components using proper raw material. (L3)	
6	**C116 IT Workshop (CS20AES103)**	C116.1	Identify the Internal parts of computers and Generation of Computers. (L1)	
		C116.2	Assemble and disassemble a computer from its parts and prepare the computer ready to use.(L3)	
		C116.3	Installation process of different types Operating system for a computer by their own.(L3)	
		C116.4	Interconnect two or more computers for information sharing.(L4)	
		C116.5	Access the Internet and browse it for required information.(L1)	
		C116.6	Prepare the documents using Word Processor, prepare spread sheets for calculations using Excel, and documents for LaTeX.(L3)	
		C116.7	Prepare slide presentation using the presentation tool.(L4)	
7	**C117 Engineering Chemistry Lab (CH20ABS102)**	C117.1	Determine the moisture content in the coal sample. (L3)	
		C117.2	Prepare advanced polymer materials. (L2)	
		C117.3	Determine the physical properties like adsorption and viscosity. (L3)	
		C117.4	Estimate Iron in cement. (L3)	
		C117.5	Calculate the hardness of water and dissolved oxygen. (L4)	
	C118	C118.1	Build algorithm and flowchart for simple problems.	
		C118.2	Use suitable control structures to solve problems.	

8	**Problem Solving using C Lab (CS20AES102)**	C118.3	Use suitable iterative statements, arrays and modular programming to solve the problems.
		C118.4	Implement Programs using pointers and String handling Functions.
		C118.5	Develop code for complex applications using structures, unions and file handling features
9	**C119 Basic Electrical & Electronics Engineering Lab (EE20AES102)**	C119.1	Verify Kirchoff's Laws & Superposition theorem. (L3)
		C119.2	Perform testing on AC and DC Machines. (L5)
		C119.3	Study I – V Characteristics of PV Cell. (L2)
		C119.4	Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.
		C119.5	Construct the given circuit in the lab.
		C119.6	Analyze the application of diode as rectifiers, clippers and clampers and other circuits.
		C119.7	Design simple electronic circuits and verify its functioning
10	**C121 Differential Equations and Vector Calculus (MA20ABS201)**	C121.1	Solve the differential equations related to various engineering fields. (L6)
		C121.2	Solve the linear differential equations of higher order related to various engineering fields. (L6)
		C121.3	Identify solution methods for partial differential equations that model physical processes. (L3)
		C121.4	Interpret the physical meaning of different operators such as gradient, curl and divergence. (L5)
		C121.5	Estimate the work done against a field, circulation and flux using vector calculus. (L5)
11	**C122 Engineering Physics (PH20ABS101)**	C122.1	Apply the different realms of physics and their applications in both scientific and technological systems through physical optics. (L3)
		C122.2	Understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications. (L2)
		C122.3	Understands the response of dielectric and magnetic materials to the applied electric and magnetic fields. (L2)
		C122.4	Explain the basic concepts of acoustics and ultrasonic's. (L2)
		C122.5	Apply the important properties of crystals like the presence of long-range order, periodicity and structure determination using X-ray diffraction technique. (L3).
12	**C123 Communicative English (EG20AHS101)**	C123.1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English. (L2)
		C123.2	Apply grammatical structures to formulate sentences and correct word forms. (L3)
		C123.3	Analyze discourse markers to speak clearly on a specific topic in informal discussions. (L4)
		C123.4	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts. (L5)
		C123.5	Create a coherent paragraph interpreting a figure/graph/chart/table. (L6)

13	**C124** **Material Science &** **Engineering** **(ME20AES201)**	C124.1	Explain the principles of binary phases. (L2)
		C124.2	Select steels and cast irons for a given application. (L3)
		C124.3	Apply heat treatment to different applications. (L3)
		C124.4	Explain the Application of non-ferrous metals and alloys in engineering. (L2)
		C124.5	Explain the properties of composites, super alloys and nano-scale materials with their applications. (L2)
14	**C125** **Engineering** **Drawing** **(ME20AES102)**	C125.1	Draw basic geometrical constructions, curves used in engineering practices. (L1)
		C125.2	Understand the concept of projection and acquire visualization skills, projection of points, Lines and Planes. (L2)
		C125.3	Illustrate the projections of solids graphically. (L3)
		C125.4	Draw and explore the sectional views of right regular solids.(L3)
		C125.5	Draw the development of surfaces of solids. (L3)
15	**C126** **Engineering** **Graphics Lab** **(ME20AES103)**	C126.1	Draw the basic views related to projections of Lines, Planes. (L1)
		C126.2	Draw the basic views related to projections of Planes. (L1)
		C126.3	Illustrate orthographic views of simple objects. (L3)
		C126.4	Illustrate isometric projections of simple solids. (L3)
		C126.5	Interpret and comprehend with drafting packages for engineering practice. (L2)
16	**C127** **Communicative** **English Lab** **(EG20AHS102)**	C127.1	Develop to handle and excel in a variety of self-instructional, learner-friendly modes of language learning. (L6)
		C127.2	Develop to employ better stress and intonation patterns and utter English sounds correctly. (L6)
		C127.3	Develop to avoid the impact of mother tongue in English and neutralize their accent. (L6)
		C127.4	Develop to participate with skill and confidence in Group Discussions, Interviews and Public Speaking. (L6)
		C127.5	Utilize the technical skills to prepare'resume, report-writing, and format-making etc. (L3)
17	**C128** **Engineering Physics** **Lab** **(PH20ABS102)**	C128.1	Utilize various optical instruments. (L3)
		C128.2	Estimate wavelength of laser and particles size using laser. (L5)
		C128.3	Evaluate the acceptance angle of an optical fiber and numerical aperture. (L5)
		C128.4	Estimate the susceptibility and related magnetic parameters of magnetic materials. (L5)
		C128.5	Organize the intensity of the magnetic field of circular coil carrying current with distance. (L3)

		C128.6	Determine magnetic susceptibility of the material and its losses by B-H curve. (L5)
		C128.7	Apply the concepts of ultrasonics by acoustic grating. (L3)
18	**C129** **Material Science &** **Engineering** **Lab** **(ME20AES202)**	C129.1	Differentiate various microstructures of ferrous and non-ferrous metals and alloys. (L4)
		C129.2	Identify grains and grain boundaries. (L1)
		C129.3	Explain Importance of hardening of steels. (L4)
		C129.4	Evaluate hardness of treated and untreated steels. (L4)
		C129.5	Differentiate hardness of super alloys, ceramics and polymeric materials. (L4)
19	**C1210** **Universal Human** **Values** **(BA20AMC201)**	C1210.1	Understanding the value of education to become more aware of themselves, and their surroundings (family, society, nature). (L2)
		C1210.2	Utilize the concepts of human being-harmony in myself become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. (L3)
		C1210.3	Understanding the concepts of society-harmony in human for better critical ability. (L2)
		C1210.4	Understanding the human values, human relationship and human society to become sensitive to their commitment. (L2)
		C1210.5	Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. (L3)
20	**C1211** **Universal Human** **Values** **(*BA20AHS201)**	C1211.1	Understanding the value of education to become more aware of themselves, and their surroundings (family, society, nature). (L2)
		C1211.2	Utilize the concepts of human being-harmony in myself become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. (L3)
		C1211.3	Understanding the concepts of society-harmony in human for better critical ability. (L2)
		C1211.4	Understanding the human values, human relationship and human society to become sensitive to their commitment. (L2)
		C1211.5	Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. (L3)
21	**C1212** **logicla skills for** **professionals** **(MA20AMC101)**	C1212.1	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Averages - Percentages - Ratio. (L2)
		C1212.2	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Partnership - Simple Interest and Compound Interest and time and distance. (L2)
		C1212.3	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of time ad work, problems on trains and Boats and streams. (L2)
		C1212.4	Analyze the techniques in series, coding and decoding and blood relations. (L3)
		C1212.5	Analyze the techniques in directions, problems on ages and analogy. (L3)
22	**C211** **Complex Variables,** **Transforms &** **Application of** **Partial Differential**	C211.1	Apply Cauchy-Riemann Equations to find the Analyticity of Complex Functions. (L3)
		C211.2	Apply Cauchy's Integral Formula and Cauchy's Integral Theorem to Evaluate Improper Integrals along Contours. (L3)
		C211.3	Analyze the Concepts of Laplace Transforms to Solve Ordinary Differential Equations. (L4)

	Equations (MA20ABS301)	C211.4	Examine the Fourier Series for Different Functions in Half and Full Range. (L4)
		C211.5	Solve One-Dimensional Wave Equation Heat Equation and Laplace Equations by Applying Fourier Series. (L3)
23	C212 Mechanics of Materials (ME20AES301)	C212.1	Classify the forces and stresses involved in plane and rigid bodies (L2)
		C212.2	Analyze the equilibrium of forces in static particles and rigid bodies. (L4)
		C212.3	Apply the concepts of stress and strain to machine and structural members. (L3)
		C212.4	Determine centroid for simple sections and construct the shear force and bending moment diagrams for beams. (L4)
		C212.5	Calculate slope and deflection in beams under different loading conditions and distinguish the strengths of solid and hollow shafts. (L4)
		C212.6	Analyze columns for buckling loads and estimate stresses in thin cylinders due to internal pressure. (L4)
24	C213 Engineering Thermodynamics (ME20APC301)	C213.1	Describe the Concepts of Continuum, System, Control Volume, Thermodynamic Properties, Thermodynamic Equilibrium, Work and Heat. (L2)
		C213.2	Evaluate the Laws of Thermodynamics System to Analyze Boilers, Heat Pumps, Refrigerator, Heat Engines, Compressors and Nozzles. (L3)
		C213.3	Examine the Change in Entropy of the System, available Energy and Irreversibility. (L3)
		C213.4	Evaluate the Performance of Pure Substance and Thermodynamic Relations. (L3)
		C213.5	Analyze Air Standard Cycles Applied in Prime Movers. (L3)
25	C214 Manufacturing Processes (ME20APC302)	C214.1	Demonstrate Different Metal Casting Processes and Gating Systems. (L2)
		C214.2	Classify Working of Various Welding Processes. (L2)
		C214.3	Evaluate the Forces and Power Requirements in Rolling Process. (L5)
		C214.4	Apply the Principles of Various Forging Operations in industrial applications. (L3)
		C214.5	Illustrate the Manufacturing Methods of Plastics, Ceramics and Powder Metallurgy. (L2)
		C214.6	Identify Different Composites Parts and Surface heat Treatment Process. (L3)
26	C215 Kinematics of Machinery (ME20APC303)	C215.1	Understand the Basic principles Involved in Mechanisms to Produce motion from one point to other point with help of Links, Pairs and Joints. (L2)
		C215.2	Apply Kinematic Analysis to achieve Simple Mechanisms. (L3)
		C215.3	Analyze Velocity and Acceleration in Mechanisms by Vector and Graphical Method. (L4)
		C215.4	Synthesize a Four-Bar Mechanism with Analytical and Graphical Methods. (L3)
		C215.5	Apply Fundamentals of Gear Theory as a Prerequisite for Gear Design. (L3)
		C215.6	Construct Cam Profile for Given Follower Motion. (L3)

27	**C216** **Mechanics of Materials Lab** **(ME20AES302)**	C216.1	Estimate the Tensile Strength of the given sample by performing Tension Test (L4)
		C216.2	Calculate the Bending Strength of Simply Supported Beam and Cantilever Beam by performing Bending Test(L3)
		C216.3	Evaluate the Torsional Stress for Circular Shafts by means of Torsion Test (L4)
		C216.4	Evaluate the Hardness Value by means of Brinell Hardness and Rockwell Hardness Tests for Different Specimens (L4)
		C216.5	Estimate the Strength of Open and Closed Coil Helical Spring by Spring Test(L4)
28	**C217** **Manufacturing Process Lab** **(ME20APC304)**	C217.1	Identify the Tools Used in Metal Casting. (L2)
		C217.2	Evaluate Mechanical Components using Metal Casting Techniques. (L3)
		C217.3	Analyze Different Welding Techniques for Various Mechanical Components. (L3)
		C217.4	Fabricate Forging Components using Press Working Operations. (L5)
		C217.5	Apply Injection, Blow Molding and Hand layup Process Techniques for Fabricating Different Composite Components. (L4)
29	**C218** **Mechanics of Machines Lab** **(Virtual Lab)** **(ME20APC305)**	C218.1	Identify Different Types of Links and Pairs in Mechanisms. (L1)
		C218.2	Apply Relative and Instantaneous Centre of Rotation Method for Different Mechanisms. (L3)
		C218.3	Analyze various motions produced by Mechanisms. (L4)
		C218.4	Analyze Various CAM Profile Motions. (L4)
30	**C219** **Soft Skills** **(EG20ASC301)**	C219.1	Memorize Various Elements of Effective Communicative Skills.
		C219.2	Interpret People at the Emotional Level Through Emotional Intelligence.
		C219.3	Apply Critical Thinking Skills in Problem Solving.
		C219.4	Analyze the Needs of an Organization for Team Building.
		C219.5	Judge the Situation and take Necessary Decisions as a Leader.
		C219.6	Develop Social and Work-Life Skills as Well as Personal and Emotional Well-Being.
31	**C2110** **Environmental Science** **(CH20AMC201)**	C2110.1	Understanding multidisciplinary nature of environmental studies and various renewable and nonrenewable resources. (L2)
		C2110.2	Understand flow and bio-geo- chemical cycles and ecological pyramids. (L2)
		C2110.3	Understand various causes of pollution and solid waste management and related preventive measures. (L2)
		C2110.4	Apply the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation. (L3)
		C2110.5	Apply the concepts of population explosion, value education and welfare programmes in society. (L3)

32	**C2111 Enhancing English Language Skills (EG20AMC301)**	C2111.1	Use English language, both written and spoken, competently and correctly.	
		C2111.2	Improve comprehension and fluency of speech.	
		C2111.3	Hone the communication skills to meet the challenges of their careers successfully.	
		C2111.4	Gain confidence in using English in verbal situations.	
		C2111.5	Strengthen communication skills in different contexts like formal and informal.	
33	**C2112 Universal Human Values (*BA20AHS201)**	C2112.1	Understanding the value of education to become more aware of themselves, and their surroundings (family, society, nature). (L2)	
		C2112.2	Utilize the concepts of human being-harmony in myself become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. (L3)	
		C2112.3	Understanding the concepts of society-harmony in human for better critical ability. (L2)	
		C2112.4	Understanding the human values, human relationship and human society to become sensitive to their commitment. (L2)	
		C2112.5	Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. (L3)	
34	**C221 Numerical Methods, Probability and Statistics (MA20ABS401)**	C221.1	Apply Different Methods to Find Roots of Algebraic and Transcendental Equations. (L3)	
		C221.2	Apply Different Methods to Find Approximate Solution of Ordinary Differential Equations and Numerical Integration. (L3)	
		C221.3	Analyse the Concepts of Probability and their Applications. (L4)	
		C221.4	Apply Discrete and Continuous Probability Distributions in Practical Problems. (L3)	
		C221.5	Analyse the Statistical Inferential Methods Based on Small and Large Sampling Tests. (L4)	
35	**C222 Dynamics of Machinery (ME20APC401)**	C222.1	Understand the Basic Principles Involved Friction, Precession, Balancing and Vibrations. (L2)	
		C222.2	Determine Power Loss and Power Transmitted Due to Friction in Various Applications. (L3)	
		C222.3	Apply Balancing Principles for Various Rotating and Reciprocating Masses. (L3)	
		C222.4	Analyze the Magnitude of Vibration and Isolate Vibration of Dynamic Systems. (L4)	
		C222.5	Determine the dimensions of Governors for Speed Control in mechanical devices. (L3)	
36	**C223 Machine Tools & Measurements (ME20APC402)**	C223.1	Understand the cutting principles involved in various Machining Process. (L2)	
		C223.2	Illustrate the working principles of various Machine tools. (L2)	
		C223.3	Evaluate the machining time and tool life for the various machining processes (L4)	
		C223.4	Classify various measuring instruments used in metrology(L2)	
		C223.5	Validate various measuring instruments in Engineering Applications. (L4)	

