

SL.NO	SUBJECT	SUBJECT CODE
1.	<b>Engineering Maths-I</b>	<b>15MAT11</b>
	<ul style="list-style-type: none"> <li>• Use partial derivatives to calculate rates of change of multivariate functions.</li> <li>• Analyze position, velocity, and acceleration in two or three dimensions using the calculus of vector valued functions.</li> <li>• Recognize and solve first-order ordinary differential equations, Newton's law of cooling</li> <li>• Use matrices techniques for solving systems of linear equations in the different areas of Linear Algebra.</li> </ul>	
2.	<b>Engineering Physics</b>	<b>15PHY12</b>
	<ul style="list-style-type: none"> <li>• Learn and understand more about basic principles and to develop problem solving skills and implementation in technology.</li> <li>• Gain Knowledge about Modern physics and quantum mechanics will update the basic concepts to implement the skills.</li> <li>• Study of material properties and their applications is the prime role to understand and use in engineering applications and studies.</li> <li>• Study Lasers and Optical fibers and its applications are to impart knowledge and to develop skills and to use modern instruments in the engineering applications.</li> <li>• Understand Crystal structure and applications are to boost the technical skills and its applications.</li> <li>• Expose shock waves concept and its applications will bring latest technology to the students at the first year level to develop research orientation programs at higher semester level.</li> <li>• Understand basic concepts of nano science and technology.</li> </ul>	
3.	<b>Elements of Civil Engg. &amp; Mechanics</b>	<b>15CIV13</b>
	<ol style="list-style-type: none"> <li>1. Know basics of Civil Engineering, its scope of study, knowledge about Roads, Bridges and Dams;</li> <li>2. Comprehend the action of Forces, Moments and other loads on systems of rigid bodies;</li> <li>3. Compute the reactive forces and the effects that develop as a result of the external loads;</li> <li>4. Locate the Centroid and compute the Moment of Inertia of regular crosssections.</li> <li>5. Express the relationship between the motion of bodies and</li> <li>6. Equipped to pursue studies in allied courses in Mechanics.</li> </ol>	
4.	<b>Elements of Mechanical Engg.</b>	<b>15EME14</b>
	<ol style="list-style-type: none"> <li>1. Various Energy sources, Boilers, Prime movers such as turbines and IC engines, refrigeration and air-conditioning systems</li> <li>2. Metal removal process using Lathe, drilling, Milling Robotics and Automation.</li> <li>3. Fair understanding of application and usage of various engineering materials.</li> </ol>	
5.	<b>Basic Electrical Engg</b>	<b>15ELE15</b>
	<ul style="list-style-type: none"> <li>• To predict the behaviour of electrical and magnetic circuits.</li> <li>• Select the type of generator / motor required for a particular application.</li> <li>• Realize the requirement of transformers in transmission and distribution of electric power and other applications.</li> <li>• Practice Electrical Safety Rules &amp; standards.</li> <li>• To function on multi-disciplinary teams.</li> </ul>	
6.	<b>Workshop Practice</b>	<b>15WSL16</b>
	<ol style="list-style-type: none"> <li>1. Demonstrate and produce different types of fitting models.</li> <li>2. Gain knowledge of development of sheet metal models with an understanding of their applications.</li> <li>3. Perform soldering and welding of different sheet metal &amp; welded joints.</li> <li>4. Understand the Basics of Workshop practices.</li> </ol>	
7.	<b>Engg. Physics Lab</b>	<b>15PHYL17</b>
	<ul style="list-style-type: none"> <li>• Develop skills to impart practical knowledge in real time solution.</li> <li>• Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.</li> <li>• Design new instruments with practical knowledge.</li> <li>• Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.</li> <li>• Understand measurement technology, usage of new instruments and real time applications in engineering studies.</li> </ul>	
8.	<b>Constitution of India, Professional Ethics and Human Rights (CPH)</b>	<b>15CPH18</b>
	<ul style="list-style-type: none"> <li>• Have general knowledge and legal literacy and thereby to take up competitive examinations</li> <li>• Understand state and central policies, fundamental duties</li> <li>• Understand Electoral Process, special provisions</li> <li>• Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, and</li> </ul>	

	<ul style="list-style-type: none"> <li>• Understand Engineering ethics and responsibilities of Engineers.</li> <li>• Have an awareness about basic human rights in India</li> </ul>	
<b>9.</b>	<b>Engineering Chemistry</b>	<b>15CHE12</b>
	<ul style="list-style-type: none"> <li>• Electrochemical and concentration cells. Classical &amp; modern batteries and fuel cells.</li> <li>• Causes &amp; effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electro less plating.</li> <li>• Production &amp; consumption of energy for industrialization of country and living standards of people. Utilization of solar energy for different useful forms of energy.</li> <li>• Replacement of conventional materials by polymers for various applications.</li> <li>• Boiler troubles; sewage treatment and desalination of sea water, and</li> <li>• Over viewing of synthesis, properties and applications of nanomaterials.</li> </ul>	
<b>10.</b>	<b>Programming in C &amp; Data Structures</b>	<b>15PCD13</b>