37	**C224** **Thermal** **Engineering – I** **(ME20APC403)**	C224.1	Explain the Basic principles of I.C Engines and Combustion in S.I and C.I Engines. (L2)	
		C224.2	Describe the Significance of Fuel Supply, Cooling, Lubrication and Ignition Systems. (L2)	
		C224.3	Illustrate the Combustion Phenomenon in CI Engines and SI Engines, Types of Combustion Chambers, Knocking. (L2)	
		C224.4	Solve the Numerical Problems on Performance Parameters of I.C Engines. (L3)	
		C224.5	Solve the Numerical Problems on Air Compressors. (L3)	
38	**C225** **BUSINESS** **ENVIRONMENT** **(BA20AHS302)**	C225.1	Discuss the Types of Business Environment, its Scope and its Analysis along with Characteristics of Business.	
		C225.2	Explain the Effects of Government Policy on the Economic Environment and Insurance Industry	
		C225.3	how Society and Cultural Environment Impacts on Business Environment.	
		C225.4	Describe how Political Environment is Utilized in Business.	
		C225.5	Explain the Natural and Technological Framework that Regulates Business	
39	**C226** **Computer Aided** **Machine Drawing** **(ME20APC404)**	C226.1	Demonstrate the Conventional Representations of Materials and Machine Components. (L2)	
		C226.2	Understand Various Types of Fasteners Used for Permanent and Temporary Joints like Screw, Bolt and Rivet etc. (L2)	
		C226.3	Develop Solid Models of Machine Parts and Assemble them by using CAD Software. (L3)	
		C226.4	Translate 3D Assemblies into 2D Drawings by using CAD Software. (L2)	
		C226.5	Create Manufacturing Drawing with Dimensional and Geometric Tolerances. (L4)	
40	**C227** **Thermal** **Engineering Lab** **(ME20APC405)**	C227.1	Draw the Diagram of Port/Valve Timing and Functioning of an I.C Engines. (L2)	
		C227.2	Evaluate the Performance Characteristics of I.C Engine at Different Loads and Draw the Heat Balance Sheet. (L3)	
		C227.3	Evaluate the Performance Test on Reciprocating Air Compressor. (L3)	
		C227.4	Illustrate the Working principle of Refrigeration System. (L4)	
		C227.5	Identify the Various Components of Babcock, Wilcox and Lancashire Boilers. (L2)	
41	**C228** **Machine Tools &** **Measurements Lab** **(ME20APC406)**	C228.1	Illustrate a experimental model with Step turning, taper turning and thread cutting on lathe machine (L4)	
		C228.2	Demonstrate working principles of drilling and tapping process using drilling machine and Practice a experimental model using the principles of operations in practical on shaper, slotter, planer and milling (L3)	
		C228.3	Adapt the working principles of grinding of tool angles, cylindrical grinding and surface grinding process (L3)	
		C228.4	Demonstrate work in quality control departments of industries and to ensure quality of products (L3)	
		C228.5	Apply the principles in instruments and measuring techniques (L3)	

42	**C229** **Real-Time** **Application of Data** **Structures** **(CS20ASC301)**	C229.1	Analyze the problems using asymptotic notations.(L4)
		C229.2	Apply Stack, Queues and linked list to solve different applications.(L3)
		C229.3	Demonstrate suitable sorting techniques for the real world problem.(L4)
		C229.4	Implement tree structures in different patterns of representation of data.(L3)
		C229.5	Analyze the given problem using graph traversal techniques.(L4)
43	**C2210** **Design Thinking for** **Innovation** **(ME20AMC401)**	C2210.1	Explain the Fundamentals of Design Thinking and Innovation.
		C2210.2	Apply the Design Thinking Techniques for Solving Problems in Various Sectors.
		C2210.3	Analyze Work in a Multidisciplinary Environment.
		C2210.4	Evaluate the Value of Creativity.
		C2210.5	Formulate Specific Problem Statements of Real Time Issues.
44	**C2211** **Engineering** **Mathematics** **(MA20AMC401)**	C2211.1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
		C2211.2	Utilize mean value theorems to real life problems (L3)
		C2211.3	Solve the differential equations related to various engineering fields (L6)
		C2211.4	Apply multiple integrals to find the area and volumes for different functions. (L3)
		C2211.5	Estimate the work done against a field, circulation and flux using vector calculus (L6)
45	**C2212** **Logical Skills for** **Professional – II** **(MA20AMC301)**	C2212.1	Demonstrate Knowledge Basic Mathematics to Develop Analytical Skills to Solving Problems of HCF, LCM Factors and Simplification.
		C2212.2	Demonstrate Knowledge Basic Mathematics to Develop Analytical Skills to Solving Problems of Pipes, Alligation or Mixture.
		C2212.3	Demonstrate Knowledge Basic Mathematics to Develop Analytical Skills to Solving Problems of Table, Bar Graphs and Pie Chart.
		C2212.4	Analyze the Techniques in Syllogism.
		C2212.5	Analyze the Techniques in Calender, Clocks and Number Series Analogy Concepts.
46	**C311** **CAD/CAM** **(ME20APC501)**	C311.1	Apply the basics of geometric representation and transformations in CAD/CAM. (L3)
		C311.2	Choose geometric modeling methods for building CAD models. (L3)
		C311.3	Compare NC, CNC and DNC. (L4)
		C311.4	Develop manual and computer aided part programming for turning and milling operations. (L3)
		C311.5	Summarize the principles of CAQC, Robotics AR, VR and AI in CIM. (L2)

47	**C312** **Design of Machine Members** **(ME20APC502)**	C312.1	Estimate safety factors of machine members subjected to static and dynamic loads. (L5)
		C312.2	Design fasteners subjected to variety of loads. (L3)
		C312.3	Select of standard machine elements such as keys, shafts, couplings and springs. (L1)
		C312.4	Design of IC Engine parts. (L3)
48	**C313** **Fluid Mechanics &** **Hydraulic** **Machines** **(ME20APC503)**	C313.1	Understand characteristics of laminar and turbulent flows. (L2)
		C313.2	Understand the energy losses in different types of pipes. (L2)
		C313.3	Identify the performance of different types of turbines. (L1)
		C313.4	Identify the performance of centrifugal pumps. (L1)
49	**C314** **Renewable Energy** **Resources** **(EE20AOE503)**	C314.1	Explain the basic concepts of solar radiation and solar collectors
		C314.2	Develop the Bio - Energy Concepts
		C314.3	Explain the geothermal Energy ,Tidal and Wave Energy
		C314.4	Apply the principles of electrical technology to develop MHD power generator & Utilize different wind parameters for design of rotor
		C314.5	Make use of power curve for energy estimation and fuel cell Technology
50	**C315** **Metal Forming** **Process** **(ME20APE503)**	C315.1	Determine major process/processes of manufacturing used for given application.
		C315.2	Explain when and why metal forming is chosen compared to other compatible methods.
		C315.3	Analyze effect of parameters influencing metal forming and compare hot working and cold working with applications.
		C315.4	Explain capabilities and applications of bulk metal forming processes and sheet metal work.
		C315.5	Outline tooling and equipments required for important metal forming processes.
		C315.6	Examine effects of friction & lubrication and causes of common defects in metal forming.
51	**C316** **CAD/CAM Lab** **(ME20APC504)**	C316.1	Generate Solid CAD models of Machine Parts. (L3)
		C316.2	Develop CNC programs for various machining operations. (L3)
		C316.3	Make use of modern software tools to accurately model parts for specific manufacturing operations.(L3)
52	**C317** **Fluid Mechanics &** **Hydraulic** **Machines Lab**	C317.1	Understand the Impact of jet on Flat vanes
		C317.2	Apply the practical aspects of Bernoulli's principle
		C317.3	Estimate frictional forces applicable in a pipe to determine major and minor losses.

	(ME20APC505)	C317.4	Demonstrate hydraulic turbine and carry out their performance study useful in hydel power plants.
		C317.5	Examine and understand pump working characteristics under given constraints
53	C318 Additive Manufacturing (Virtual Lab) (ME20ASC501)	C318.1	Distinguish the different parts of the 3D printer.
		C318.2	Perform the assembly of different parts of the 3D printer.
		C318.3	Analyze the different parameters effect on the performance of the 3D printer.
		C 318.4	Build the 3D printer by using the different parts available and apply this concept to build different type of 3D printers.
		C 318.5	Analyze the functioning of different parts which contributes to improve the performance of the 3D printer.
54	C319 Mandatory Noncredit Course Biology for Engineers (CH20AMC301)	C319.1	Analyze about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
		C319.2	Analyze about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.
		C319.3	Analyze about human physiology.
		C319.4	Analyze about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
		C319.5	Apply biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals.
55	C3110 Problem Solving and Programming (Lateral Entry Students Only) (IT20AMC501)	C3110.1	Solve computational problems (L3).
		C3110.2	Select the features of C language appropriate for solving a problem (L4)
		C3110.3	Design computer programs for real world problems (L6)
		C3110.4	Organize the data which is more appropriated for solving a problem (L6)
56	C3111 Technical Seminar Presentation – I (ME20ATS501)	C3111.1	Establish motivation for any topic of interest and develop a thought process for technical presentation
		C3111.2	Organize a detailed literature survey and build a document with respect to technical publications
		C3111.3	Analysis and comprehension of proof-of-concept and related data
		C3111.4	Effective presentation and improve soft skills
		C3111.5	Make use of new and recent technology for creating technical reports
57	C3112 Evaluation of Summer Internship (ME20AIP501)	C3112.1	Apply fundamental engineering principles to solve practical problems encountered in an industry setting
		C3112.2	Analyze and interpret technical data collected during the internship to draw meaningful conclusions
		C3112.3	Design and propose solutions for real-world engineering challenges faced by the internship company, considering manufacturability, cost, and environmental impact
		C3112.4	Effectively communicate internship experiences, findings, and recommendations through written reports and oral presentations

		C3112.5	Demonstrate professionalism, teamwork skills, and a commitment to ethical practices while working in a collaborative engineering environment
58	**C321** **Finite Element** **Methods** **(ME20APC601)**	C321.1	Distinguish different numerical methods involved in Finite Element Analysis (L 3)
		C321.2	Apply equations in finite element methods for 1D, 2D and 3D problems. (L3)
		C321.3	Apply shape functions in finite element formulations and use linear, quadratic, and cubic shape functions for interpolation (L3)
		C321.4	Formulate and solve basic problems in heat transfer, solid mechanics and fluid mechanics. (L3)
		C321.5	Analyse beams and shafts using finite element analysis. (L4)
59	**C322** **Heat Transfer** **(ME20APC602)**	C322.1	Apply the concepts of different modes of heat transfer. (L3)
		C322.2	Apply knowledge of conduction heat transfer in the design of insulation of furnaces and pipes. (L3)
		C322.3	Analyse free and forced convection phenomena in external and internal flows. (L4)
		C322.4	Design of thermal shields using the concepts of black body and non-black body radiation. (L5)
		C322.5	Use analytical and numerical solution techniques in solving heat transfer problems, including heat generation and extended surfaces. (L3)
60	**C323** **Thermal** **Engineering – II** **(ME20APC603)**	C323.1	Demonstrate the Rankine cycle and apply thermodynamic concepts on boilers. (L2)
		C323.2	Figure out the types and applications of steam nozzles and condensers and
		C323.3	Solve the problems on Nozzles.(L3)
		C323.4	Classify the steam turbines and describe it's working. (L2)
		C323.5	Explain the working of gas turbines and analyse the performance.(L2)
		C323.6	Demonstrate the principles of operation of refrigeration and Air-conditioning systems (L2)
61	**C324** **Composite** **Materials** **(ME20APE601)**	C324.1	Explain the practical applications of composites. (L3)
		C324.2	Identify the various types of Polymer Matrix Composites. (L2)
		C324.3	Understand the Processing & Applications of MMCs. (L2)
		C324.4	Classify the various types of Ceramic Matrix Materials. (L2)
		C324.5	Explain the applications of carbon fiber composites & bio composites. (L3)
62	**C325** **Disaster** **Management** **(CE20AOE601)**	C325.1	Know the different types of disasters and their effects on environment.
		C325.2	Have the knowledge about Causes of disasters.
		C325.3	Gain knowledge about disaster management through engineering applications.

	(CE20AOE001)	C325.4	Explain the process of risk management
		C325.5	Distinguish between the different approaches needed to manage pre- during and post disaster periods
63	C326 Computer Aided Engineering Lab (ME20APC604)	C326.1	Explain the need for Finite Element Method in Manufacturing Design.
		C326.2	Interpret the real life problems and propose sustainable design solutions for specific needs through applications of Engineering principles.
		C326.3	Utilize FEA software to solve simple structural, heat transfer and fluid flow problems.
		C326.4	Analyze a physical problem, develop experimental procedures for accurately investigating the problem, and effectively perform.
64	C327 Heat Transfer Lab (ME20APC605)	C327.1	Explain different modes of heat transfer
		C327.2	Identify parameters for measurement for calculating heat transfer
		C327.3	Determine effectiveness of heat exchanger
		C327.4	Design new equipment related to heat transfer
		C327.5	Apply principles of heat transfer in wide application in industries
65	C328 Instrumentation & Composite Materials (ME20APC606)	C328.1	Able to explain how common fibers are produced and how the properties of the fibers are related to the internal structure.
		C328.2	Able to select matrices for composite materials in different applications.
		C328.3	Able to describe key processing methods for fabricating composites.
66	C329 Skill Oriented Course Application Development using Python (IT20ASC301)	C329.1	Write, Test and Debug Python Programs. (L1)
		C329.2	Use Conditionals and Loops for Python Programs. (L3)
		C329.3	Construct custom modules and functions to handle different operations. (L3)
		C329.4	Implement Object oriented concepts through real time scenarios and handle errors. (L3)
		C329.5	Design different shapes and objects using turtle graphics. (L4)
67	C3210 Technical Seminar Presentation – II (ME20ATS601)	C3210.1	Establish motivation for any topic of interest and develop a thought process for technical presentation
		C3210.2	Organize a detailed literature survey and build a document with respect to technical publications
		C3210.3	Analysis and comprehension of proof-of-concept and related data
		C3210.4	Effective presentation and improve soft skills
		C3210.5	Make use of new and recent technology for creating technical reports
		C411.1	Identify different parts of automobile. (L3)

68	**C411 Automobile Engineering (ME20APE701)**	C411.2	Explain the working of various parts like engine, transmission, clutch, brakes.(L2)
		C411.3	Describe the working of steering and the suspension systems. (L2)
		C411.4	Summarize the environmental implications of automobile emissions. (L2)
		C411.5	Outline the future developments in the automobile industry.(L2)
69	**C412 Mechanical Behavior of Materials (ME20APE707)**	C412.1	Understand the structure of materials (L2)
		C412.2	Apply materials based on their structure and failure modes. (L2)
		C412.3	Characterize materials using different machines. (L3)
		C412.4	Summarize the various strengthening mechanisms with suitable examples. (L2)
		C412.5	Identify the creep in different materials and its influence in selection of materials. (L3)
70	**C413 Modern Manufacturing Methods (ME20APE710)**	C413.1	Model the material removal in various modern manufacturing processes.
		C413.2	Analyze the processes and evaluate the role of each process parameter during machining of various advanced materials.
		C413.3	Understand material removal mechanism by using electro-thermal energy and its applications.
		C413.4	Select the chemical and electro chemical processes for micro-machining to fabricate micro device.
		C413.5	Know the Complex shape can be machined easily by using EBM and LBM.
71	**C414 Air Pollution and Quality Control (CE20AOE701)**	C414.1	Identify the major sources of air pollution.
		C414.2	Understand their effects on health and environment.
		C414.3	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
		C414.4	Choose and design control techniques for particulate and gaseous emissions.
		C414.5	Understand the noise pollution and control methods.
72	**C415 Utilization of Energy in Electrical Utilities (EE20AOE705)**	C415.1	Develop a lighting scheme for a given practical case.
		C415.2	Analyze the performance of Heating and Welding methods
		C415.3	Make all numerical calculations associated with electric traction.
		C415.4	Evaluate the Mechanics of Train and its parameters
		C415.5	Analyze the economic aspects in utilisation of electrical energy
		C416.1	Understand the concepts & principles of management and designs of organization in a practical world

	C416 Management Science (BA20AHS705)	C416.2	Apply the knowledge of Work-study principles & Quality Control techniques in industry	
		C416.3	Analyze the concepts of HR Min Recruitment, Selection and Training & Development.	
		C416.4	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT.	
		C416.5	Create Modern technology in management science	
73	**C417 Mechanism and Robotics (Virtual Lab) (ME20ASC701)**	C417.1	Identify the geometric relationship between input and output motion parameters of robotic arms.	
		C417.2	Formulate the transformation matrix through which a relationship is established between different links of the manipulator.	
		C417.3	Create the workspace through a 3D graph plot of manipulator position for various inputs. CO4: Assess the robot motion for various inputs of the joint angular value.	
		C417.4	Interpret the simulation of mechanisms for different input parameters.	
		C417.5	Analyse the various types of circuits used in construction of robots.	
74	**C418 Evaluation of Industrial / Research Mini Project (ME20AIP701)**	C418.1	practice acquired knowledge within the chosen area of technology for project development	
		C418.2	Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.	
		C418.3	Reproduce, improve and refine technical aspects for engineering projects	
		C418.4	Work as an individual or in a team in development of technical projects	
		C418.5	Communicate and report effectively project related activities and findings.	
75	**C419 Technical Seminar Presentation – III (ME20ATS701)**	C419.1	Establish motivation for any topic of interest and develop a thought process for technical presentation	
		C419.2	Organize a detailed literature survey and build a document with respect to technical publications	
		C419.3	Analysis and comprehension of proof-of-concept and related data	
		C419.4	Effective presentation and improve soft skills	
		C419.5	Make use of new and recent technology for creating technical reports	
76	**C420 Project Work Stage – I (ME20APW701)**	C420.1	Define the project scope and objectives based on a comprehensive literature review and identify relevant engineering principles.	
		C420.2	Develop a detailed work plan with timelines, milestones, and resource allocation for project completion.	
		C420.3	Demonstrate proficiency in using appropriate engineering tools and software for project planning and analysis.	
		C420.4	Effectively communicate project goals, methodology, and initial findings through written reports and presentations.	
		C420.5	Identify potential safety hazards and environmental considerations associated with the project.	

77	C421 Project Work Stage – II / Full Internship in Industry (ME20APW801)	C421.1	Apply knowledge of Mechanical Engineering principles and problem-solving techniques to design and develop solutions for a complex engineering project
		C421.2	Conduct thorough research, analyze data, and interpret results to support the design and development of the project.
		C421.3	Demonstrate effective communication skills by preparing comprehensive project reports, presentations, and justifications for chosen solutions
		C421.4	Evaluate the project's impact on society and the environment, considering sustainability and ethical principles
		C421.5	Effectively manage project resources, timeline, and budget, demonstrating teamwork and leadership skills in a multidisciplinary setting.

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HOD

S.No	Year/Sem	Course No	Course Name	Course Outcomes:
1	I - I	19A54101	Algebra and Calculus	Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
				Utilize mean value theorems to real life problems (L3)
				familiarize with functions of several variables which is useful in optimization (L3)
				Students will also learn important tools of calculus in higher dimensions. Students willbecome familiar with 2- dimensional coordinate systems (L5)
				Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions
2		19A51101T	Engineering Chemistry	demonstrate the corrosion prevention methods and factors affecting corrosion (L2)
				explain the preparation, properties, and applications of thermoplastics & thermosettings, elastomers & conducting polymers. (L2)
				explain calorific values, octane number, refining of petroleum and cracking of oils (L2)
				explain the setting and hardening of cement and concrete phase (L2)
				summarize the application of SEM, TEM and X-ray diffraction in surface characterization (L2
3		19A05101T	Problem Solving & Programming	Construct his own computer using parts (L6).
				Recognize the importance of programming language independent constructs (L2)
				Solve computational problems (L3)
				Select the features of C language appropriate for solving a problem (L4)
				Design computer programs for real world problems (L6)
				Organize the data which is more appropriated for solving a problem (L6)
4		19A03102	Engineering Graphics Lab	draw various curves applied in engineering. (L2)
				show projections of solids and sections graphically. (L2)
				draw the development of surfaces of solids. (L3)
				use computers as a drafting tool. (L2)
				draw isometric and orthographic drawings using CAD packages. (L3)
5		19A03101	Engineering Workshop	Apply wood working skills in real world applications. (I3)
				Build different parts with metal sheets in real world applications. (I3)
				Apply fitting operations in various applications. (I3)
				Apply different types of basic electric circuit connections. (I3)
				Demonstrate soldering and brazing. (I2)
6		19A51101P	Engineering Chemistry Lab	determine the cell constant and conductance of solutions (L3)
				prepare advanced polymer materials (L2)
				determine the physical properties like surface tension, adsorption and viscosity (L3)
				estimate the Iron and Calcium in cement (L3)
				calculate the hardness of water (L4)
7		19A05101P	Problem Solving & Programming Lab	Construct a Computer given its parts (L6)
				Select the right control structure for solving the problem (L6)
				Analyze different sorting algorithms (L4)
				Design solutions for computational problems (L6)
				Develop C programs which utilize the memory efficiently using programming constructs like pointers.

1		19A02201T	Basic Electrical & Electronics Engineering	Apply concepts of KVL/KCL in solving DC circuits (L3)
				Choose correct rating of a transformer for a specific application (L5)
				Illustrate working principles of induction motor - DC Motor (L3)
				Identify type of electrical machine based on their operation.(L1)
				Describe working principles of protection devices used in electrical circuits. (L2)
2		19A54201	Differential Equations and Vector Calculus	solve the differential equations related to various engineering fields (L6)
				Identify solution methods for partial differential equations that model physical processes (L3)
				interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
				estimate the work done against a field, circulation and flux using vector calculus (L6)
3		19A56102T	Engineering Physics	Explain physics applied to solve engineering problems (L2)
				Apply the principles of acoustics in designing of buildings (L3)
				Explains the applications of ultrasonics in various engineering fields (L2)
				Apply electromagnetic wave propagation in different Optical Fibers (L2)
				Apply the lasers concepts in various applications (L3)
				Explains the concepts of dielectric and magnetic materials (L2)
				Identify the sensors for various engineering applications (L3)
4	I-II	19A05201T	Data Structures	Select Appropriate Data Structure for solving a real world problem (L4)
				Select appropriate file organization technique depending on the processing to be done (L4)
				Construct Indexes for Databases (L6)
				Analyse the Algorithms (L4)
				Develop Algorithm for Sorting large files of data (L3
5		19A52101T	Communicative English 1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
				Apply grammatical structures to formulate sentences and correct word forms
				Analyze discourse markers to speak clearly on a specific topic in informal discussions
				Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
				Create a coherent paragraph interpreting a figure/graph/chart/table
6		19A52101P	Communicative English 1 Lab	To remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
				To apply communication skills through various language learning activities
				To analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
				To evaluate and exhibit acceptable etiquette essential in social and professional settings
				To create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
7		19A03201	Mechanical Engineering Workshop	make moulds for sand casting. (L3)
				develop different weld joints. (L3)
				assemble or disassemble of machine components. (L3)
				make plastic components. (L3)
				use power tools for different applications. (L3)
				Assemble computer and installation of software (L3)

				Describe construction, working and characteristics of diodes, transistors and operational amplifiers (L2)
8		19A02201P	Basic Electrical & Electronics Engineering Lab	Demonstrate how electronic devices are used for applications such as rectification, switching and amplification (L2)
				Build different building blocks in digital electronics using logic gates (L3)
				Explain functionality of flip-flops, shift registers and counters for data processing applications (L2)
				Explain functioning of various communication systems (L2)
9		19A56102P	Engineering Physics Lab	Operate various optical instruments (L2)
				Estimate wavelength of laser and particles size using laser(L2)
				estimate the susceptibility and related magnetic parameters of magnetic materials (L2)
				plot the intensity of the magnetic field of circular coil carrying current with distance (L3)
				evaluate the acceptance angle of an optical fiber and numerical aperture (L3)
				determine magnetic susceptibility of the material and its losses by B-H curve (L3)
				identify the type of semiconductor i.e., n-type or p-type using hall effect (L3)
				Apply the concepts of sensors for various applications (L2)
10		19A05201P	Data Structures Lab	Select the data structure appropriate for solving the problem (L5)
				Implement searching and sorting algorithms (L3)
				Design new data types (L6)
				Illustrate the working of stack and queue (L4)
				Organize the data in the form of files (L6)
1		19A54301	Complex Variables, Transforms and PDE	Understand the analyticity of complex functions and conformal mappings.
				Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
				Understand the usage of Laplace Transforms.
				Evaluate the Fourier series expansion of periodic functions.
				Formulate/solve/classify the solutions of Partial differential equations and also find the solution of one dimensional wave equation and heat equation.
2		19A05304T	Python Programming	Apply the features of Python language in various real applications.
				Select appropriate data structure of Python for solving a problem.
				Design object oriented programs using Python for solving real-world problems.
				Apply modularity to programs.
3		19A03301T	Manufacturing Processes	Demonstrate different metal casting processes and gating systems. (L2)
				Classify working of various welding processes. (L2)
				Evaluate the forces and power requirements in rolling process. (L5)
				Apply the principles of various forging operations. (L3)
				Outline the manufacturing methods of plastics, ceramics and powder metallurgy. (L1)
				Identify different unconventional processes and their applications. (L3)
4		19A03302	Engineering Mechanics	Resolve forces and couples in mechanical systems. (L3)
				Identify the frictional forces and its influence on equilibrium. (L3)
				Find the centre of gravity and moment of inertia for various geometric shapes (L3)
				Develop equations for different motions. (L4)
				Determine the displacement, velocity and acceleration relations in dynamic systems (L4)
				Relate the impulse and momentum (L4)

SV COLLEGE OF ENGINEERING
AUTONOMOUS
DEPARTMENT OF CIVIL ENGINEERING
COURSE OUTCOMES

S.No	Course Name	CO's	Course Outcome.
1	LINEAR ALGEBRA & CALCULUS (MA20ABS101)	C111.1	Apply Solve the system of linear equations and reduce the quadratic forms to canonical form by applying matrices.
		C111.2	Apply mean value theorems for different functions with different intervals.
		C111.3	Analyze the multivariable calculus to find Jacobean, Maximum and Minimum.
		C111.4	Apply multiple integrals to find the area and volume for different functions.
		C111.5	Analyze the concepts of Beta and Gamma special function for different functions
2	Engineering Physics (PH20ABS101)	C112.1	Apply the different realms of physics and their applications in both scientific and technological systems through physical optics.
		C112.2	Understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications.
		C112.3	Understands the response of dielectric and magnetic materials to the applied electric and magnetic fields.
		C112.4	Explain the basic concepts of acoustics and ultrasonics.
		C112.5	Apply the important properties of crystals like the presence of long-range order, periodicity and structure determination using X-ray diffraction technique
3	Communicative English (EG20AHS101)	C113.1	Retrieve the knowledge of basic grammatical concepts
		C113.2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
		C113.3	Apply grammatical structures to formulate sentences and correct word forms
		C113.4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
		C113.5	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
4	Basic Electrical & Electronics Engineering (EE20AES101)	C114.1	Apply concepts of KVL/KCL in solving DC circuits
		C114.2	Choose correct rating of a transformer for a specific application
		C114.3	Illustrate working principles of induction motor - DC Motor
		C114.4	Identify type of electrical machine based on their operation.
		C114.5	Describe working principles of protection devices used in electrical circuits.
5	Engineering Drawing (ME20AES102)	C115.1	Draw basic geometrical constructions, curves used in engineering practices
		C115.2	Understand the concept of projection and acquire visualization skills, projection of points, Lines and Planes
		C115.3	Illustrate the projections of solids graphically
		C115.4	Draw and explore the sectional views of right regular solids
		C115.5	Draw the development of surfaces of solids
6	Engineering Graphics Lab (ME20AES103)	C116.1	Draw the basic views related to projections of Lines, Planes
		C116.2	Draw the basic views related to projections of Planes
		C116.3	Illustrate orthographic views of simple objects
		C116.4	Illustrate isometric projections of simple solids.
		C116.5	Interpret and comprehend with drafting packages for engineering practice
7	Engineering Physics Lab (PH20ABS102)	C117.1	Estimate wavelength of laser and particles size using laser
		C117.2	Evaluate the acceptance angle of an optical fiber and numerical aperture
		C117.3	Estimate the susceptibility and related magnetic parameters of magnetic materials
		C117.4	Organize the intensity of the magnetic field of circular coil carrying current with distance
		C117.5	Determine magnetic susceptibility of the material and its losses by B-H curve
8	Communicative English Lab (EG20AHS102)	C118.1	Able to handle and excel in a variety of self-instructional, learner-friendly modes of language learning
		C118.2	Able to employ better stress and intonation patterns and utter English sounds correctly
		C118.3	Able to avoid the impact of mother tongue in English and neutralize their accent
		C118.4	Able to participate with skill and confidence in Group Discussions, Interviews and Public Speaking
		C118.5	Able to use computers in resume preparation, report-writing, and formatmaking etc.
9	Basic Electrical & Electronics Engineering Lab (EE20AES102	C119.1	Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.
		C119.2	Construct the given circuit in the lab
		C119.3	Analyze the application of diode as rectifiers, clippers and clampers and other circuits.
		C119.4	Design simple electronic circuits and verify its functioning
		C119.5	Able to use computers in resume preparation, report-writing, and formatmaking etc.
10	Logical Skills for Professionals-I (MA20AMC101)	C11A.1	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Averages - Percentages – Ratio
		C11A.2	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Partnership - Simple Interest and Compound Interest and time and stance.
		C11A.3	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of time ad work, problems on trains and Boats and streams
		C11A.4	Analyze the techniques in series, coding and decoding and blood relations
		C11A.5	Analyze the techniques in directions, problems on ages and analogy
11	Differential Equations and Vector Calculus (MA20ABS201)	C121.1	Apply Solve the system of linear equations and reduce the quadratic forms to canonical form by applying matrices.
		C121.2	Apply mean value theorems for different functions with different intervals.
		C121.3	Analyze the multivariable calculus to find Jacobean, Maximum and Minimum.
		C121.4	Apply multiple integrals to find the area and volume for different functions.
		C121.5	Analyze the concepts of Beta and Gamma special functions for different functions.
12	Engineering Chemistry (CH20ABS101)	C122.1	Explain the constituents of Composites and its classification
		C122.2	Identify the factors affecting the refractory material
		C122.3	Illustrate the functions and properties of lubricants
		C122.4	Demonstrate the phases and reactivity of concrete formation
		C122.5	Identify the constituents of Portland cement
		C123.1	To learn how to solve a given problem.

13	Problem Solving Using C (CS20AES101)	C123.2	To illustrate the basic concepts of C programming language.
		C123.3	To discuss the concepts of Functions, Arrays, Pointers and Structures.
		C123.4	To familiar with Dynamic memory allocation concepts.
		C123.5	To apply concepts of structures and files to solve real word problems.
14	Strength of Materials (CE20AES201)	C124.1	Understand the different types of couples and force systems
		C124.2	Determine the centroid and moment of inertia for different cross-sections
		C124.3	Understand the concepts of stress, strain, generalized Hooke's law, elastic moduli and strain energy.
		C124.4	Develop shear force and bending moment diagrams for different load cases.
		C124.5	Compute the flexural stresses and shear stresses for different loading cases and different cross-sections.
15	Engineering Workshop (ME20AES101)	C125.1	Apply fitting operations in various applications for good strength
		C125.2	Analyze different types of basic electric circuit connections
		C125.3	Demonstrate soldering and brazing in joining circuits.
		C125.4	Make moulds for sand casting using standard equipment.
		C125.5	Develop different weld joints for various metals.
16	IT Workshop (CS20AES103)	C126.1	Assemble and disassemble a computer from its parts and prepare the computer ready to use.
		C126.2	Installation process of different types Operating system for a computer by their own
		C126.3	Interconnect two or more computers for information sharing
		C126.4	Access the Internet and browse it for required information.
		C126.5	Prepare the documents using Word Processor, prepare spread sheets for calculations using
17	Problem Solving Using C Lab (CS20AES102)	C127.1	Build algorithm and flowchart for simple problems.
		C127.2	Use suitable control structures to solve problems
		C127.3	Use suitable iterative statements and arrays to solve the problems.
		C127.4	Implement Programs using functions and pointers.
		C127.5	Develop code for complex applications using structures, unions and file handling features
18	Engineering Chemistry Lab (CH20ABS102)	C128.1	Determine the moisture content in the coal sample
		C128.2	Prepare advanced polymer materials
		C128.3	Determine the physical properties like adsorption and viscosity
		C128.4	Estimate Iron in cement
		C128.5	Calculate the hardness of water and dissolved oxygen
19	Strength of Materials Lab (CE20AES202)	C129.1	Able to analyse the behaviour of mild steel for various tension, direct shear, torsion test.
		C129.2	Evaluating the deflection limits of beams by the concept of modulus of elasticity.
		C129.3	Determination of compressive strength of wood.
		C129.4	Evaluation of material hardness by hardness test.
		C129.5	Understanding the Impact test on metals
20	Environmental Science (CH20AMC201)	C12A.1	Understanding multidisciplinary nature of environmental studies and various renewable and nonrenewable resources.
		C12A.2	Understand flow and bio-geo- chemical cycles and ecological pyramids
		C12A.3	Understand various causes of pollution and solid waste management and related preventive measures
		C12A.4	Apply the rainwater harvesting, watershed management, and ozone layer depletion and waste land reclamation.
		C12A.5	Apply the concepts of population explosion, value education and welfare programmes in society
21	Speech & Oral Communication (EG20AMC101)	C12B.1	Improve the neutral accent and be free from mother tongue influence.
		C12B.2	Hypothesizing small talks on general topics and learn critiquing skills by participating in Conversations.
		C12B.3	Applying Vocabulary and using it in their day-to-day life.
		C12B.4	Understanding and mastering in verbal and non-verbal communication.
22	Complex Variables, Transforms & Applications to Partial Differential Equations (MA20ABS301)	C211.1	Apply Cauchy-Riemann equations to find the analyticity of complex functions.
		C211.2	Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
		C211.3	Analyze the concepts of Laplace Transforms to solve ordinary differential equations.
		C211.4	Examine the Fourier series for different functions in half and full range.
		C211.5	Solve one-dimensional wave equation heat equation and Laplace equations by applying Fourier series.
23	Structural Analysis-I (CE20APC301)	C212.1	Concept of Energy theorems & deflections for analysing of structures.
		C212.2	Application of Castiglianos theorem for analysis of forces in intermediate trusses.
		C212.3	Develop the deflection, Bending moment and shear diagrams for beams under various loading conditions.
		C212.4	Analysis of continuous beams & portal frames by slope deflection method.
		C212.5	Analysis of continuous beams & portal frames by moment distribution method.
24	Building Materials and Concrete Technology (CE20APC302)	C213.1	Able to understand the characteristics of various building materials such as stone and clay product.
		C213.2	Able to evaluate the properties of the binding materials for their suitability in building construction.
		C213.3	Able to classify ferrous and non-ferrous materials in building construction.
		C213.4	Able to understand the construction procedure of various building components such as stair cases, masonry and flooring.
		C213.5	Able to understand the installation of electrical, sanitary and plumbing fittings in buildings.
25	Fluid Mechanics and Hydraulic Machines (CE20APC303)	C214.1	Familiarize basic terms used in fluid mechanics
		C214.2	Understand the principles of fluid statics, kinematics and dynamics
		C214.3	Understand flow characteristics and classify the flows and estimate various losses in flow through channels
		C214.4	Analyze characteristics for uniform and non-uniform flows in open channels.
		C214.5	Design different types of turbines, centrifugal and multistage pumps.
26	Surveying (CE20APC304)	C215.1	Calculate angles, distances and levels
		C215.2	Identify data collection methods and prepare field notes
		C215.3	Understand the working principles of survey instruments
		C215.4	Estimate the volumes of earth work
		C215.5	Able to use modern survey instruments.
27	Basic Civil Engineering Laboratory (CE20APC305)	C216.1	To find the characteristics of fine and coarse aggregates
		C216.2	To evaluate the properties of the binding materials for their suitability in building construction.
		C216.3	To understand the workability behavior of concrete through various tests
		C216.4	To know construction procedure and their problems
		C216.5	To know the binding nature of construction materials
		C217.1	Able to evaluate the survey work by using chain and compass.