	<ul style="list-style-type: none"> <li>• Achieve Knowledge of design and development of C problem solving skills.</li> <li>• Understand the basic principles of Programming in C language</li> <li>• Design and develop modular programming skills.</li> <li>• Effective utilization of memory using pointer technology</li> <li>• Understands the basic concepts of pointers and data structures.</li> </ul>	
<b>11.</b>	<b>Computer Aided Engineering Drawing</b>	<b>15CED14</b>
	<ol style="list-style-type: none"> <li>1. Students will be able to demonstrate the usage of CAD software.</li> <li>2. Students will be able to visualize and draw Orthographic projections, Sections of solids and Isometric views of solids.</li> <li>3. Students are evaluated for their ability in applying various concepts to solve practical problems related to engineering drawing.</li> </ol>	
<b>12.</b>	<b>Basic Electronics</b>	<b>15ELN15</b>
	<ul style="list-style-type: none"> <li>• To predict the behaviour of electrical and magnetic circuits.</li> <li>• Select the type of generator / motor required for a particular application.</li> <li>• Realize the requirement of transformers in transmission and distribution of electric power and other applications.</li> <li>• Practice Electrical Safety Rules &amp; standards.</li> <li>• To function on multi-disciplinary teams.</li> </ul>	
<b>13.</b>	<b>Computer Programming Lab</b>	<b>15CPL16</b>
	<ul style="list-style-type: none"> <li>• Gaining Knowledge on various parts of a computer.</li> <li>• Able to draw flowcharts and write algorithms</li> <li>• Able design and development of C problem solving skills.</li> <li>• Able design and develop modular programming skills.</li> <li>• Able to trace and debug a program</li> </ul>	
<b>14.</b>	<b>Engg. Chemistry Lab</b>	<b>15CHEL17</b>
	<ul style="list-style-type: none"> <li>• Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results, and</li> <li>• Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results</li> </ul>	
<b>15.</b>	<b>Environmental Studies</b>	<b>15CIV18</b>
	<ol style="list-style-type: none"> <li>1. Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,</li> <li>2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,</li> <li>3. Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components</li> <li>4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues</li> </ol>	
<b>16.</b>	<b>ENGINEERING MATHEMATICS-II</b>	<b>15MAT21</b>
	<ul style="list-style-type: none"> <li>• solve differential equations of electrical circuits, forced oscillation of mass spring and elementary heat transfer.</li> <li>• solve partial differential equations fluid mechanics, electromagnetic theory and heat transfer.</li> <li>• Evaluate double and triple integrals to find area , volume, mass and moment of inertia of plane and solid region.</li> <li>• Use curl and divergence of a vector valued functions in various applications of electricity, magnetism and fluid flows.</li> </ul>	

	• Use Laplace transforms to determine general or complete solutions to linear ODE	
<b>17.</b>	<b>Engineering Mathematics –III</b>	<b>15MAT31</b>
	1. Know the use of periodic signals and Fourier series to analyze circuits and system communications. 2. Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform. 3. Employ appropriate numerical methods to solve algebraic and transcendental equations. 4. Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems. 5. Determine the extremals of functionals and solve the simple problems of the calculus of variations.	
<b>18.</b>	<b>Analog Electronics</b>	<b>15EC32</b>
	Acquire knowledge of <ul style="list-style-type: none"> <li>• Working principles, characteristics and basic applications of BJT and FET.</li> <li>• Single stage, cascaded and feedback amplifier configurations.</li> <li>• Frequency response characteristics of BJT and FET.</li> <li>• Power amplifier classifications such as Class A, Class B, etc.</li> </ul> Analyse the performance of <ul style="list-style-type: none"> <li>• FET amplifier in CS configuration.</li> <li>• Power Amplifiers and Oscillator circuits.</li> <li>• Interpretation of performance characteristics of transistors amplifiers, frequency Response and Oscillators.</li> <li>• Apply the knowledge gained in the design of transistorized circuits, amplifiers and Oscillators.</li> </ul>	
<b>19.</b>	<b>Digital Electronics</b>	<b>15EC33</b>
	Acquire knowledge of <ul style="list-style-type: none"> <li>o Combinational Logic.</li> <li>o Simplification Techniques using Karnaugh Maps, Quine-McClusky Technique.</li> <li>o Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors.</li> <li>o Working of Latches, Flip-Flops,</li> <li>o Designing Registers, Counters.</li> <li>o Mealy, Moore Models and State Diagrams</li> </ul> Analyse the performance of <ul style="list-style-type: none"> <li>o Simplification Techniques using Karnaugh Maps, Quine-McClusky Technique.</li> </ul> Synchronous Sequential Circuits. <ul style="list-style-type: none"> <li>• Design and Develop Mealy and Moore Models for digital circuits.</li> <li>• Apply the knowledge gained in the design of Counters and Registers.</li> </ul>	
<b>20.</b>	<b>Network Analysis</b>	<b>15EC34</b>
	Acquire knowledge for solving problems related to <ul style="list-style-type: none"> <li>• Series and Parallel combination of Passive Components, Source Transformation and Source Shifting.</li> <li>• Network Theorems and Electrical laws to reduce circuit complexities and to arrive at feasible solutions.</li> <li>• Various Two port Parameters and their Relationship for finding Network Solutions.</li> <li>• Analyze the Performance of various Types of Networks Using different concepts and principles.</li> </ul>	