		C217.2	Able to solve the area and inaccessible distance by plane table surveying.
28	Surveying Lab (CE20APC306)	C217.3	Able to use the knowledge of basic survey instruments for computation of area of a land into field execution.
		C217.4	Able to use the technics of L.S and C.S to analyze difference in levelling.
		C217.5	Able to use the concept of contour by conducting levelling to develop a contour map.
29	Fluid Mechanics and Hydraulic Machines Lab (CE20APC307)	C218.1	Able to calibrate venturimeter and orifice meter.
		C218.2	Able to determine the coefficient of discharge for a small orifice by constant head method and variable head method.
		C218.3	Able to determine the coefficient of discharge for an external mouth piece by constant head method and variable head method.
		C218.4	Able to calibrate rectangular and triangular notches.
		C218.5	Able to determine friction factor and loss of head in sudden contraction and expansion.
30	Real-time application of Data Structures (CS20ASC301)	C219.1	Analyze the problems using asymptotic notations.
		C219.2	Apply Stack, Queues and linked list to solve different applications.
		C219.3	Demonstrate suitable sorting techniques for the real-world problem.
		C219.4	Implement tree structures in different patterns of representation of data.
		C219.5	Analyze the given problem using graph traversal techniques
31	Biology for Engineers (CH20AMC301)	C21A.1	Able to understand about cells and their structure and function along with different types of cells and basics for classification of living Organisms.
		C21A.2	Able to explain about biomolecules, their structure and function and their role in the living organisms along with how biomolecules are useful in Industry.
		C21A.3	Able to analyse about human physiology.
		C21A.4	Able to understand about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
		C21A.5	Able to know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals.
32	Logical Skills for Professionals-II (MA20AMC301)	C21B.1	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of HCF, LCM Factors and Simplification.
		C21B.2	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Pipes, Alligation or Mixture.
		C21B.3	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Table, Bar Graphs and Pie Chart.
		C21B.4	Analyze the techniques in Syllogism.
		C21B.5	Analyze the techniques in Calendar, Clocks and Number Series Analogy concepts.
33	Enhancing English Language Skills (EG20AMC301)	C21C.1	Use English language, both written and spoken, competently and correctly.
		C21C.2	Improve comprehension and fluency of speech.
		C21C.3	Hone the communication skills to meet the challenges of their careers successfully.
		C21C.4	Gain confidence in using English in verbal situations.
		C21C.5	Strengthen communication skills in different contexts like formal and informal.
34	Soil Mechanics (CE20AES401)	C221.1	Able to understand the characteristics of soils and assess relationships between different parameters. Also useful to determine soil properties, Liquid, Shrinkage and Plasticity Limits and classify soils based on different limits.
		C221.2	Able to determine the permeability of soils and stratified soils, explain factords affecting permeability and estimate the rate of seepage using flow net.
		C221.3	Able to compute stresses in soils under various loading conditions, explain compaction of soils and understand compaction control.
		C221.4	Able to understand the consolidations and settlement of soils, Differentiate compaction and consolidation & Primary and secondary consolidation.
		C221.5	Able to determine the shear strength of the soil and to understand the various shear tests based on drainage conditions.
35	Numerical Methods, Probability and Statistics (MA20ABS401)	C222.1	Apply different methods to find roots of algebraic and transcendental equations.
		C222.2	Apply different methods to find approximate solution of ordinary differential equations and Numerical Integration.
		C222.3	Analyse the concepts of probability and their applications.
		C222.4	Apply discrete and continuous probability distributions in practical problems.
		C222.5	Analyse the statistical inferential methods based on small and large sampling tests.
36	Structural Analysis-II (CE20APC401)	C223.1	Determine deflection at any point on a beam under simple and combined loads
		C223.2	Apply energy theorems for analysis of indeterminate structures
		C223.3	Analyze beams and portal frames using slope deflection
		C223.4	Analyze beams and portal frames using moment distribution methods
		C223.5	Analyze beams and portal frames using Kani's method.
37	Environmental Engineering (CE20APC402)	C224.1	Able to understand about quality of water and purification process
		C224.2	Able to classify and select appropriate technique for treatment of waste water.
		C224.3	Able to assess the impact of air pollution.
		C224.4	Able to understand consequences of solid waste and its management.
		C224.5	Able to design domestic plumbing systems.
38	Managerial Economics & Financial Analysis (BA20AHS301)	C225.1	Should be able to understand managerial economics and demand analysis.
		C225.2	Should be able to analyze decisions relating to production and cost analysis.
		C225.3	Should be able to evaluate market structures and forms of business.
		C225.4	Should be able to assess financial statements and ratios.
		C225.5	Should be able to apply capital budgeting methods.
39	Soil Mechanics Lab (CE20AES402)	C226.1	Able to identify various soils based on their characteristics.
		C226.2	Able to evaluate permeability and seepage of soils.
		C226.3	Able to determine plasticity characteristics of various soils.
		C226.4	Able to perform consolidation process by predicting settlement of soils.
		C226.5	Able to perform various shear tests to the soil.
40	Geology Lab (CE20APC403	C227.1	Able to gain basic knowledge on characteristics of rocks and minerals.
		C227.2	Able to identify and differentiate rocks using geological classification.
		C227.3	Able to carry out geo physical investigations for infrastructural projects.
		C227.4	Able to apply concepts of structural geology for civil engineering structures.
		C227.5	Able to understand the seismic zones of India.
		C228.1	Able to find the characteristics of fine and coarse aggregates.

41	Material Testing Lab (CE20APC404)	C228.2	Able to evaluate the properties of the aggregates for their suitability in building construction.
		C228.3	Able to evaluate the properties of the binding materials for their suitability in building construction.
		C228.4	Able to understand the workability behaviour of concrete through various tests
		C228.5	Able to evaluate the strength of hardened concrete through destructive and non-destructive tests
42	Soft Skills (EG20ASC301)	C229.1	Memorize various elements of effective communicative skills
		C229.2	Interpret people at the emotional level through emotional intelligence
		C229.3	Apply critical thinking skills in problem solving
		C229.4	Analyze the needs of an organization for team building
		C229.5	Judge the situation and take necessary decisions as a leader
43	Universal Human Values (BA20AHS201)	C22A.1	Develop the use of matrix algebra techniques that is needed by engineers for practicalapplications
		C22A.2	Utilize mean value theorems to real life problems
		C22A.3	Solve the differential equations related to various engineering fields
		C22A.4	Apply multiple integrals to find the area and volumes for different functions.
		C22A.5	Estimate the work done against a field, circulation and flux using vector calculus
44	Design of Reinforced Concrete Structures (CE20APC501)	C311.1	Able to understand the basic concepts of working stress and limit state design methods.
		C311.2	Able to understand behavior of beams under shear, torsion and also visualize importance of bond and anchorage.
		C311.3	Able to understand behavior of columns with different slenderness characteristics, Contrast behavior of columns axial. And under uniaxial biaxial eccentricities and designs of RC columns.
		C311.4	Able to classify footings based on shape and utility, examine the field conditions and suggest appropriate footings and design reinforced concrete footings.
		C311.5	Able to classify understand performance of slabs based on dimensions and design reinforced concrete slabs & Stair cases as per IS codal provisions.
45	Highway Engineering (CE20APC502)	C312.1	Understanding the importance of planing and survey in highway development
		C312.2	Able to design the cross section elements,sight distance,horizontal and vertical alingments
		C312.3	Understanding the concept of traffic studies,traffic regulations and control and intersection to design a traffic system.
		C312.4	Able to design different types of intersections
		C312.5	Able to design the flexible and rigid pavements by using IRC code provisions
46	Foundation Engineering (CE20APC503)	C313.1	Understand the concept of soil exploration techniques for reconnaisance.
		C313.2	Analysing of stability of earth slopes.
		C313.3	Evaluating the earth pressures of cohessive and cohession less soils by various methods
		C313.4	Able to analysis the settlement of pile foundations and cassions
		C313.5	Analysing the suitability of foundations based on soil condition
48	Structured Query Language (CS20AOE503)	C314.1	Able to Know usage of mysql workbench
		C314.2	Able to explain Databases and its usage
		C314.3	Able to use select statement to retrieve data
		C314.4	Able to construct key relationships on a table.
		C314.5	Able to explain how to join more than one table
48	Cost Effective Housing Techniques (CE20APE502)	C315.1	Understand the planning, design, evaluation, construction and financing of housing projects with cost effective housing techniques.
		C315.2	Have knowledge on living condition of slum, slum housing policies, and slum improvement.
		C315.3	Know the usage of various low cost housing techniques.
		C315.4	Understand about alternative building materials for low cost housing and Rural housing.
		C315.5	Adopt the suitable techniques in rural and disaster prone areas by using locally available materials
49	Environmental Engineering Lab (CE20APC504)	C316.1	Perform common environmental experiments relating to water and wastewater quality, and know which tests are appropriate for given environmental problems.
		C316.2	Statistically analyze and interpret laboratorial results
		C316.3	Apply the laboratorial results to problem identification, quantification, and basic environmental design and technical solutions
		C316.4	Understand and use the water and wastewater sampling procedures and sample preservations.
		C316.5	Understand the impact of water and wastewater treatment on people and the environment
50	Advanced Soil Mechanics Lab (CE20APC505)	C317.1	Identify various engineering properties of soils.
		C317.2	Determine compaction characteristics of various soils.
		C317.3	Evaluate Shear strength and load carrying capacity of soils.
		C317.4	Determine swelling characteristics of soils
		C317.5	Design consolidation process by predicting settlement of soils.
51	Elements of Building, Planning and Drawing (CE20ASC501)	C318.1	To impart the practical knowledge in detailing and drawing of various components of building and Different types of Buildings.
		C318.2	Interpret the symbols, signs and conventions from the given drawing.
		C318.3	The student should be able to distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.
		C318.4	The student is expected to learn the skills of drawing building elements and plan various types of buildings as per requirements.
		C318.5	Student should be able to plan various buildings as per the building by-laws.
52	Constitution of India (BA20AMC501)	C319.1	Understand historical background of the constitution making and its importance for Building a democratic India.
		C319.2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
		C319.3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
		C319.4	Analyze the decentralization of power between central, state and local self-government
		C319.5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy
53	Problem Solving and Programming (IT20AMC501)	C31A.1	Solve computational problems.
		C31A.2	Select the features of C language appropriate for solving a problem
		C31A.3	Design computer programs for real world problems
		C31A.4	Organize the data which is more appropriated for solving a problem
		C321.1	Able to understand bolted and welded connections, estimate strength of welds and design Welded and Bolted connections as per IS Codal provisions.
		C321.2	Able to understand behavior of tension members and compression members.

54	Design of Steel Structures (CE20APC601)	C321.3	Able to understand behavior of simple and compound beams, visualize importance of curtailment of flange plates and design of detail of steel beams under different conditions adopting IS Code.
		C321.4	Able to understand behavior of builtup columns, Column bases and design of built-up columns and column bases adopting IS Code.
		C321.5	Able to identify different components of plate girder, design of components of plate girder confirming to IS Code and to Understand the functioning of gantry girder for different types of loads.
55	Water Resources Engineering (CE20APC602)	C322.1	Able to understand of the theories and principles governing the hydrologic processes.
		C322.2	Able to identify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects.
		C322.3	Able to develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures.
		C322.4	Able to determine aquifer parameters, yield of wells and model hydrologic processes.
		C322.5	Able to understand duty, delta,soil-water-plant relationships and design Hydraulic Structures.
56	Estimation Costing and Valuation (CE20APC603)	C323.1	Able to understand basics on methods and types of estimation.
		C323.2	Able to formulate specifications and tender documents.
		C323.3	Able to prepare contract agreements
		C323.4	Able to determine rate analysis of different items.
		C323.5	Able to perform valuations of buildings.
57	Railways, Airport and Harbor Engineering (CE20APE601)	C324.1	Understanding the concept of permanent way in railway studies
		C324.2	Able to design the geometric elements of railway track by various methods
		C324.3	Able to relate the Aircraft characteristics and their influence on various design elements
		C324.4	Able to analyse the design elements of runways and taxiways
		C324.5	Able to understand the concept of Harbours and Docks in field applications
58	Web Technologies (AM20AOE502)	C325.1	Analyze a web page and identify its elements and attributes.
		C325.2	Create web pages using XHTML and Cascading Styles sheets.
		C325.3	Installation and usage of Server software's.
		C325.4	Database Connectivity to web applications
		C325.5	Build web applications using Servlet and JSP
59	Advanced Surveying Lab (CE20APC604)	C326.1	Able to use the concept of theodolites, trigonometric, curve setting, setting out works, contours, total station in civil engineering field
		C326.2	Able to solve horizontal & vertical angles by method of repetition and reiteration.
		C326.3	Able to solve heights and distances by trigonometric levelling and tacheometric survey
		C326.4	Able to use Total station for remote heights and angle measurement in advanced survey techniques
		C326.5	Able to apply total station for obtaining gradient, difference in height between two inaccessible points
60	Transportation Engineering Lab (CE20APC605)	C327.1	Analyzing the engineering properties of aggregates
		C327.2	Able to analyse the grades and properties of bitumen
		C327.3	Able to develop a report on traffic volume studies at mid block and intersections
		C327.4	Able to design the traffic siganls
		C327.5	Analyzing the limits for aggregate and bitumen
61	Building Drawing Using Auto CAD (CE20APC606)	C328.1	Develop drawing skills for effective demonstration of building details.
		C328.2	Draw building plans using Computer Aided Design and Drafting software's.
		C328.3	Develop engineering project drawings incorporating details and design parameters in 2D & 3D.
		C328.4	Examine efficiency of CAD design
		C328.5	Develop drawing skills for effective demonstration of building details
	Application Development Using Python (IT20ASC301)	C329.1	Write, Test and Debug Python Programs
		C329.2	Use Conditionals and Loops for Python Programs
		C329.3	Construct custom modules and functions to handle different operations
		C329.4	Implement Object oriented concepts through real time scenarios and handle errors
		C329.5	Design different shapes and objects using turtle graphics
	Intellectual Property Rights and Patents (BA20AMC502)	C32A.1	Understand IPR law & Cyber law
		C32A.2	Discuss registration process, maintenance and litigations associated with trademarks
		C32A.3	Illustrate the copy right law
		C32A.4	Enumerate the trade secret
	AI Tools Techniques and Applications	C32B.1	Demonstrate various AI applications, languages and Intelligent Agents.
		C32B.2	Solve problems using search strategies and understand the basic process of Machine Learning.
		C32B.3	Apply classification and regression algorithms on real world data.
		C32B.4	Develop an expert system.
		C32B.5	Comprehend the structure of an artificial neural network and identify the building blocks of a convolutional neural network
62	Air Pollution and Control (CE20APE703)	C411.1	Identify the major sources of air pollution and understand their effects on health and environment.
		C411.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
		C411.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
		C411.4	Choose and design control techniques for particulate and gaseous emissions.
		C411.5	Understand the air pollution due to automobiles and control methods
63	Disaster Management & Mitigation (CE20APE706)	C412.1	Able to use the concept of environmental hazards and disasters tocreate awareness.
		C412.2	Able to develop awareness programs to educate people on environmental hazards and disasters.
		C412.3	Able to defend most endogenous hazard and develops human adjustment techniques.
		C412.4	Able to defend most exogenous hazard and develops human adjustment techniques.
		C412.5	Able to develop plan to execute during disaster preparedness and management.
64	Ground Improvement Techniques (CE20APE710)	C413.1	Able to understand methods of in-situ densification and study different types of drains for soil densification.
		C413.2	Able to understand methods of dewatering and study different types of dewatering and working criteria.
		C413.3	Able to study different methods of stabilization of soils and utilization of industrial wastes to stabilize soils.
		C413.4	Able to understand principles of reinforced earth in ground improvement and study procedures for verification of stability of slopes.
		C413.5	Able to utilization of geo-synthetics and geo-textiles, Compare different types of synthetic based soil stabilization material and understand methods and efficiency of grouting.
		C414.1	Explain the practical applications of composites.

65	Composite Materials & its Applications (ME20AOE701)	C414.2	Identify the various types of.Polymer Matrix Composites.
		C414.3	Understand the Processing & Applications of MMCs.
		C414.4	Classify the various types of Ceramic Matrix Materials.
		C414.5	Explain the applications of carbon fiber composites & bio composites
66	Utilization of Energy & Electrical Utilities (EE20AOE705)	C415.1	Develop a lighting scheme for a given practical case.
		C415.2	Analyse the performance of Heating and Welding methods
		C415.3	Make all numerical calculations associated with electric traction.
		C415.4	Evaluate the Mechanics of Train and its parameters
		C415.5	Analyse the economic aspects in utilisation of electrical energy
67	Management Science (BA20AHS705)	C416.1	Understand the concepts & principles of management and designs of organization in a practical world
		C416.2	Apply the knowledge of Work-study principles & Quality Control techniques in industry
		C416.3	Analyze the concepts of HR Min Recruitment, Selection and Training & Development.
		C416.4	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT.
		C416.5	Create Modern technology in management science
68	Computer Aided Design of Structures (CE20ASC701)	C417.1	Able to analyse and design steel tabular truss using CAD software
		C417.2	Able to analyse and design retaining walls using CAD software
		C417.3	Able to analyse and design simple towers using CAD software
		C417.4	Able to analyse and design one-way & two way slabs using CAD software
		C417.5	Able to analyse and design the column using CAD software
69	Project Work Stage– II (CE20APW801)	C423.1	Able to apply the fundamental engineering knowledge for development of components, products, processes or technologies in the engineering field.
		C423.2	Able to apply knowledge gained in solving real time engineering problems.
		C423.3	Able to design and develop solutions for the given problems.
		C423.4	Able to investigate the problems using advanced technologies and use modern tools for solving different real world problems.
		C423.5	Able to document the work and can lead the team in multidisciplinary fields.