<b>21.</b>	<b>Electronic Instrumentation</b>	<b>15EC35</b>
	<ul style="list-style-type: none"> <li>• Acquire knowledge and solve problems related to <ul style="list-style-type: none"> <li>o Accuracy and precision</li> <li>o Functioning of various types of analog and digital measuring instruments.</li> <li>o Different types of quantization, resolution and sensitivity in digital instruments such as frequency meters, tachometers, pH meters etc.</li> <li>o Microprocessor based instrumentation</li> <li>o Functioning of various types of Oscilloscopes and signal generators.</li> <li>o Different types of transducers in various applications.</li> </ul> </li> </ul>	
<b>22.</b>	<b>Engineering Electromagnetics</b>	<b>15EC36</b>
	<ul style="list-style-type: none"> <li>• Acquire knowledge and solve problems related to <ul style="list-style-type: none"> <li>o Basic Concepts of Electric Fields, Magnetic Fields and Electromagnetic Waves.</li> <li>o Basic Concepts to Solve Complex Problems in Electric Fields, Magnetic Fields and Electromagnetic Waves.</li> <li>o Time-varying fields and Maxwell's equations.</li> <li>o Wave propagation in free space and dielectrics.</li> </ul> </li> <li>• Analyze</li> </ul>	

	<ul style="list-style-type: none"> <li>o Different Charge and Current Configurations to derive Electromagnetic Field Equations.</li> <li>o Poisson's and Laplace's Equations, Uniqueness theorem, and solution of Laplace's equation.</li> <li>o Time-varying fields, Maxwell's equations, wave propagation in free space and dielectrics.</li> <li>• Interpretation of</li> <li>o Gradient, Divergence and Curl Operators.</li> <li>o Maxwell's Equations in differential and integral forms.</li> <li>o Wave propagation in free space and dielectrics.</li> <li>• Apply the knowledge gained in the design of Electric and Electronic Circuits, Electrical Machines and Antenna's and Communication Systems.</li> </ul>	
<b>23.</b>	<b>Analog Electronics Lab</b>	<b>15ECL37</b>
	<ul style="list-style-type: none"> <li>• Design and Test rectifiers, clipping circuits, clamping circuits and voltage regulators.</li> <li>• Compute the parameters from the characteristics of JFET and MOSFET devices.</li> <li>• Design, test and evaluate BJT amplifiers in CE configuration.</li> <li>• Design and Test JFET/MOSFET amplifiers.</li> <li>• Design and Test a power amplifier.</li> <li>• Design and Test various types of oscillators.</li> </ul>	
<b>24.</b>	<b>Digital Electronics Lab</b>	<b>15ECL38</b>
	<ul style="list-style-type: none"> <li>• Demonstrate the truth table of various expressions and combinational circuits using logic gates.</li> <li>• Design, test and evaluate various combinational circuits such as adders, subtractors, comparators, multiplexers and demultiplexers.</li> <li>• Construct flips-flops, counters and shift registers.</li> <li>• Simulate full adder and up/down counters.</li> </ul>	
<b>25.</b>	<b>Analog and Digital Electronics</b>	<b>15CS32</b>
	<ul style="list-style-type: none"> <li>• Acquire knowledge of <ul style="list-style-type: none"> <li>o JFETs and MOSFETs , Operational Amplifier circuits and their applications.</li> <li>o Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.</li> <li>o Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors.</li> <li>o Working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters.</li> </ul> </li> <li>• Analyze the performance of <ul style="list-style-type: none"> <li>o JFETs and MOSFETs , Operational Amplifier circuits</li> <li>o Simplification Techniques using Karnaugh Maps, Quine McClusky Technique.</li> <li>o Synchronous and Asynchronous Sequential Circuits. Apply the knowledge gained in the design of Counters, Registers and A/D &amp; D/A converters</li> </ul> </li> </ul>	
<b>26.</b>	<b>Data Structures and Applications</b>	<b>15CS33</b>
	<ul style="list-style-type: none"> <li>• Acquire knowledge of <ul style="list-style-type: none"> <li>- Various types of data structures, operations and algorithms.</li> <li>- Sorting and searching operations.</li> <li>- File structures.</li> </ul> </li> <li>• Analyse the performance of <ul style="list-style-type: none"> <li>- Stack, Queue, Lists, Trees, Graphs, Searching and Sorting techniques.</li> </ul> </li> <li>• Implement all the applications of Data structures in a high-level language.</li> <li>• Design and apply appropriate data structures for solving computing problems.</li> </ul>	
<b>27.</b>	<b>Computer Organization</b>	<b>15CS34</b>
	<ul style="list-style-type: none"> <li>• Acquire knowledge of <ul style="list-style-type: none"> <li>- The basic structure of computers &amp; machine instructions and programs, Addressing Modes, Assembly Language, Stacks, Queues and Subroutines.</li> <li>- Input/output Organization such as accessing I/O Devices, Interrupts.</li> <li>- Memory system basic Concepts, Semiconductor RAM Memories, Static memories, Asynchronous DRAMS, Read Only Memories, Cache Memories and Virtual Memories.</li> <li>- Some Fundamental Concepts of Basic Processing Unit, Execution of a Complete Instruction, Multiple Bus Organization, Hardwired Control and Micro programmed Control.</li> <li>- Pipelining, embedded and large computing system architecture.</li> </ul> </li> <li>• Analyse and design arithmetic and logical units.</li> <li>• Apply the knowledge gained in the design of Computer.</li> <li>• Design and evaluate performance of memory systems</li> </ul>	

	• Understand the importance of life-long learning	
<b>28.</b>	<b>Unix and Shell Programming</b>	<b>15CS35</b>
	<ul style="list-style-type: none"> <li>• Explain multi user OS UNIX and its basic features</li> <li>• Interpret UNIX Commands, Shell basics, and shell environments</li> <li>• Design and develop shell programming, communication, System calls and terminology.</li> <li>• Design and develop UNIX File I/O and UNIX Processes.</li> <li>• Perl script writing</li> </ul>	
<b>29.</b>	<b>Discrete Mathematical structures</b>	<b>15CS36</b>
	<ol style="list-style-type: none"> <li>1. Verify the correctness of an argument using propositional and predicate logic and truth tables.</li> <li>2. Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.</li> <li>3. Solve problems involving recurrence relations and generating functions.</li> <li>4. Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.</li> <li>5. Explain and differentiate graphs and trees</li> </ol>	
<b>30.</b>	<b>Analog and Digital Electronics Laboratory</b>	<b>15CSL37</b>
	<ul style="list-style-type: none"> <li>• Analog components and circuits including Operational Amplifier, Timer, etc.</li> <li>• Combinational logic circuits.</li> <li>• Flip - Flops and their operations</li> <li>• Counters and Registers using Flip-flops.</li> <li>• Synchronous and Asynchronous Sequential Circuits.</li> <li>• A/D and D/A Converters</li> </ul>	
<b>31.</b>	<b>Data Structures Laboratory</b>	<b>15CSL38</b>
	<ul style="list-style-type: none"> <li>• Use various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.</li> <li>• Design and demonstrate various combinational logic circuits.</li> <li>• Design and demonstrate various types of counters and Registers using Flip-flops</li> <li>• Use simulation package to design circuits.</li> <li>• Understand the working and implementation of ALU.</li> </ul>	
<b>32.</b>	<b>Materials Science</b>	<b>15ME32</b>
	<ol style="list-style-type: none"> <li>1. Describe the mechanical properties of metals, their alloys and various modes of failure.</li> <li>2. Understand the microstructures of ferrous and non-ferrous materials to mechanical properties.</li> <li>3. Explain the processes of heat treatment of various alloys.</li> <li>4. Understand the properties and potentialities of various materials available and material selection procedures.</li> <li>5. Know about composite materials and their processing as well as application.</li> </ol>	
<b>33.</b>	<b>Basic Thermodynamics</b>	<b>15ME33</b>
	<ol style="list-style-type: none"> <li>1.Explain thermodynamic systems, properties, Zeroth law of thermodynamics, temperature scales and energy interactions.</li> <li>2.Determine heat, work, internal energy, enthalpy for flow &amp; non flow process using First and Second Law of Thermodynamics.</li> <li>3.Interpret behavior of pure substances and its applications to practical problems.</li> <li>4.Determine change in internal energy, change in enthalpy and change in entropy using TD relations for ideal gases.</li> <li>5.Calculate Thermodynamics properties of real gases at all ranges of pressure, temperatures using modified equation of state including Vander Waals equation, Redlich Wong equation and BeattieBridgeman equation.</li> </ol>	
<b>34.</b>	<b>Mechanics of Materials</b>	<b>15ME34</b>
	<ol style="list-style-type: none"> <li>1.Understand simple, compound, thermal stresses and strains their relations, Poisson's ratio, Hooke's law, mechanical properties including elastic constants and their relations.</li> <li>2.Determine stresses, strains and deformations in bars with varying circular and rectangular cross-sections subjected to normal and temperature loads</li> <li>3.Determine plane stress, principal stress, maximum shear stress and their orientations using analytical method and Mohr's circle.</li> <li>4.Determine the dimensions of structural members including beams, bars and rods using Energy methods and also stress distribution in thick and thin cylinders</li> <li>5.Draw SFD and BMD for different beams including cantilever beams, simply supported beams and overhanging beams subjected to UDL, UVL, Point loads and couples</li> <li>6.Determine dimensions, bending stress, shear stress and its distribution in beams of circular, rectangular, symmetrical I and T sections subjected to point loads and UDL</li> <li>7.Determine slopes and deflections at various points on beams subjected to UDL, UVL, Point loads and couples.</li> <li>8.Determine the dimensions of shafts based on torsional strength, rigidity and flexibility and also elastic stability of columns using Rankin's and Euler's theory</li> </ol>	

<b>35.</b>	<b>Metal Casting and Welding</b>	<b>15ME35</b>
	1.Describe the casting process, preparation of Green, Core, dry sand molds and Sweep, Shell, Investment and plaster molds.2.Explain the Pattern, Core, Gating, Riser system and Jolt, Squeeze, Sand Slinger Molding Machines..3.Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces.4.Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings. 5.Explain the Solidification process and Casting of Non-Ferrous Metals.6.Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes used in manufacturing.7.Explain the Resistance spot, Seam, Butt , Projection, Friction, Explosive, Thermit, Laser and Electron Beam Special type of welding process used in manufacturing. 8.Describe the Metallurgical aspects in Welding and inspection methods for the quality assurance of components made of casting and joining process.	