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POs	Programme Outcome
PO1	Engineering Knowledge: An ability to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems as appropriate to the field of electronics & communication engineering practice.
PO2	Problem analysis: Ability to Identify, formulates, review research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: ability to Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Apply research-based knowledge and research methods including design of experiments, analysis and interpretation of data pertaining to Electronics & Communication Engineering problems and arrive valid conclusions.
PO5	Modern tool usage: An ability to use the techniques, resources and modern engineering tools necessary for modeling the complex system design in Electronics and Communication Engineering
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: An Ability to Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively in both verbal and written forms such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member or a leader in a team, to manage projects in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	An ability to get an employment in Electronics and Communication Engineering field and related industries and to participate & succeed in competitive examinations like GRE, GATE,TOEFL, PSUs, etc.
PS02	Should be able to design and test various electronic systems that perform analog and digital processing functions.

HOD-ECE

HEAD OF THE DEPARTMENT
ELECTRONICS & COMMUNICATION ENGINEERING
SV COLLEGE OF ENGINEERING
KARAKAMBADI ROAD,TIRUPATI-517 507

S. No	COURSE NAME	COs	COURSE OUTCOMES
1	LINEAR ALGEBRA & CALCULUS (MA20ABS101)	C111.1	Solve the system of linear equations and reduce the quadratic forms to canonical form by applying matrices.
		C111.2	Apply mean value theorems to solve real valued functions
		C111.3	Familiarize with functions of several variables which is useful in optimization
		C111.4	Apply multiple integrals to find the area and volumes for different functions
		C111.5	Analyze the concepts of Beta and Gamma special function for different functions
2	APPLIED PHYSICS (PH20ABS103)	C112.1	Analyze the intensity variation of light due to Interference, diffraction and polarization.
		C112.2	Distinguish the types of lasers and apply its principles in modern technology.
		C112.3	Analyze the concept of dielectric and magnetic materials for potential applications in the emerging micro devices.
		C112.4	Apply the fundamentals of quantum mechanics and their applications to study the behaviour free electrons in solids.
		C112.5	Apply the basic concepts of semiconductor and superconductivity in Engineering applications.
3	COMMUNICATIVE ENGLISH (EG20AHS101)	C113.1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English. (L2)
		C113.2	Apply grammatical structures to formulate sentences and correct word forms. (L3)
		C113.3	Analyze discourse markers to speak clearly on a specific topic in informal discussions. (L4)
		C113.4	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts. (L5)
		C113.5	Create a coherent paragraph interpreting a figure/graph/chart/table. (L6)
4	FUNDAMENTALS OF ELECTRICAL CIRCUITS (EE20AES103)	C114.1	Given a network, able to find equivalent impedance by using network reduction techniques and determine the current through any element and voltage across and power through any
		C114.2	Given a circuit and the excitation, determine the real power, reactive power, power factor etc, (L5)
		C114.3	Apply the network theorems suitably to analyze complex circuits and determine the effective voltages and currents in the circuit. (L6)
		C114.4	Determine the Dual of the Network, develop the Cut Set and Tie-set Matrices for a given Circuit. (L5)
		C114.5	Analyze the three-phase balanced and unbalanced circuits and to measure active and reactive powers in three phase circuits. (L5)
5	ENGINEERING DRAWING (ME20AES102)	C115.1	Draw basic geometrical constructions, curves used in engineering practices. (L1)
		C115.2	Understand the concept of projection and acquire visualization skills, projection of points, Lines and Planes. (L2)
		C115.3	Illustrate the projections of solids graphically. (L3)
		C115.4	Draw and explore the sectional views of right regular solids.(L3)
		C115.5	Draw the development of surfaces of solids. (L3)
6	ENGINEERING GRAPHICS LAB (ME20AES103)	C116.1	Draw the basic views related to projections of Lines, Planes. (L1)
		C116.2	Draw the basic views related to projections of Planes. (L1)
		C116.3	Illustrate orthographic views of simple objects. (L3)
		C116.4	Illustrate isometric projections of simple solids. (L3)
		C116.5	Interpret and comprehend with drafting packages for engineering practice. (L2)
		C117.1	Apply skill to find the wavelength of spectral lines using plane diffraction grating

S. No	COURSE NAME	COs	COURSE OUTCOMES
7	APPLIED PHYSICS LAB (PH20ABS104)	C117.2	Analyze the usage of dielectric materials applications.
		C117.3	Apply the concept of hysteresis curve of a ferromagnetic material to know the strength of magnetic material.
		C117.4	Analyze the working principles of semiconducting devices to study the applications of semiconducting technology.
		C117.5	Differentiate the patterns of spectrums using interference and diffraction phenomena.
8	COMMUNICATIVE ENGLISH LAB (EG20AHS101)	C118.1	Develop to handle and excel in a variety of self-instructional, learner-friendly modes of language learning. (L6)
		C118.2	Develop to employ better stress and intonation patterns and utter English sounds correctly. (L6)
		C118.3	Develop to avoid the impact of mother tongue in English and neutralize their accent. (L6)
		C118.4	Develop to participate with skill and confidence in Group Discussions, Interviews and Public Speaking. (L6)
		C118.5	Utilize the technical skills to prepare resume, report-writing, and formatmaking etc. (L3)
9	FUNDAMENTALS OF ELECTRICAL CIRCUITS LAB (EE20AES104)	C119.1	Distinguish analogy between electric and magnetic circuits and apply the principles to determine circuit parameters. (L5)
		C119.2	Remember, understand and apply various theorems and verify practically. (L5)
		C119.3	Understand and analyze active, reactive power measurements in three phase balanced & unbalanced circuit (L5)
10	LOGICAL SKILLS FOR PROFESSIONALS (MA20AMC102)	C11A.1	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Averages - Percentages - Ratio. (L2)
		C11A.2	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Partnership - Simple Interest and Compound Interest and time and distance. (L2)
		C11A.3	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of time ad work, problems on trains and Boats and streams. (L2)
		C11A.4	Analyze the techniques in series, coding and decoding and blood relations. (L3)
		C11A.5	Analyze the techniques in directions, problems on ages and analogy. (L3)
11	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (MA20ABS201)	C121.1	Solve the differential equations related to various engineering fields
		C121.2	Solve the linear differential equations of higher order related to various engineering fields
		C121.3	Identify solution methods for partial differential equations that model physical processes
		C121.4	Interpret the physical meaning of different operators such as gradient, curl and divergence
		C121.5	Estimate the work done against a field, circulation and flux using vector calculus
12	CHEMISTRY (CH20ABS103)	C122.1	Categorize the different problems present in the water and usage of technology to improve the quality of water.
		C122.2	Compare octahedral and tetrahedral complexes in crystal field theory and develop knowledge on super capacitors ,semi conductors, nanomaterials.
		C122.3	Apply the basic concepts of electro analytical techniques that facilitate rapid and reliable measurements
		C122.4	Distinguish polymerization reactions with mechanisms and their applications.
		C122.5	Use the principle of instrumentation to analyze the chemical and biological components.
13	PROBLEM SOLVING USING C (CS20AES101)	C123.1	Solve computational problems (L3).
		C123.2	Select the features of C language appropriate for solving a problem (L4)
		C123.3	Design computer programs for real world problems (L6)
		C123.4	Organize the data which is more appropriated for solving a problem (L6).
	ELECTRONIC	C124.1	Understand principle of operation, characteristics and applications of Semi conductor diodes, Bipolar Junction Transistor and MOSFETs.
		C124.2	Apply the basic principles for solving the problems related to Semiconductor diodes, BJTs, and MOSFETs.

S. No	COURSE NAME	COs	COURSE OUTCOMES
14	DEVICES AND CIRCUITS (EC20AES201)	C124.3	Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze biasing circuits of BJTs, and MOSFETs.
		C124.4	Design diode circuits and amplifiers using BJTs, and MOSFETs.
		C124.5	Compare the performance of various semiconductor devices.
15	ENGINEERING WORKSHOP (ME20AES101)	C125.1	Identify tools, work material, measuring instruments useful for domestic applications (L3).
		C125.2	Apply wood working skills in real world applications. (L3)
		C125.3	Build different parts with metal sheets in real world applications. (L3)
		C125.4	Apply fitting operations in various applications for good strength. (L3)
		C125.5	Analyze different types of basic electric circuit connections. (L4)
		C125.5	Demonstrate soldering and brazing in joining circuits. (L2)
		C125.6	Make moulds for sand casting using standard equipment. (L3)
		C125.7	Develop different weld joints for various metals. (L3)
		C125.8	Inspect various parts of machine components. (L4)
		C125.9	Make plastic components using proper raw material. (L3)
16	IT Workshop (CS20AES103)	C126.1	Identify the Internal parts of computers and Generation of Computers. (L1)
		C126.2	Assemble and disassemble a computer from its parts and prepare the computer ready to use.(L3)
		C126.3	Installation process of different types Operating system for a computer by their own.(L3)
		C126.4	Interconnect two or more computers for information sharing.(L4)
		C126.5	Access the Internet and browse it for required information.(L1)
		C126.6	Prepare the documents using Word Processor, prepare spread sheets for calculations using Excel, and documents for LaTeX.(L3)
		C126.7	Prepare slide presentation using the presentation tool.(L4)
17	PROBLEM SOLVING USING C LAB (CS20AES102)	C127.1	Build algorithm and flowchart for simple problems.
		C127.2	Use suitable control structures to solve problems.
		C127.3	Use suitable iterative statements, arrays and modular programming to solve the problems.
		C127.4	Implement Programs using pointers and String handling Functions.
		C127.5	Develop code for complex applications using structures, unions and file handling features.
18	CHEMISTRY LAB (CH20ABS104)	C128.1	Demonstrate electro-analytical techniques for the chemical analysis.
		C128.2	Apply Beer-Lambert Law to know the concentration of unknown samples
		C128.3	Analyze the quality and quantity of chemical compounds in given samples.
		C128.4	Prepare different types of polymers.
19	ELECTRONIC DEVICES & CIRCUITS LAB (EC20AES202)	C129.1	Understand the basic characteristics and applications of basic electronic devices. (L1)
		C129.2	Observe the characteristics of electronic devices by plotting graphs.(L2)
		C129.3	Analyze the Characteristics of UJT, BJT, MOSFET (L3).
		C129.4	Design MOSFET/ BJT based amplifiers for the given specifications. (L4)
		C129.5	Simulate all circuits in PSPICE/Multisim. (L5).

S. No	COURSE NAME	COs	COURSE OUTCOMES
20	ENVIRONMENTAL SCIENCE (CH20AMC201)	C12A.1	Understand the concepts of environment and natural resources.
		C12A.2	Classify the types of ecosystems and conservation methods of bio-diversity
		C12A.3	Identify the causes and problems of pollution in their real life situations
		C12A.4	Develop awareness on social issues such as global warming, acid rains, ozone layer depletion and sustainalibility.
		C12A.5	Determine the consequences of population exploitation in detail.
21	SPEECH AND ORAL COMMUNICATION (EG20AMC103)	C12B.1	Improve the neutral accent and be free from mother tongue influence. (L6)
		C12B.2	Hypothesizing small talks on general topics and learn critiquing skills by participating in Conversations. (L6)
		C12B.3	Applying Vocabulary and using it in their day-to-day life. (L4)
		C12B.4	Understanding and mastering in verbal and non-verbal communication. (L2)
22	COMPLEX VARIABLES AND TRANSFORMS (MA20ABS302)	C211.1	Apply Cauchy-Riemann equations to find the analyticity of complex functions
		C211.2	Apply CauchY integral formula and Cauchy Integral theorem to evaluate improper integrals along contours
		C211.3	Analyze the concepts of Laplace Transforms to solve ordinary differential equations
		C211.4	Examine the Fourier series for different functions in half and full range
		C211.5	Analyze the concepts of Z transforms to solve Difference equations
		C211.6	Analyze the concepts of Z transforms to solve Difference equations.(L4)
23	DIGITAL LOGIC DESIGN (EC20APC301)	C212.1	Understand the properties of Boolean algebra, other logic operations, and minimization of Boolean functions using Karnaugh map.
		C212.2	Make use of the concepts to solve the problems related to the logic circuits.
		C212.3	Analyze the combinational and sequential logic circuits.
		C212.4	Compare various Programmable logic devices.
		C212.5	Compare the concepts of RAM and ROM.
		C212.6	Understand the operation CMOS, TTL logic families, ECL logic families and interfacing between them.
24	ELECTRONIC CIRCUIT ANALYSIS & DESIGN (EC20APC302)	C213.1	Understand the working principle of multistage amplifiers, Feedback amplifiers, power amplifiers and tuned amplifiers. (L2)
		C213.2	Analyze multistage amplifiers, feedback amplifiers, power amplifiers, and tuned amplifiers. (L4)
		C213.3	Design multistage amplifiers, feedback amplifiers, oscillators, power amplifiers and tuned amplifiers for the given specification.(L6)
		C213.4	Evaluate the efficiency of large signal (power) amplifiers. (L5)
		C213.5	Compare the frequency response of Single-stage, Double-stage amplifiers with Single tuned, double tuned and Stagger tuned amplifiers. (L2)
25	SIGNALS & SYSTEMS (EC20APC303)	C214.1	Understand the mathematical description and representation of continuous- time and discrete-time signals and systems. Also understand the concepts of various transform techniques. (L2)
		C214.2	Apply sampling theorem to convert continuous-time signals to discrete-time signals and reconstruct back, different transform techniques to solve signals and system related
		C214.3	Analyze the frequency spectra of various continuous-time signals using different transform methods. (L4)
		C214.4	Analyze the systems based on their properties and determine the response of them. (L4)
		C214.5	Analyze the frequency spectra of various discrete-time signals using different transform methods. (L4)
26	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	C215.1	Should be able to understand managerial economics and demand analysis.
		C215.2	Should be able to analyze decisions relating to production and cost analysis.
		C215.3	Should be able to evaluate market structures and forms of business.

S. No	COURSE NAME	COs	COURSE OUTCOMES
	(BA20AHS301)	C215.4	Should be able to assess financial statements and ratios
		C215.5	Should be able to apply capital budgeting methods
27	BASIC SIMULATION LAB (EC20APC304)	C216.1	Learn how to use the MATLAB software and know syntax of MATLAB Programming (L1)
		C216.2	Understand how to simulate different types of signals and system response.(L2)
		C216.3	Analyze signals using Fourier, Laplace and Z-transforms. (L4)
		C216.4	Compute Fourier transform of a given signal and plot its magnitude and phase spectrum.(L2)
		C216.5	Verify Sampling theorem, Determine Convolution and Correlation between signals and sequences. (L5)
28	(EC20APC305) DIGITAL LOGIC DESIGN LAB	C217.1	Understand the pin configuration of various digital ICs used in the lab
		C217.2	Conduct the experiment and verify the properties of various logic circuits
		C217.3	Design sequential circuits
		C217.4	Design combinational circuits
29	ELECTRONIC CIRCUIT ANALYSIS & DESIGN LAB (EC20APC306)	C218.1	Understand the characteristics and frequency response of various amplifiers and determine its gain and bandwidth. (L2)
		C218.2	Simulate and analyze the performance of negative feedback amplifier circuits, oscillators and Power amplifiers and single tuned amplifiers. (L4)
		C218.3	Design a RC and LC oscillator circuits for a given frequency. (L2)
		C218.4	Calculate the efficiency of the power amplifier circuits. (L2)
		C218.5	Distinguish the operating modes of various Power amplifier circuits.(L6)
30	(IT20ASC301)APPLICATION DEVELOPMENT USING PYTHON (Skill Course)	C219.1	Write, Test and Debug Python Programs. (L1)
		C219.2	Use Conditionals and Loops for Python Programs. (L3)
		C219.3	Construct custom modules and functions to handle different operations. (L3)
		C219.4	Implement Object oriented concepts through real time scenarios and handle errors. (L3)
		C219.5	Design different shapes and objects using turtle graphics. (L4)
31	(CH20AMC301) BIOLOGY FOR ENGINEERS	C21A.1	Analyze about cells and their structure and function. Different types of cells and basics for classification of living Organisms
		C21A.2	Analyze about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry
		C21A.3	Analyze about human physiology
		C21A.4	Analyze about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms
		C21A.5	Apply biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals
32	(MA20AMC301) LOGICAL SKILLS FOR PROFESSIONALS-II	C21B.1	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of HCF, LCM Factors and Simplification
		C21B.2	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Pipes, Alligation or Mixture
		C21B.3	Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Table, Bar Graphs and Pie Chart
		C21B.4	Analyze the techniques in Syllogism
		C21B.5	Analyze the techniques in Calender, Clocks and Number Series Analogyconcepts
33	(EG20AMC301)Enhancing English Language Skills (Lateral Entry	C21C.1	Use English language, both written and spoken, competently and correctly.
		C21C.2	Improve comprehension and fluency of speech.
		C21C.3	Hone the communication skills to meet the challenges of their careers successfully