<b>36.</b>	<b>Machine Tools and Operations</b>	<b>15ME35B</b>
	<ul style="list-style-type: none"> <li>• Explain the construction &amp; specification of various machine tools.</li> <li>• Describe various machining processes pertaining to relative motions between tool &amp; work piece.</li> <li>• Discuss different cutting tool materials, tool nomenclature &amp; surface finish.</li> <li>• Apply mechanics of machining process to evaluate machining time.</li> <li>• Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost.</li> </ul>	
<b>37.</b>	<b>Computer Aided Machine Drawing</b>	<b>15ME36 A</b>
	1.Sections of pyramids, prisms, cubes, cones and cylinders resting on their bases in 2D .2.Orthographic views of machine parts with and without sectioning in 2D. 3.Sectional views for threads with terminologies of ISO Metric, BSW, square and acme, sellers and American standard threads in 2D. 4.Hexagonal and square headed bolt and nut with washer, stud bolts with nut and lock nut, flanged nut, slotted nut, taper and split pin for locking counter sunk head screw, grub screw, Allen screw assemblies in 2D .5.Parallel key, Taper key, and Woodruff Key as per the ISO standards in 2D .6.single and double riveted lap joints, butt joints with single/double cover straps, cotter and knuckle joint for two rods in 2D .7.Sketch split muff, protected type flanged, pin type flexible, Oldham's and universal couplings in 2D .8.assemblies from the part drawings with limits ,fits and tolerance given for Plummer block, Ram bottom safety valve, I.C. Engine connecting rod, Screw Jack, Tailstock of lathe, Machine Vice and Lathe square tool post in 2D and 3D	
<b>38.</b>	<b>Mechanical Measurements and Metrology</b>	<b>15ME36B</b>
	1.Understand the objectives of metrology, methods of measurement, selection of measuring instruments, standards of measurement and calibration of end bars. 2.Describe slip gauges, wringing of slip gauges and building of slip gauges, angle measurement using sine bar, sine center, angle gauges, optical instruments and straightness measurement using Autocollimator.3.Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design. 4.Understand the principle of Johnson Mikrokator, sigma comparator, dial indicator, LVDT, back pressure gauges, Solex comparators and Zeiss Ultra Optimeter.5.Describe measurement of major diameter, minor diameter, pitch, angle and effective diameter of screw threads by 2 – wire, 3 – wire methods, screw thread gauges and tool maker's microscope. 6.Explain measurement of tooth thickness using constant chord method, addendum comparator methods and base tangent method, composite error using gear roll tester and measurement of pitch, concentricity, run out and involute profile. 7.Understand laser interferometers and Coordinate measuring machines.8.Explain measurement systems, transducers, intermediate modifying devices and terminating devices. 9.Describe functioning of force, torque, pressure, strain and temperature measuring devices.	
<b>39.</b>	<b>Materials Testing Lab</b>	<b>15MEL37A</b>
	<ol style="list-style-type: none"> <li>1. Acquire experimentation skills in the field of material testing.</li> <li>2. 2.Develop theoretical understanding of the mechanical properties of materials by performing experiments.</li> <li>3. Apply the knowledge to analyze a material failure and determine the failure inducing agent/s.</li> <li>4. Apply the knowledge of testing methods in related areas.</li> <li>5. Know how to improve structure/behavior of materials for various industrial applications.</li> </ol>	
<b>40.</b>	<b>Mechanical Measurements and Metrology Lab</b>	<b>15MEL37B</b>
	1.To calibrate pressure gauge, thermocouple, LVDT, load cell, micrometer.2.To measure angle using Sine Center/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set. 3.To demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.4.To measure cutting tool forces using Lathe/Drill tool dynamometer.5.To measure Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth vernier/Gear tooth micrometer.6.To measure surface roughness using Tally Surf/ Mechanical Comparator.	
<b>41.</b>	<b>Foundry and Forging Lab'</b>	<b>15MEL38A</b>
	<ul style="list-style-type: none"> <li>• Demonstrate various skills of sand preparation, molding.</li> <li>• Demonstrate various skills of forging operations.</li> </ul>	

	• Work as a team keeping up ethical principles.	
<b>42.</b>	<b>Machine Shop</b>	<b>15MEL38B</b>
	1.Perform turning , facing , knurling , thread cutting, tapering , eccentric turning and allied operations .2.Perform keyways / slots , grooves etc using shaper.3.Perform gear tooth cutting using milling machine.4.Understand the formation of cutting tool parameters of single point cutting tool using bench grinder / tool and cutter grinder.5.Understand Surface Milling/Slot Milling.6Demonstrate precautions and safety norms followed in Machine Shop.7.Exhibit interpersonal skills towards working in a team.	
<b>43.</b>	<b>Strength of Materials</b>	<b>15CV32</b>
	1. To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion. 2. To suggest suitable material from among the available in the field of construction and manufacturing. 3. To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts. 4. To understand the basic concept of analysis and design of members subjected to torsion. 5. To understand the basic concept of analysis and design of structural elements such as columns and struts.	
<b>44.</b>	<b>Fluid Mechanics</b>	<b>15CV33</b>
	1. Possess a sound knowledge of fundamental properties of fluids and fluid continuum 2. Compute and solve problems on hydrostatics, including practical applications 3. Apply principles of mathematics to represent kinematic concepts related to fluid flow 4. Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications 5. Compute the discharge through pipes and over notches and weirs	
<b>45.</b>	<b>Basic Surveying</b>	<b>15CV34</b>
	1. Posses a sound knowledge of fundamental principles Geodetics[L1][PO1] 2. Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.[L2][L3][PO3] 3. Capture geodetic data to process and perform analysis for survey problems [L4][PO2] 4. Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours [L4] [PO2]	
<b>46.</b>	<b>Engineering Geology</b>	<b>15CV35</b>
	1. Students will able to apply the knowledge of geology and its role in Civil Engineering 2. Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices. 3. Analyze the natural disasters and their mitigation. 4. Assess various structural features and geological tools in ground water exploration, Natural resource estimation and solving civil engineering problems. 5. Apply and asses use of building materials in construction and asses their properties	
<b>47.</b>	<b>Building Materials and Construction</b>	<b>15CV36</b>
	1. Select suitable materials for buildings and adopt suitable construction techniques. 2. Adopt suitable repair and maintenance work to enhance durability of buildings.	
<b>48.</b>	<b>Building Materials Testing Laboratory</b>	<b>15CVL37</b>
	1. Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion. 2. Identify, formulate and solve engineering problems of structural elements subjected to flexure. 3. Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.	
49.	Basic Surveying Practice	15CVL38
	1. Apply the basic principles of engineering surveying and for linear and angular measurements. 2. comprehend effectively field procedures required for a professional surveyor. 3. Use techniques, skills and conventional surveying instruments necessary for engineering practice.[L3,L4][PO5]	
<b>50.</b>	<b>Engineering Mathematics –IV</b>	<b>15MAT 41</b>
	1. Solve first and second order ordinary differential equations arising in flow problems using single step and multistep numerical methods. 2. Understand the analyticity, potential fields, residues and poles of complex potentials in field theory and electromagnetic theory.	

	<p>3. Describe conformal and bilinear transformation arising in aerofoil theory, fluid flow visualization and image processing.</p> <p>4. Solve problems of quantum mechanics, hydrodynamics and heat conduction by employing Bessel's function relating to cylindrical polar coordinate systems and Legendre's polynomials relating to spherical polar coordinate systems.</p> <p>5. Solve problems on probability distributions relating to digital signal processing, information theory and optimization concepts of stability of design and structural engineering.</p> <p>6. Draw the validity of the hypothesis proposed for the given sampling distribution in accepting or rejecting the hypothesis.</p> <p>7. Determine joint probability distributions and stochastic matrix connected with the multivariable correlation problems for feasible random events.</p> <p>8. Define transition probability matrix of a Markov chain and solve problems related to discrete parameter random process.</p>	
<b>51.</b>	<b>Microprocessor</b>	<b>15EC 42</b>
	<p>1.Explain the History of evaluation of Microprocessors, Architecture of 8086, 8088, 8087, CISC &amp; RISC, Von-Neumann &amp; Harvard CPU architecture</p> <p>2.Write 8086 Assembly level programs using the 8086 instruction set</p> <p>3.Write modular programs using procedures and macros.</p> <p>4.Write 8086 Stack and Interrupts programming</p> <p>5.Interface 8086 to Static memory chips and 8255, 8254, 0808 ADC, 0800 DAC, Keyboard, Display and Stepper motors.</p> <p>6.Use INT 21 DOS interrupt function calls to handle Keyboard and Display</p>	
<b>52.</b>	<b>Control Systems</b>	<b>15EC43</b>
	<p>1.Develop the mathematical model of mechanical and electrical systems</p> <p>2.Understand time domain specifications for first and second order systems</p> <p>3.Determine the stability of a system in the time domain using Routh Hurwitz criteria and root locus technique</p> <p>4.Determine the stability of a system in the frequency domain using Nyquist and bode plots</p> <p>5.Model a control system in continuous and discrete time using state variable techniques</p>	
<b>53.</b>	<b>Signals and Systems</b>	<b>15EC44</b>
	<p>1.Classify signals and systems</p> <p>2.Determine performance of a system in time-domain given impulse response</p> <p>3.Determine frequency components of a given arbitrary periodic or aperiodic analog signal using Fourier methods</p> <p>4.Determine frequency components of a given arbitrary periodic or aperiodic discrete signal using Fourier methods</p> <p>5.Understand the properties of Fourier transforms and their use in sampling of analog signals</p> <p>6.Determine stability of a system using Z-Transforms</p>	
<b>54.</b>	<b>Principles of Communication Systems</b>	<b>15EC45</b>
	<p>1.Determine the performance of analog modulation schemes in time and frequency domains.</p> <p>2.Determine the performance of systems for generation and detection of modulated analog signals.</p> <p>3.Characterize analog signals in time domain as random processes and in frequency domain using Fourier transforms.</p> <p>4.Characterize the influence of channel on analog modulated signals</p> <p>5.Determine the performance of analog communication systems.</p> <p>6.Understand the characteristics of pulse amplitude modulation, pulse position modulation and pulse code modulation systems.</p>	
<b>55.</b>	<b>Linear Integrated Circuits</b>	<b>15EC46</b>
	<p>1.Explain Op-Amp circuit and parameters including CMRR, PSRR, Input &amp; Output Impedances and Slew Rate</p> <p>2.Design Op-Amp based Inverting, Non-inverting, Summing &amp; Difference Amplifier</p> <p>3.Design Op-Amp based AC Amplifiers including Voltage Follower, Inverting / Noninverting &amp; Difference Amplifier</p> <p>4.Develop circuits for Op-Amp based Voltage / Current Sources &amp; Sinks, Current, Instrumentation and Precision Amplifiers</p> <p>5.Develop circuits for Op-Amp based linear and non-linear circuits comprising of limiting, clamping, Sample &amp; Hold, Differentiator / Integrator Circuits, Peak Detectors, Oscillators and Multiplier &amp; Divider</p> <p>6.Design first &amp; Second Order Low Pass, High Pass, Band Pass, Band Stop Filters and Voltage Regulators</p> <p>7.Explain applications of linear ICs in phase detector, VCO, DAC, ADC and Timer</p>	
<b>56.</b>	<b>Microprocessor Lab</b>	<b>15ECL47</b>
	<p>1.Program a microprocessor to perform arithmetic, logical and data transfer applications.</p> <p>2.Understand assembler directives, DOS Interrupts, branch and loop operations.</p> <p>3.Interface a microprocessor to various devices for simple applications.</p>	