S. No	COURSE NAME	COs	COURSE OUTCOMES
	(Lateral Entry) Students only)	C21C.4	Gain confidence in using English in verbal situations
		C21C.5	Strengthen communication skills in different contexts like formal and informal
34	(CS20AES401) DATA STRUCTURE S USING C	C221.1	Analyze the problems using asymptotic notations.
		C221.2	Apply Stack, Queues and linked list to solve different applications.
		C221.3	Demonstrate suitable sorting techniques for the real world problem
		C221.4	Implement tree structures in different patterns of representation of data.
		C221.5	Analyze the given problem using graph traversal techniques
35	(MA20ABS402) PROBABILITY THEORY AND STOCHASTIC PROCESSES	C222.1	Analyze and understand the concepts of Probability.
		C222.2	Analyze the concept of Single Random Variable and evaluate the operations that may be performed on a single Random variable
		C222.3	Analyze the concepts of Multiple Random Variable and evaluate the operations that may be performed on a multiple Random variable
		C222.4	Analyze the concepts of Random Process and evaluate the Temporal characteristics of Random Processes
		C222.5	Analyze the concepts of Random Process and evaluate the Temporal characteristics of Random Processes
36	(EC20APC401) ANALOG COMMUNICATION S	C223.1	Understand the concepts of various Amplitude, Angle and Pulse Modulation schemes
		C223.2	Apply the concepts to solve problems in Analog and pulse modulation schemes
		C223.3	Analysis of Analog communication system in the presence of noise.
		C223.4	Compare and contrast design issues, advantages, disadvantages and limitations of various modulation schemes in Analog communication systems
		C223.5	Solve basic communication problems & calculate information rate and channel capacity of a discrete communication channel
37	(EC20APC402)ELEC TROMAGNETIC WAVES AND TRANSMISSION LINES	C224.1	Understanding the basic laws and applications of electromagnetic fields
		C224.2	Evaluate the problems related to electromagnetic fields
		C224.3	Analyze Maxwell equations for static and time varying fields
		C224.4	Analyze electric and magnetic fields at the interface of different media
		C224.5	Evaluate electric and magnetic fields and calculates different angles
		C224.6	Evaluate transmission lines with equivalent circuit and their characteristics with various lengths
38	(EC20APC403) LINEAR & DIGITAL INTEGRATED CIRCUITS AND APPLICATIONS	C225.1	List out the characteristics of Linear and Digital ICs.
		C225.2	Discuss the various applications of linear & Digital ICs
		C225.3	Solve the application based problems related to linear and digital ICs
		C225.4	Analyze various applications based circuits of linear and digital ICs.
		C225.5	Design the circuits using either linear ICs or Digital ICs from the given specifications.
		C225.6	Develop digital circuits using HDL.
39	(EC20APC404) ANALOG COMMUNICATION S LABORATORY	C226.1	Understand different analog modulation techniques &Radio receiver characteristics
		C226.2	Analyze different analog modulation techniques.
		C226.3	Design and implement different modulation and demodulation techniques
		C226.4	Observe the performance of system by plotting graphs & Measure radio receiver characteristics
		C226.5	Simulate all digital modulation and demodulation techniques

S. No	COURSE NAME	COs	COURSE OUTCOMES
40	(CS20AES402) DATASTRUCTURES USING C LAB	C227.1	Demonstrate the concept of Recursion for solving a problem.
		C227.2	Choose and implement linear data structure to solve problems
		C227.3	Develop programs for searching and sorting algorithms
		C227.4	Select and implement suitable non linear data structure for solving a problem
41	(EC20APC405)LINEAR & DIGITAL INTEGRATED CIRCUITS AND APPLICATIONS LAB	C228.1	Understand the pin configuration of each linear/ digital IC and its functional diagram.
		C228.2	Conduct the experiment and obtain the expected results.
		C228.3	Analyze the given circuit/designed circuit and verify the practical observations with the analyzed results.
		C228.4	Design the circuits for the given specifications using linear and digital ICs.
		C228.5	Acquaintance with lab equipment about the operation and its use.
42	(EG20ASO401) SOFT SKILLS	C229.1	Memorize various elements of effective communicative skills
		C229.2	Interpret people at the emotional level through emotional intelligence
		C229.3	Apply critical thinking skills in problem solving
		C229.4	Analyze the needs of an organization for team building
		C229.5	Judge the situation and take necessary decisions as a leader
		C229.6	Develop social and work-life skills as well as personal and emotional well being
43	(SH20AMC401) NSS/Yoga/Cultural/Games and Sports/	C22A.1	understanding of Asana with its benefits and contra-indications
		C22A.2	Understand the role and importance of Music and its cultural background
		C22A.3	Develop multicultural awareness and appreciation for Music and Drama by exposing learners to various forms of Art.
		C22A.4	Participate and contribute to society through various programmes of NSS, social services and community outreach programs
44	(BA20AMC201) UNIVERSAL HUMAN VALUES	C22B.1	Understanding the value of education to become more aware of themselves, and their surroundings (family, society, nature).
		C22B.2	Utilize the concepts of human being-harmony in myself become more responsible in life, and in handling problems with sustainable
		C22B.3	Understanding the concepts of society-harmony in human for better critical ability
		C22B.4	Understanding the human values, human relationship and human society to become sensitive to their commitment
		C22B.5	Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction
45	(MA20AMC401)Engineering Mathematics (Lateral Entry Students only)	C22C.1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications
		C22C.2	Utilize mean value theorems to real life problems
		C22C.3	Solve the differential equations related to various engineering fields
		C22C.4	Apply multiple integrals to find the area and volumes for different functions
		C22C.5	Estimate the work done against a field, circulation and flux using vector calculus
46	(EC20APC501) ANTENNAS AND WAVE PROPAGATION	C311.1	Discuss various antenna parameters, principles of operation of basic antennas & Analyze field components of various dipole antennas
		C311.2	Demonstrate the basic principles of antennas which are operated in VHF- UHF frequency range.
		C311.3	Demonstrate the basic principles of antennas which are operated in Microwave frequency & discuss various feeding mechanism.
		C311.4	Analyze radiation pattern of various antenna arrays & Evaluate the antenna parameters.
		C311.5	Discuss various EM wave propagation methods & Analyze mathematical aspects of wave propagation.

S. No	COURSE NAME	COs	COURSE OUTCOMES
47	(EC20APC502) DIGITAL COMMUNICATIONS	C312.1	Understand the elements of digital communication system, baseband pulse transmission, pass band digital modulation
		C312.2	Understand the concepts of geometric representation of signals, basics of information theory and error correcting codes
		C312.3	Apply the knowledge of signals and system & statistical theory to evaluate the performance of digital communication systems
		C312.4	Analyze the different coding, modulation techniques, Probability of error performance of digital system.
		C312.5	Compare the performance of different modulation schemes& error correcting codes.
48	(EC20APC503) MICROPROCESSORS AND MICROCONTROLLERS	C313.1	Demonstrate ability to understand the architecture of 8086 microprocessor.
		C313.2	Demonstrate ability to develop 8086 assemble language programming using assembly language programming in MASM/TASM.
		C313.3	Demonstrate ability to describe interfacing of peripheral devices with 8086
		C313.4	Demonstrate ability to understand the architecture and addressing modes of 8051 microcontroller
		C313.5	Demonstrate ability to understand the hardware features of 8051 and interfacing with pushbutton switches, LED, LCD, Stepper motor, Seven Segment Display., etc.
49	(CS20AOE502) COMPUTER ARCHITECTURE & ORGANIZATION	C314.1	Understand the basics of instructions sets and their impact on processor design.
		C314.2	Demonstrate an understanding of the design of the functional units of a digital computer system.
		C314.3	Evaluate cost performance and design trade-offs in designing and Constructing a computer processor including memory.
		C314.4	Design a pipeline for consistent execution of instructions with minimum hazards
		C314.5	Recognize and manipulate representations of numbers stored in digital computers.
50	(EE20APE502) CONTROL SYSTEM ENGINEERING	C315.1	Understand the concepts of control systems classification, feedback effect, mathematical modelling, and and state space analysis. Apply the concepts of Block diagram reduction,
		C315.2	Analyse time response analysis, error constants, and stability characteristics of a given mathematical model using different methods.
		C315.3	Apply the concepts of RH and Root locus for stability calculations
		C315.4	Analyze system behavior of the system in frequency domain. frequency response characteristics, Design and develop different compensators. Bode, Nyquist, Polar plots for
		C315.5	Analyze system behavior based on the state space analysis of that system. controllability and observability
51	(EC20APC504)DIGITAL COMMUNICATIONS LAB	C316.1	Understand real time behavior of different digital modulation schemes and technically visualize spectra of different digital modulation schemes.
		C316.2	Design and implement different modulation and demodulation techniques.
		C316.3	Analyze digital modulation & demodulation techniques
		C316.4	Simulate all digital modulation and demodulation techniques in MATLAB.
52	(EC20APC505)MICROPROCESSORS AND MICROCONTROLLERS LAB	C317.1	Demonstrate ability to handle arithmetic and Logical operations using assembly language programming in MASM/TASM.
		C317.2	Demonstrate ability to handle string instructions using assembly language programming in MASM/TASM.
		C317.3	Demonstrate ability to handle sorting operations and using assembly language programming in MASM/TASM
		C317.4	Demonstrate ability to handle Arithmetic and Logical operations using 8051 trainer kits.
		C317.5	Demonstrate ability to handle sorting operations using 8051 trainer kits.
		C317.6	To interface the Microprocessor/Microcontroller with various peripherals for various applications.
53	(EC20ASC501) PCB DESIGN AND PROTOTYPE DEVELOPMENT	C318.1	Learn how to design schematic and layout using PCB.
		C318.2	Design and implement experiments using PCB
		C318.3	Test and analyze the working of PCB.
		C318.4	Identify different components required in PCB Design.

S. No	COURSE NAME	COs	COURSE OUTCOMES
		C318.5	Aware of PCB Making Process.
		C318.6	Able to design different circuits using design tools.
54	(BA20AMC501) CONSTITUTION OF INDIA	C319.1	Understand historical background of the constitution making and its importance for Building a democratic India
		C319.2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary
		C319.3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
		C319.4	Analyze the decentralization of power between central, state and local self-government
		C319.5	Apply the knowledge in strengthening of the constitutional institutions like CAG,Election Commission and UPSC for sustaining democracy.
55	(IT20AMC501) PROBLEM SOLVING AND PROGRAMMING	C31A.1	Solve computational problems (L3).
		C31A.2	Select the features of C language appropriate for solving a problem (L4)
		C31A.3	Design computer programs for real world problems (L6)
		C31A.4	Organize the data which is more appropriated for solving a problem (L6).
56	(EC20ATS501)Technical Seminar Presentation-I	C31B.1	Interpret the recent technological updations.
		C31B.2	Prepare Presentation and seminar report on the specified technical topic.
		C31B.3	Develop knowledge, presentation and communication skills.
		C31B.4	Defend or convince the audience during viva process.
57	(EC20AIP501)Evaluation of Summer Internship	C31C.1	Identify and grab the internship opportunity.
		C31C.2	Develop the skills required for doing the assigned project work.
		C31C.3	Apply the skills and use the modern tools for implementing the assigned project work.
		C31C.4	Observe the work environment and learn the work culture.
		C31C.5	Develop presentation and interpersonal communication skills through presentations and documentation.
58	(EC20APC601)DIGITAL SIGNAL PROCESSING	C321.1	Design & Implementation of IIR filters using different techniques
		C321.2	Design of FIR filters based on windowing methods
		C321.3	Analyze DFT computation using fast algorithms.
		C321.4	Analyse multi-rate signal processing techniques
		C321.5	Understanding the architecture details and instruction sets of fixed and Floating point DSP's
59	(EC20APC602) MICROWAVE ENGINEERING AND OPTICAL COMMUNICATION	C322.1	Analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.
		C322.2	Understand microwave transmission lines and how to Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc
		C322.3	Differentiate Linear bean tubes and crossed field tubes in terms of operation and performance
		C322.4	Understand various types of fibers, modes, configurations and signal degradations
		C322.5	Analyze signal degradation in optical fibers and compare the performance of various optical sources and detectors.
60	(EC20APC603) VLSI DESIGN	C323.1	Outline the processing steps in the fabrication of a nMOS, pMOS and CMOS structure.
		C323.2	Illustrate the Layout procedure of simple MOS circuit using Lambda based design
		C323.3	Summarize the scaling effects of various key parameters of MOSFET devices
		C323.4	Design various MOS based logic circuits.

S. No	COURSE NAME	COs	COURSE OUTCOMES
		C323.5	Develop algorithms for automatic test generation for combinational and sequential circuits
61	(EC20APE601) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	C324.1	Describe the basic principles involved in the meters for measuring voltage, current, resistance and frequency (L2)
		C324.2	Analyze CRO for measuring signal characteristics (L4)
		C324.3	Analyze different waveforms using advanced instruments such as signal generators, logic analyzer & Spectrum analyzer (L4)
		C324.4	Apply the principles of various DC/AC bridges to solve various measurement parameters (L3)
		C324.5	Analyze various parameters using sensors and transducers (L4)
62	(EE20AOE603) OPTIMIZATION TECHNIQUES THROUGH MATLAB	C325.1	Use optimization terminology and concepts, and understand how to classify an optimization problem
		C325.2	Apply optimization methods to engineering problems.
		C325.3	Implement optimization algorithms.
		C325.4	Compare different genetic algorithms.
		C325.5	Solve multivariable optimization problems.
63	(EC20APC604)DIGITAL SIGNAL PROCESSING LAB	C326.1	Implement various DSP Algorithms using software packages.
		C326.2	Implement DSP algorithms with Digital Signal Processor.
		C326.3	Analyze and observe magnitude and phase characteristics (Frequency response Characteristics) of digital IIR-Butterworth, Chebyshev filters.
		C326.4	Analyze & observe magnitude and phase characteristics (Frequency response Characteristics) of digital FIR filters using window techniques.
		C326.5	Analyze digital filters using Software Tools.
64	(EC20APC605) MICROWAVE AND OPTICAL COMMUNICATIONS LAB	C327.1	Understand the mode characteristics of Reflex Klystron oscillator and negative resistance characteristics of Gunn Oscillator.
		C327.2	Determine the Scattering matrix of given passive device experimentally and verify the same theoretically.
		C327.3	Determine numerical aperture and bending losses of a given optical fiber.
		C327.4	Establish optical link between transmitter and receiver experimentally to find attenuation and signal strength of the received signal.
65	(EC20APC606)VLSI DESIGN LAB	C328.1	Understand how to use FPGA/CPLD hardware tools in the lab.
		C328.2	Develop HDL source code for the given problem/experiment, and simulate the given circuit with suitable simulator and verify the results.
		C328.3	Analyze the obtained results of the given experiment/problem.
		C328.4	Design and implement the experiments using FPGA/CPLD hardware tools.
66	(EC20ASC601)GRAPHICAL SYSTEM DESIGN USING Lab VIEW	C329.1	Able to develop and edit functional block diagrams and front panels.
		C329.2	Able to utilize composite data in the form of Arrays and Clusters.
		C329.3	Able to control program execution through structures such as 'For-While' loops and 'Case Structures'
		C329.4	Able to utilize features which will reconfigure the general physical and software layouts of the LabVIEW programming environment
67	(BA20AMC502) INTELLECTUAL PROPERTY RIGHTS AND PATENTS	C32A.1	Understand IPR law & Cyber law
		C32A.2	Discuss registration process, maintenance and litigations associated with trademarks
		C32A.3	Illustrate the copy right law
		C32A.4	Enumerate the trade secret
68	(EC20ATS601)Technical Seminar	C32B.1	Interpret the recent technological updations.
		C32B.2	Prepare Presentation and seminar report on the specified technical topic.