	4. Effectively utilize microprocessor peripherals. 5. Utilize procedures and macros for modular programming.	
<b>57.</b>	<b>Linear ICs and Communication Lab</b>	<b>15ECL48</b>
	1. Gain hands-on experience in building analog systems for a given specification using the basic building blocks. 2. Gain hands-on experience in AM and FM techniques, frequency synthesis 3. Gain hands-on experience in pulse and flat top sampling techniques 4. Make the right choice of an IC and design the circuit for a given application. 5. Design and analyze the performance of instrumentation amplifier, LPF, HPF, DAC and oscillators using linear IC. 6. Understand the applications of Linear IC for addition, integration and 555 timer operation to generate signals/pulses.	
<b>58.</b>	<b>Software Engineering</b>	<b>15CS 42</b>
	<ul style="list-style-type: none"> <li>• Design a software system, component, or process to meet desired needs within realistic constraints.</li> <li>• Assess professional and ethical responsibility</li> <li>• Function on multi-disciplinary teams</li> <li>• Use the techniques, skills, and modern engineering tools necessary for engineering practice</li> <li>• Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.</li> </ul>	
<b>59.</b>	<b>Design and Analysis of Algorithms</b>	<b>15CS43</b>
	<ul style="list-style-type: none"> <li>• Describe computational solution to well known problems like searching, sorting etc.</li> <li>• Estimate the computational complexity of different algorithms.</li> <li>• Devise an algorithm using appropriate design strategies for problem solving.</li> </ul>	
<b>60.</b>	<b>Microprocessors and microcontrollers</b>	<b>15CS 44</b>
	<ul style="list-style-type: none"> <li>• Differentiate between microprocessors and microcontrollers</li> <li>• Design and develop assembly language code to solve problems</li> <li>• Gain the knowledge for interfacing various devices to x86 family and ARM processor</li> <li>• Demonstrate design of interrupt routines for interfacing devices</li> </ul>	
<b>61.</b>	<b>Object Oriented Programming with JAVA</b>	<b>15CS45</b>
	<ul style="list-style-type: none"> <li>• Explain the object-oriented concepts and JAVA.</li> <li>• Develop computer programs to solve real world problems in Java.</li> <li>• Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets and swings.</li> </ul>	
<b>62.</b>	<b>Data communications</b>	<b>15CS46</b>
	<ul style="list-style-type: none"> <li>• Illustrate basic computer network technology.</li> <li>• Identify the different types of network topologies and protocols.</li> <li>• Enumerate the layers of the OSI model and TCP/IP functions of each layer.</li> <li>• Make out the different types of network devices and their functions within a network</li> </ul>	
<b>63.</b>	<b>Design and Analysis of Algorithm Laboratory</b>	<b>15CSL47</b>
	<ul style="list-style-type: none"> <li>• Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)</li> <li>• Implement a variety of algorithms such as sorting, graph related, combinatorial, etc., in a high level language.</li> <li>• Analyze and compare the performance of algorithms using language features.</li> <li>• Apply and implement learned algorithm design techniques and data structures to solve real world problems</li> </ul>	
<b>64.</b>	<b>Microprocessors Laboratory</b>	<b>15CSL48</b>
	<ul style="list-style-type: none"> <li>• Learn 80x86 instruction sets and gain the knowledge of how assembly language works.</li> <li>• Design and implement programs written in 80x86 assembly language</li> <li>• Know functioning of hardware devices and interfacing them to x86 family</li> <li>• Choose processors for various kinds of applications.</li> </ul>	
<b>65.</b>	<b>Kinematics of Machinery</b>	<b>15ME42</b>
	1. Identify mechanisms with basic understanding of motion. 2. Comprehend motion analysis of planar mechanisms, gears, gear trains and cams. 3. Carry out motion analysis of planar mechanisms, gears, gear trains and cams.	