S. No	COURSE NAME	COs	COURSE OUTCOMES
	Presentation-II	C32B.3	Develop knowledge, presentation and communication skills.
		C32B.4	Defend or convince the audience during viva process.
69	(AM20AMC601) AI TOOLS TECHNIQUES & APPLICATIONS	C32C.1	Demonstrate various AI applications, languages and Intelligent Agents.
		C32C.2	Solve problems using search strategies and understand the basic process of Machine Learning. CO3: Apply classification and regression algorithms on real world data.
		C32C.3	Develop an expert system.
		C32C.4	Comprehend the structure of an artificial neural network and identify the building blocks of a convolutional neural network.
70	Microwave Engineering and Optical Communications (19A04701T)	C411.1	Apply the boundary conditions of the rectangular, circular waveguides and cavity resonators to solve for field expressions in waveguides.
		C411.2	Analyze different microwave passive devices and derive their scattering matrices.
		C411.3	Differentiate Linear beam tubes and cross field tubes in terms of operation and performance.
		C411.4	Understand various types of fibers, modes, configurations and signal degradations.
		C411.5	Understand the propagation and principle of operation of optical sources and detectors.
71	VLSI Design (19A04702T)	C412.1	Understand CMOS fabrication process, design rules and apply the concepts to draw the layout and stick diagrams of given logic circuits.
		C412.2	Analyze technology scaling, sheet resistance, capacitance and propagation delays in CMOS circuits.
		C412.3	Analyze the behaviour of MOSFET amplifier circuits with various loads.
		C412.4	Design MOSFET based logic circuits using various logic styles like static and dynamic CMOS.
		C412.5	Analyze the various design for testability methods for combinational & sequential CMOS Circuits.
72	Image Processing (19A04703d)	C413.1	Analyze various types of image fundamentals mathematically.
		C413.2	Compare image enhancement methods in spatial and frequency domains.
		C413.3	Demonstrate various segmentation algorithms for given image.
		C413.4	Justify DCT and wavelet transform techniques for image compression and standards.
		C413.5	Describe various color models for color image processing.
73	Cyber Security (19A05704b)	C414.1	Summarize the threats, vulnerabilities related to computer security
		C414.2	Determine the attacks on web data
		C414.3	Analyze the security tools and techniques for cloud computing
		C414.4	Evaluate the need for privacy and its impact on emerging technologies
		C414.5	Categorize the legal issues and ethical issues in computer society
74	Management Science (19A52701b)	C415.1	Understand the concepts & principles of management and designs of organization in a practical world
		C415.2	Apply the knowledge of Work-study principles & Quality Control techniques in industry
		C415.3	Analyze the concepts of HRM in Recruitment, Selection and Training & Development
		C415.4	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time, cost of project & to analyze the business through SWOT
		C415.5	Create Modern technology in management science.
75	Microwave and Optical	C416.1	Understand the mode characteristics of Reflex Klystron oscillator and negative resistance characteristics of Gunn Oscillator.
		C416.2	Determine the VSWR and Impedance of an unknown load connected at the end of the bench setup.
		C416.3	Determine the Scattering matrix of given passive device experimentally and verify the same theoretically. Also determine numerical aperture and bending losses of a given optical fiber.

S. No	COURSE NAME	COs	COURSE OUTCOMES
75	Communications Lab (19A04701P)	C416.4	**Analyze** the radiation characteristics to find the directivity and HPBW of a given antenna.
		C416.5	**Establish** optical link between transmitter and receiver experimentally to find attenuation and signal strength of the received signal.
		C416.6	**Understand** the DC characteristics of LED and Photo diode.
76	VLSI Design Lab (19A04702P)	C417.1	**Develop** HDL source code for the given problem/experiment.
		C417.2	**Simulate** the given circuit with suitable simulator and analyze the results.
		C417.3	**Understand** how to use FPGA hardware tool and Cadence tool.
		C417.4	**Design** the circuit and implement using Cadence tool.
		C417.5	**Analyze** the waveforms and layout diagram.
77	Industrial Training/Skill Development/Research Project (19A04705)	C418.1	**Identify** and grab the internship opportunity.
		C418.2	**Develop** the skills required for doing the assigned project work.
		C418.3	**Apply** the skills and use the modern tools for implementing the assigned project work.
		C418.4	**Observe** the work environment and learn the work culture.
		C418.5	**Develop** presentation and interpersonal communication skills through presentations and documentation.
78	Advanced 3G and 4G Wireless Mobile Communications (19A04801a)	C421.1	**Understand** the concepts of wireless communications and standards
		C421.2	**Apply** a wireless technique to solve engineering problem
		C421.3	**Analyze** working of wireless technologies
		C421.4	**Evaluate** a wireless technique in a given situation
		C421.5	**Plan** a wireless system for deployment
79	IoT Applications in Electrical Engineering (19A02802a)	C422.1	To get exposed to recent trends in few applications of IoT in Electrical Engineering
		C422.2	To understand about usage of various types of motionless sensors
		C422.3	To understand about usage of various types of motion detectors
		C422.4	To get exposed to various applications of IoT in smart grid
		C422.5	To get exposed to future working environment with Energy internet
80	Project (19A04803)	C423.1	**Identify** the socially relevant problems and define the problem statement.
		C423.2	**Analyze** and categorize executable project modules by applying acquired knowledge and skills with due consideration of constraints.
		C423.3	**Use** efficient resources/IT tools for designing project modules.
		C423.4	**Combine** all the modules through effective team work after efficient testing and simulation.
		C423.5	**Improve** the team building, communication and management skills.
		C423.6	**Elaborate** the completed task and demonstrate working of the model/module in most convincing manner.
		C423.7	**Compile** the project report with appropriate writing skills.
		C423.8	**Predict** the consequences of developed model in terms of safety, health hazards and ensure ethical values
		C423.9	**Verify** the scope of transforming model/module into marketable product through proper financial management.

DEPARTMENT OF MANAGEMENT STUDIES

MBA 2022-23

R20 Regulation

PROGRAM OUTCOMES

a. Equip with advanced business acumen that helps them to understand the key business functions and organizational resources for efficient business management.

b. Familiarize themselves with financial concepts, analysis and reporting systems.

c. Apply technology to enhance organizational efficiency and create innovative business solutions.

d. Identify customer needs and to participate in the process of developing products and services to meet their requirements.

e. Demonstrate the ability to analyze complex, unstructured qualitative and quantitative problems by collecting, analyzing data by using accounting, financial, mathematical, statistical tools, information and communication technologies to solve the complex business problems.

f. An ability to understand the impact of Managerial solutions in a global, economic, environmental, and societal context.

g. Familiarize with social responsibility issues that managers must address, including business ethics, cultural diversity, and environmental concerns.

h. An understanding of professional, ethical, legal, financial, marketing, sales, logistical security and social issues and responsibilities.

i. Acquire leadership skills, understand group and individual dynamics, and be able to work in teams.

j. An ability to communicate effectively, both in writing and orally.

k. Apply conceptual business foundations to solve practical decision-making problems, both individually and as part of teams using techniques such as case analysis, projects and assignments.

l. Exhibit business-related behavioral skills including leadership, interpersonal, communication (written and oral), team, and lifelong learning skills

Semester III

Course Objectives

Innovation and Entrepreneurship Development

CO1: To know the significance of innovation and entrepreneurship.
CO2: To get clarity about institutions supporting business businesses.
CO3: To know the various aspects and phases of a project proposal.
CO4: To introduce the business model and business plan.
CO5: To learn about the challenges faced by women entrepreneurs.

Green Business Management

CO1: To know the significance of Green Business and its relevancy to 21st Century.
CO2: To understand Corporate structure and Corporate Environmental Responsibility.
CO3: To provide knowledge on Sustainable Development and Diversity
CO4: To introduce the Environmental Reports 1440.
CO5: To learn about Eco- friendly Designs and E- Commerce models.

Cost and Management Accountancy

CO1: To acquire knowledge and understanding of the concepts, techniques and practices of cost and management accounting
CO2: To develop Cost analytical skills for decision-making in Materials Control.
CO3: To know how to control Labour costs by Time-Keeping and Time Booking, efficiency Rating Procedures; Remuneration Systems and Incentive Schemes.
CO4: To Study the difference between management accounting and cost accounting and financial accounting.
CO5: To Analysis and Interpretation of Financial Statements and To practice the recent Trends in Presenting Financial Statements.

Product and Brand Management

CO1: To understand the classification of Products, Product Mix and Product Line.

CO2: To get insight about the new Product Development and Product Positioning Strategies.

CO3: To focus on the Brand loyalty, Brand Valuation and Brand Positioning.

CO4: To gain the knowledge of the brand equity and Brand extension.

CO5: To learn the Brands in banking sector, insurance sector and service sector.

Human Resource Development

CO1: To understand the significance of Human Resource Development.

CO2: To learn about the need of the Training and Development Programs.

CO3: To gain the knowledge of the implementation and evaluation of the HRD Programs.

CO4: To get knowledge on focusing on Career Development.

CO5: To get insight about diversity of culture and demographic changes.

Mobile Commerce

CO1: To provide knowledge on trends in Mobile Commerce with different electronic devices.

CO2: To learn about data base transactions access comprehensively.

CO3: To manage interactions between mobile application users and business men.

CO4: To get knowledge on Mobile Ticketing, computing and payment.

CO5: To understand the mobile commerce portals and their services.

FINANCIAL INSTITUTIONSAND SERVICES

CO1: To understand the role and functions of RBI

CO2: To enrich the knowledge of structure and performance of banking and non-banking institutions.

CO3: To equip the information of instruments in primary and secondary market.

CO4: To know about venture capital financing.

CO5: Become aware of challenges faced by the investment bankers.

CONSUMER BEHAVIOUR

CO1: understand consumers, market segments, strategies and psychological dimensions

CO2:To know economic demographic, cross culture, socio culture, reference group, family influence of consumer behaviour

CO3: Enumerate designing persuasive communication, diffusion of innovation and its models.

CO4: Familiarise the student with high and low involvement, brand loyalty and repeat purchase behavior of consumer

CO5: Become aware of consumer protection act 1986, consumer disputes redressal agencies and commissi

LABOR LAWS AND LEGISLATIONS

CO1. Develop a comprehensive understanding of the evolution of labor laws in India, exploring their significance, relevance to HRM, and implications within the legal framework.

CO2. Acquire an in-depth understanding of key legislations governing employment and working conditions in India.

CO3. Develop a comprehensive understanding of the legal provisions governing remuneration, to ensure adherence and fair practices in compensation management.

CO4. Gain an in-depth comprehension of laws concerning industrial relations, to effectively navigate and manage workplace dynamics while ensuring legal compliance and harmonious labor relations.

CO5. Develop a comprehensive understanding of laws pertaining to social security, to ensure effective implementation and compliance with provisions aimed at safeguarding employee welfare and security.

Supply Chain Management

CO1: Understand the role of distribution logistics in value discovery within the supply chain framework.

CO2: Identify core processes within an organization and evaluate whether they should be internally produced or outsourced to external suppliers.

CO3: Analyze the value addition potential of different distribution strategies, such as direct shipping, cross-docking, and consolidation centers.

CO4: Explore risk pooling strategies to mitigate supply chain uncertainty and reduce overall inventory costs through aggregation and centralized inventory management.

CO5: Evaluate the value of information in supply chain management, including its role in reducing the bullwhip effect, improving forecasting accuracy, and enhancing decision-making.

Investment and portfolio management

CO1: To understand the objectives of investment and process of investment.
CO2: To learn about the fundamental analysis and technical analysis.
CO3: To gain the knowledge of the classification of risk and risk factors.

CO4: To focus on the types of securities and valuation of securities.
CO5: To get insight about the process of portfolio management and portfolio models.

Retail Management

CO1: To provide a comprehensive overview of retail management, encompassing key concepts and practices.

CO2: To explore the critical factors and methodologies involved in selecting optimal retail store locations.

CO3: To delve into the principals and techniques of merchandise management and planning, aiming to optimize inventory assortment, pricing and allocation strategies

CO4: To examine the role of information technology and systems in retail with a focus on enhancing operational efficiency customer experience and decision making process within retail organizations.

CO5: To understand the dynamics of the Indian retail market and develop strategies to effectively meet consumer needs.

Performance Management

CO1: To Provide Knowledge on Performance management through different methods

CO2: To enable the students to understand the benefits of mentoring and Competency map

CO3: To understand the importance of Coaching and Counseling in Performance Management

CO4: To understand different performance methods for reward

CO5: To get comprehensive understanding on learning approaches and fringe benefits

Enterprise Resource Planning

CO1: To know the Fundamentals and Overview of Enterprise Resources Planning
CO2: To Know about the concepts of Data Mining and Data Warehousing
CO3: To understand the various modules of ERP this is used in Organization
CO4: To get clarity how to Implement Various ERP Modules in organization
CO5: To know the ERP Products and its Impact

MERGERS & ACQUISITION

CO1: Acquire conceptual knowledge in ethical issues of Mergers & Acquisition.
CO2: To Know about strategic approaches in value creation and merger negotiations.

CO3: To evaluate the defensive tactics and leverage buyouts.
CO4: Become aware of SEBI guidelines for takeovers, buyback of securities and ESOP.
CO5: To understand opportunities and threats of cross border Mergers & Acquisition.

ADVERTISING AND SALES PROMOTION MANAGEMENT

CO1: Should be able to understand advertising strategies in different sectors. Should be able to understand the roles of ad managers.
CO2: Should be able to perform the functions of advertising agencies
CO3: Should be able to apply different pre-testing and post testing advertising methods.
CO4: Should be able to apply different sales promotion strategies.
CO5: Should be able to perform the roles of public relations officer. Should be able to understand the power of publicity.

KNOWLEDGEMANAGEMENT

CO1: To understand the design and the clear concepts of knowledge management
CO2: To equip the knowledge of life cycle of knowledge management in an organization
CO3: To have a clear understanding about the road map of knowledge management and information architecture
CO4: To entail basic knowledge of information technology in knowledge management systems.
CO5: To perceive the concept of knowledge management in manufacturing and service industry.

Data Ware Housing and Mining

CO1: To understand data mining and data ware housing concepts
CO2: To know the context of Data Ware House
CO3: To know the data ware house structures related to organization
CO4: To Analyzing the Contexts of the Data warehouse
CO5: To know how to Getting Data into the Data warehouse

Business Ethics and Corporate Governance

CO1: Should be in a position to differentiate Business ethics from General ethics
CO2: Will be in a position to make decisions out of ethical dilemma's
CO3: Will be aware of corporate governance philosophies, structure, Directors Role etc.
CO4: Will be having awareness over corporate social responsibility of organizations.
CO5: Will be in a position to combat frauds happening in workplace

Semester IV
Course Objectives

STRATEGIC MANAGEMENT

CO1: Should be in a position to differentiate strategic formation

CO2: Will be in a position to make decisions related to strategy implementation

CO3: Will be aware of Guidelines for proper control- Strategic surveillance -strategic audit etc.,

CO4: Will be having awareness over Strategy and Corporate Evaluation and feedback in the Indian and international context.

CO5: Will be in a position to implement the Tools and techniques

CO6: Will be in a position to perform the Strategic Management process

E- Business

CO1: Explore various electronic commerce models, including Business-to-Business (B2B), Business-to-Consumer (B2C), Consumer-to-Consumer (C2C), and others, analyzing their characteristics and functionalities.

CO2: Analyze the role of digital signatures and digital certificates in ensuring the authenticity, integrity, and non-repudiation of electronic documents and transactions.

CO3: Explore the concept of money in the digital age, understanding its evolution from physical currency to electronic forms and its role in facilitating transactions in the modern economy.

CO4: Examine strategies for conducting business over the web, including e-commerce platforms, digital marketing tactics, and customer relationship management (CRM) approaches, to capitalize on online opportunities and maximize business growth.

CO5: Analyze strategies for managing e-business applications infrastructure, including cloud computing, virtualization, and scalability solutions, to accommodate dynamic business demands and ensure high performance.

Financial Derivatives:

CO1: To know the Uses of Derivatives Markets and Basic knowledge of Derivatives: understand the basic concepts of derivative markets and its principles, by equip himself and able to work on i

CO2: To get clarity about to know the structure of forward and Future Markets and Mechanics of forward markets: identify the significant role of forward market, Terms and structure of forward market. Determination of forward prices

CO3: To study the Principles of Option Pricing Options: Distinguish between Options and Futures, Structure of Options Market, Principles of Option Pricing, Option Pricing Models: The Binomial Model, The Black – Scholes Merton Model.

CO4: To know the Option Pricing Models: The Binomial Model, The Black – Scholes Merton Model and To make aware of Basic Option Strategies

CO5: To know the basics of using Swaps to Manage Risk, Pricing and Valuing Swaps and Swaps: Concept and Nature, Evolution of Swap Market, Features of Swaps

Services Marketing

CO1: Understand the differences between a service and physical product, characteristics of services, marketing mix adapted for services and Services in modern economy

CO2: Understand the importance of customer expectations in services segment, Types of expectations

CO3: Understand to establish pricing objectives, Pricing of services, and Pricing strategies and putting them into practice

CO4: Understand Marketing communication and marketing communication mix

CO5: Understand the marketing planning process related to services, formulation and implementation of marketing strategy

Organization development

CO1: To understand the importance of Values and Ethics in the development of Organisation
CO2: To know the significance of Wave Management and Organisation Transformation
CO3: To understand the action research as process and approach of Organisation Development
CO4: To bring comprehensive understanding on Team intervention and Behaviour Models
CO5: To able to understand the system ramification and power politics and future Organization Development

DATA COMMUNICATION AND NETWORK ANALYSIS

CO1: To understand data communication network analysis, digital transmission, terminal handlines errors correction and coding.
CO2: To know simple protocols, virtual circuits and broadcasting algorithms
CO3: Become aware of flow control and buffering, synchronization and internet work fragmentation.
CO4: Familiarize the student network security and privacy, data encryption, authentication and digital signature.
CO5: Enumerate ISDN, TCP/IP and networking and Internetworking derives.

International Financial Management

CO 1: To understand the nature and importance of International Financial Management and how it differs from Financial Management.

CO 2: To gain knowledge about how the foreign exchange market works.

CO 3: To have an insight into the management of foreign exchange exposure and risk.

CO 4: To understand the mechanism of cross-border investment decisions.

CO 5: To develop knowledge and skill towards financing decisions and working capital management of MNC's.

INTERNATIONAL MARKETING

CO1: Should be in a position to differentiate international and domestic marketing
CO2: Will be in a position to make decisions related to Indirect Exporting, Direct Exporting, Foreign Manufacturing Strategies
CO3: Will be aware of New products in International Market
CO4: Will be having awareness over Distribution Structures and Distribution Patterns
CO5: Will be in a position to Selecting Foreign Country Market intermediaries
CO6: Will be in a position to perform the Export Marketing

GLOBAL HUMAN RESOURCE MANAGEMENT

CO1: Should be able to differentiate between domestic and global human resource management
CO2: Should be able to understand different cross-cultural hofstede's dimensions and cultural issues.
CO3: Should be able to understand the different recruitment and selection process of ghrm. Should be able to learn compensation structure of ghrm
CO4: Should be able to understand the cross-cultural training and international training and development methods.
CO5: Should be able to analyze the industrial relations,trade unions and collective bargaining.Should be able to gain knowledge on participative management about USA-European countries and Asain countries-Middle east

Corporate Information Management

CO1: To provide knowledge on Information Technology and its application
CO2: To get knowledge on collaboration of innovation and business network
CO3: To ubnderstand the IT alignment and security and New Service Models
CO4: To get knowledge on IT outsourcing and collaboration and implementation of IT Policy
CO5: To analyze Project management, Technology Cycles and Role of Research and Development Policy.

PROGRAM SPECIFIC OBJECTIVES

PSO-1: Students will establish themselves as effective professionals by solving real problems through the use of management science knowledge and with attention to team work, effective communication, critical thinking and problem solving skills.

PSO-2: Students will develop professional skills that prepare them for immediate employment and for life-long learning in advanced areas of management and related fields.

PSO-3: Students will demonstrate their ability to adapt to a rapidly changing environment by having learned and applied new skills and new competencies.

PSO-4: Students will be provided with an educational foundation that prepares them for excellence, leadership roles along diverse career paths with encouragement to professional ethics and active participation needed for a successful career.

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j. An ability to communicate effectively, both in writing and orally.

k. Apply conceptual business foundations to solve practical decision-making problems, both individually and as part of teams using techniques such as case analysis, projects and assignments.

l. Exhibit business-related behavioral skills including leadership, interpersonal, communication (written and oral), team, and lifelong learning skills

MBA SEM-I
COURSE OUTCOMES

Management and Organizational Behaviour

CO1: Should be able to perform roles of managers

CO2: Should be implement principles of management

CO3: Should be able to optimize organizational resources

CO4: Should be able motivate employees in an organization.

CO5: Should be able to reduce conflicts & Increase productivity.

CO6: Should be able to understand group behaviour & Individual behaviour.

Business Environment and Law

CO1: Outline how an entity operates in a business environment

CO2: Explain the clear cut study of Monetary, Fiscal and EXIM Policy

CO3: Explain the effects of Law of Contracts 1872

CO4: Provide students with a background of update of the Company's Act 1956.

CO5: Provide students with a background of update of the IT Act 2000.

Managerial Economics

CO1: Should be able to perform roles of managerial economist and Demand Analysis

CO2: Should be able to understand Production and Break- Even Analysis

CO3: Should be implement principles of Market Analysis

CO4: Should be implement principles of pricing strategies

CO5: Should be able to handle the inflationary measures and Trade Cycles

Financial Accounting for Managers

CO1: Should be able to understand the different concepts in accounting

CO2: Should be implement principles of accounting.

CO3: Should be able to perform roles of accountant.

CO4: Should be implement methods to calculate deprecation and inventory valuation.

CO5: Should be able to perform as accountant.

CO6: Should be able to forecast financial future.

CO7: Should be able to access and analyse balance sheet.

Statistics for Managers

CO1: To familiarize the students with the statistical techniques.

CO2: To develop the computational skill of the students.

CO3: To instill the managerial decision making capabilities in the students.

CO4: To enhance the analytical skills of students that helps them with sales projections.

Business Communication

CO1: To make student familiar with Channels of Communication

CO2: Students are able to understand types of Business Communication

CO3: Students are able to understand inter-personal Communication

CO4: To make students comfortable to understand Barriers of Communication

CO5: Students can understand how to write Report Writing

Information Technology for Managers

CO1: Ability to understand basic concepts of computer and acquires knowledge about information technology.

CO2: To understand the basic concepts, queries and the applications of database systems.

CO3: To apply Microsoft access, PowerPoint, word and excel applications to create personal, academic and business documents following current professional and/or industry standards.

CO4: To gain knowledge about data communication and networks and ability to configure a computer network logically.

Semester II

Course Objectives

Human Resource Management

CO1: Explain the importance of human resources and their effective management in organizations

CO2: Demonstrate a basic understanding of different tools used in forecasting and planning human resource needs

CO3: Describe the meanings of terminology and tools used in managing employees effectively

CO4: Record governmental regulations affecting employees and employers

CO5: Analyze the key issues related to administering the human elements such as motivation, compensation, appraisal, career planning, diversity, ethics, and training

Marketing Management

CO1: Use written formats to communicate marketing outcomes.

CO2: Analyze the relevance of marketing concepts and theories in evaluating the impacts of environmental changes on marketing planning, strategies and practices.

CO3: State the role and functions of marketing within a range of organizations.

CO4: Describe key marketing concepts, theories and techniques for analyzing a variety of marketing situations.

CO5: Demonstrate the ability to justify marketing strategies and advocate a strategically informed position when considering marketing plan implementation.

CO6: Manage themselves and members they work within a team when undertaking independent management study.

Business Research Methods

CO1: Should be able to take proper decisions based on collected information

CO2: Should be able to know about various methods of research

CO3: Should be able to know how to collect the data

CO4: Should be able to do Sampling and Survey research

CO5: Should be able to analyze the data statistically & give proper interpretations

CO6: Should be able to prepare the project reports

Financial Management

CO1: Should be able to understand the Need of finance in business

CO2: Should be implement principles of capital budgeting decisions in selection of proposals

CO3: Should be able to optimize share holders wealth for acquiring of cheaper source of capital

CO4: Should be able to understand the difference between operating profit and net profit

CO5: Should be able to forecast future estimated working capital according to demand

CO6: Should be able to assess the procedure of merging and distribution of shares

Operations Research

CO1: To provide the basic tools of operations research to students.

CO2: To enhance the mathematical approaching skill in management problems.

CO3: To develop problem solving &decision making skills that is useful in management of organizations

CO4: To solve the problems in defined steps, by mathematical analysis.

Operations Management

CO1: At the end of the course, a student will be able to:

CO2: Able to perform Production Planning.

CO3: Able to explain Production Controlling.

CO4: Able to focus on Plant Layout Types and their Suitability

CO5: Able to Managing Standard time of a work and Worker.

CO6: Able to Handle Materials Management Issues .

CO7: Able to draft Control Charts for Quality Management.

CO8: To Focus on Quality Management

Management Information Systems

CO1: Describe the role of information technology and information systems in business

CO2: Define the theoretical models used to construct databases

CO3: Develop an understanding of the principles in the System Development Life Cycle

CO4: Describe the concepts and vocabulary of e-commerce security

CO5: To gain knowledge about ERP, big data and cloud computing.

PROGRAM SPECIFIC OBJECTIVES

PSO-1: Students will establish themselves as effective professionals by solving real problems through the use of management science knowledge and with attention to team work, effective communication, critical thinking and problem solving skills.

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DEPARTMENT OF MCA

S. No	COURSE NAME	COs	COURSE OUTCOMES
1	Computer Organization (CA20FPC101)	C111.1	Explain the organization of basic computer, its design & the design of control unit and trade-offs between hardware and software.
		C111.2	Students will formulate and solve problems, understand the performance requirement of the systems and the operations & languages of the register transfer, micro operations and input-output organization.
		C111.3	Students can understand how computer stores positive and negative numbers
		C111.4	Understand the organization of memory and memory management hardware.
		C111.5	Elaborate advanced concepts of computer architecture, Parallel Processing, inter- processor communication and synchronization.
2	Data Structures Using C (CA20FPC102)	C112.1	Analyze the basic concepts of C Programming language.
		C112.2	Design applications in C, using functions, arrays, pointers and structures.
		C112.3	Apply various operations of Stacks and Queues in solving the problems.
		C112.4	Explain operations on Linked lists.
		C112.5	Demonstrate various tree traversals and graph traversal techniques.
3	Database Management Systems (CA20FPC103)	C113.1	Design a database for a real-world information system
		C113.2	Define transactions which preserve the integrity of the database
		C113.3	Generate tables for a database

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		C113.4	Organize the data to prevent redundancy
		C113.5	Pose queries to retrieve the information from database
4	Accounting and Financial Management(BA20FHS101)	C114.1	The student will be able to understand the basic accounting principles
		C114.2	Get exposure to the fundamental concepts, techniques and tools of Financial Management,
		C114.3	Enable to prepare and analyze financial statements of business enterprises for taking sound financial decisions.
5	Mathematical Foundations for Computer Science (CA20FPC104)	C115.1	Able to apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology.
		C115.2	Able to apply the concepts in courses like Computer Organization, DBMS, Analysis of Algorithms, Theoretical Computer Science, Cryptography, Artificial Intelligence
6	Computer Networks (CA20FPC105)	C116.1	Ability to choose the transmission media depending on the requirements.
		C116.2	Ability to design new protocols for computer network.
		C116.3	Ability to configure a computer network logically.
7	Database Management Systems Lab (CA20FPC106)	C117.1	Design database for any real world problem
		C117.2	Implement PL/SQL programs
		C117.3	Define SQL queries
		C117.4	Decide the constraints
		C117.5	Investigate for data inconsistency
8	Data Structures Using C Lab (CA20FPC107)	C118.1	Demonstrate basic concepts of C programming language.
		C118.2	Develop C programs using functions, arrays, structures and pointers.
		C118.3	Illustrate the concepts Stacks and Queues.
		C118.4	Design operations on Linked lists.

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		C118.5	Apply various Binary tree traversal techniques.
			Develop searching and sorting methods
9	**Office Automation & Trouble shooting Lab (CA20FPC108)**	C119.1	Preparing a Govt. Order / Official Letter / Business Letter / Circular Letter Covering formatting commands - font size and styles - bold, underline, upper case, lower case, superscript, subscript, indenting paragraphs, spacing between lines and characters, tab settings etc.
		C119.2	Printing envelopes and mail merge. To print envelopes with from addresses and to addresses to use mail merge facility for sending a circular letter to many persons to use mail merge facility for printing mailing labels
		C119.3	Create an advertisement Prepare a resume. Prepare a Corporate Circular letter inviting the shareholders to attend the Annual Meeting
		C119.4	Using formulas and functions: To prepare a Worksheet showing the monthly sales of a company in different branch offices (Showing Total Sales, Average Sales). Prepare a Statement for preparing Result of 10 students in 5 subjects (using formula to get Distinction, I Class, II Class and Fail under Result column against each student
		C119.5	Creating a Chart: To create a chart for comparing the monthly sales of a company in different branch offices.
		C119.6	Troubleshoot the following OS problems Unable to copy and paste Replacing Windows Splash Screens Out of memory error Windows cannot find Program.exe to open ... Windows Installer error
10	**Mandatory Course(Corporate Communication Skills) (CA20FMC101)**	C11A.1	Understand verbal and non-verbal features of communication and hold formal / informal conversations
		C11A.2	The significance of paralinguistic features will be understood by the students and they will try to be intelligible.
		C11A.3	Become good at Inter-personal skills

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		C11A.4	Achieve neutral accent and be free from mother tongue influence
		C11A.5	Being an active participant in debates and group discussion, showing ability to express agreement, argument to summarize ideas to elicit the views of others and present own ideas.
11	Operating Systems (CA20FPC201)	C121.1	Able to use operating systems effectively.
		C121.2	Write System and application programs to exploit operating system functionality.
		C121.3	Add functionality to the exiting operating systems
		C121.4	Design new operating systems
12	Python Programming (CA20FPC202)	C122.1	Apply the features of Python language in various real applications.
		C122.2	Select appropriate data structure of Python for solving a problem.
		C122.3	Design object-oriented programs using Python for solving real-world problems.
		C122.4	Apply modularity to programs.
13	OOPS through JAVA (CA20FPC203)	C123.1	Use object-oriented approach for solving problems and implementing them
		C123.2	Ability to write Efficient programs that handle exceptions
		C123.3	Create user friendly interface
14	Probability and Statistics (MA20FBS201)	C124.1	Make use of the concepts of probability and their applications
		C124.2	Apply discrete and continuous probability distributions to analyze statistical data.
		C124.3	Design the components of a classical hypothesis test for large samples.
		C124.4	Infer the statistical inferential methods based on small sampling tests.

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		C124.5	Utilize the basic characteristic features of a queuing system and acquire skills in analyzing queuing models.
15	Software Engineering (CA20FPC204)	C125.1	Define and develop a software project from requirement gathering to implementation.
		C125.2	Ability to code and test the software
		C125.3	Ability to plan, Estimate and Maintain software systems
16	Artificial Intelligence (CA20FPC208)	C126.1	Possess the ability to formulate an efficient problem space for a problem expressed in English
		C126.2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
		C126.3	Possess the skill for representing knowledge using the appropriate technique
		C126.4	Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems and Machine Learning.
17	Operating Systems Lab (CA20FPC210)	C127.1	Ensure the development of applied skills in operating systems related areas.
		C127.2	Able to write software routines modules or implementing various concepts of operating system.
18	Python Programming Lab (CA20FPC211)	C128.1	Use python basic concepts to develop problems to solve computational problems.
		C128.2	Apply lists, dictionaries, sets and functions in python programming
		C128.4	Experiment module design and text files in python programming
19	Java Programming Lab (CA20FPC212)	C129.2	Solve simple problems using the fundamental syntax and semantics of Java
		C129.3	Analyze and design Java programs using object-oriented principles
		C129.4	Develop simple GUI interfaces with event handling capabilities
		C129.5	Develop and debug java programs using an IDE

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20	Design and Analysis of Algorithms (CA20FPC301)	C12A.1	Ability to analyse the performance of algorithms.
		C12A.2	Ability to choose appropriate algorithm design techniques for solving problems.
		C12A.3	Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.
21	Data Science & Analytics (CA20FPC302)	C12B.1	Understand business intelligence and business and data analytics.
		C12B.2	To understand the business data analysis through the powerful tools of data application.
		C12B.3	Understand the methods of data mining.
		C12B.4	Apply basic tools (plots, graphs, summary statistics) to carry out EDA.
		C12B.5	Understand the key elements of a data science project
		C12B.6	Identify the appropriate data science technique and/or algorithm to use for the major data science tasks
22	Web Technologies (CA20FPC303)	C211.1	Ability to design websites and do client side validations
		C211.2	Share information over a network
		C211.3	Ability to write server side programs
23	Cloud Computing (CA20FPC304)	C212.1	Understand the concepts of cloud computing and its related techniques.
		C212.2	Provide a pleasant and effective user interface
24	Software Testing (CA20FPC305)	C213.1	Understand the basic testing procedures.
		C213.2	Able to support in generating test cases and test suites.
		C213.3	Able to test the applications manually by applying different testing methods and automation tools.
		C213.4	Apply tools to resolve the problems in Real time environment.
25	Big data Analytics	C214.1	Analyse the big data analytics techniques for useful business application.

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	(CA20FPC312)	C214.2	Design efficient algorithms for mining the data from large volumes.
		C214.3	Analyse the HADOOP and Map Reduce technologies associated with big data analytics.
		C214.4	Explore on big data applications using Pig and Hive.
26	Design and Analysis of Algorithms Lab(CA20FPC315)	C215.1	Ability to analyse the performance of algorithms.
		C215.2	Ability to choose appropriate algorithm design techniques for solving problems.
		C215.3	Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.
27	Data Science and Analytics Lab (CA20FPC316)	C216.1	Understand and use appropriate and relevant, fundamental and applied mathematical and statistical knowledge, methodologies and modern computational tools;
		C216.2	Recognise and use research principles and methods applicable to data science.
		C216.3	Extract an interpretation of data using exploratory data analysis
		C216.4	Visualise and plot graphical representations of data.
28	Web Technologies Lab (CA20FPC317)	C217.1	Ability to apply object oriented concepts for programming and its use.
		C217.2	Practical WEB Development using java by using JDBC and ODBC connectivity.
		C217.3	Implementation of servlets and PHP connectivity by using MYSQL applications.
		C217.4	Learning how to use PHP in different operating systems with different editors like eclipse and net beans.
		C217.5	Acquire skills to develop final project by acquired knowledge during curriculum.
29	Mandatory	C218.1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)

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	Course(Universal Human Values) (CA20FMC318)	C218.2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
		C218.3	They would have better critical ability.
		C218.4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
		C218.5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which are reflected in Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) of the various Programmes offered by the Institution.

In finish of Master of Computer Applications, Student can have wide range of job opportunities to pick up for industry. Software MNCs are the prime recruiters, where web development, data analytics are few areas in high demand for MCA folks. One may also become self employed, by becoming freelancer or independent software developer, software security expert, consultant etc. or Student can take equal part of his/her interest to pursue higher education such as PhD and eventually take up a job in Research and Development sector associated with this field.

Programme Outcomes (POs)

- An ability to apply knowledge of mathematics, computer science and management in practice
- An ability to identify, critically analyse, formulate and develop computer applications
- An ability to select modern computing tools and techniques and use them with dexterity
- An ability to design a computing system to meet desired needs within realistic constraints such as safety, security and applicability
- An ability to devise and conduct experiments, interpret data and provide well informed conclusions
- An ability to understand the impact of system solutions in a contemporary, global,economical, environmental, and societal context for sustainable development.

Programme Specific Outcomes (PSOs)

PSO 1: - Understand, analyze and develop computer programs in the areas related to algorithms, Process and solutions for specific application development using appropriate data modeling concepts.

PSO 2 - Apply standard Software Engineering practices and strategies in software project development using open-source programming environment to deliver quality product for business success.

PSO 3 -Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

HOD