<b>66.</b>	<b>Applied Thermodynamics</b>	<b>15ME43</b>
	<ul style="list-style-type: none"> <li>• Apply thermodynamic concepts to analyze the performance of gas power cycles including propulsion systems.</li> <li>• Evaluate the performance of steam turbine components.</li> <li>• Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution</li> </ul>	

	<p>effect on environment.</p> <ul style="list-style-type: none"> <li>• Apply thermodynamic concepts to analyze turbo machines.</li> <li>• Determine performance parameters of refrigeration and air-conditioning systems.</li> <li>• Understand the principles and applications of refrigeration systems.</li> <li>• Analyze air-conditioning processes using the principles of psychrometry and Evaluate cooling and heating loads in an airconditioning system.</li> <li>• Understand the working, applications, relevance of air and identify methods for performance improvement.</li> </ul>
<b>67.</b>	<p style="text-align: center;"><b>Fluid mechanics</b></p> <p style="text-align: right;"><b>15ME44</b></p>
	<ul style="list-style-type: none"> <li>• Identify and calculate the key fluid properties used in the analysis of fluid behavior.</li> <li>• Understand and apply the principles of pressure, buoyancy and floatation</li> <li>• Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.</li> <li>• Understand and apply the principles of fluid kinematics and dynamics.</li> <li>• Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.</li> <li>• Understand the basic concept of compressible flow and CFD</li> </ul>
<b>68.</b>	<p style="text-align: center;"><b>Metal Casting and Welding</b></p> <p style="text-align: right;"><b>15ME45A</b></p>
	<p>1.Describe the casting process, preparation of Green, Core, dry sand molds and Sweep, Shell, Investment and plaster molds. 2.Explain the Pattern, Core, Gating, Riser system and Jolt, Squeeze, Sand Slinger Molding Machines.3.Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces.4.Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings. 5.Explain the Solidification process and Casting of Non-Ferrous Metals.6.Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes used in manufacturing. 7.Explain the Resistance spot, Seam, Butt , Projection, Friction, Explosive, Thermit, Laser and Electron Beam Special type of welding process used in manufacturing. 8.Describe the Metallurgical aspects in Welding and inspection methods for the quality assurance of components made of casting and joining process.</p>
<b>69.</b>	<p style="text-align: center;"><b>Machine Tools and Operations</b></p> <p style="text-align: right;"><b>15ME45B</b></p>
	<p>Explain the construction &amp; specification of various machine tools.</p> <ul style="list-style-type: none"> <li>• Describe various machining processes pertaining to relative motions between tool &amp; work piece.</li> <li>• Discuss different cutting tool materials, tool nomenclature &amp; surface finish.</li> <li>• Apply mechanics of machining process to evaluate machining time.</li> </ul> <p>Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost.</p>
<b>70.</b>	<p style="text-align: center;"><b>Computer Aided Machine Drawing</b></p> <p style="text-align: right;"><b>15ME46 A</b></p>
	<ol style="list-style-type: none"> <li>1. Improve their visualization skills.</li> <li>2. Understand the theory of projection.</li> <li>3. Make component drawings.</li> <li>4. Produce the assembly drawings using part drawings.</li> <li>5. Engage in life long learning using sketching and drawing as communication tool.</li> </ol>
<b>71.</b>	<p style="text-align: center;"><b>Mechanical Measurements and Metrology</b></p> <p style="text-align: right;"><b>15ME46B</b></p>
	<p>1.Understand the objectives of metrology, methods of measurement, selection of measuring instruments, standards of measurement and calibration of end bars. 2.Describe slip gauges, wringing of slip gauges and building of slip gauges, angle measurement using sine bar, sine center, angle gauges, optical instruments and straightness measurement using Autocollimator. 3.Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design.4.Understand the principle of Johnson Mikrokator, sigma comparator, dial indicator, LVDT, back pressure gauges, Solex comparators and Zeiss Ultra Optimeter .5.Describe measurement of major diameter, minor diameter, pitch, angle and effective diameter of screw threads by 2 – wire, 3 – wire methods, screw thread gauges and tool maker’s microscope.6.Explain measurement of tooth thickness using constant chord method, addendum comparator methods and base tangent method, composite error using gear roll tester and measurement of pitch, concentricity, run out and involute profile. 7.Understand laser interferometers and Coordinate measuring machines.8.Explain measurement systems, transducers, intermediate modifying devices and terminating devices. 9.Describe functioning of force, torque, pressure, strain and temperature measuring devices.</p>
<b>72.</b>	<p style="text-align: center;"><b>Materials Testing Lab</b></p> <p style="text-align: right;"><b>15MEL47A</b></p>
	<ol style="list-style-type: none"> <li>1. Acquire experimentation skills in the field of material testing.</li> <li>2. 2.Develop theoretical understanding of the mechanical properties of materials by performing experiments.</li> <li>3. Apply the knowledge to analyze a material failure and determine the failure inducing agent/s.</li> <li>4. Apply the knowledge of testing methods in related areas.</li> </ol>

	5. Know how to improve structure/behavior of materials for various industrial applications.	
<b>73.</b>	<b>Mechanical Measurements and Metrology Lab</b>	<b>15MEL47B</b>
	1.To calibrate pressure gauge, thermocouple, LVDT, load cell, micrometer.2.To measure angle using Sine Center/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set. 3.To demonstrate measurements using Optical Projector/Tool maker microsc.3.To demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.4.To measure cutting tool forces using Lathe/Drill tool dynamometer.5.To measure Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth vernier/Gear tooth micrometer. 6.To measure surface roughness using Tally Surf/ Mechanical Comparator.	
<b>74.</b>	<b>Foundry and Forging Lab</b>	<b>15MEL48A</b>
	<ul style="list-style-type: none"> <li>• Demonstrate various skills of sand preparation, molding.</li> <li>• Demonstrate various skills of forging operations.</li> <li>• Work as a team keeping up ethical principles.</li> </ul>	
<b>75.</b>	<b>Machine Shop</b>	<b>15MEL48B</b>
	1.Perform turning , facing , knurling , thread cutting, tapering , eccentric turning and allied operations.2.Perform keyways / slots , grooves etc using shaper.3.Perform gear tooth cutting using milling machine.4.Understand the formation of cutting tool parameters of single point cutting tool using bench grinder / tool and cutter grinder .5.Understand Surface Milling/Slot Milling.6. Demonstrate precautions and safety norms followed in Machine Shop.7.Exhibit interpersonal skills towards working in a team	
<b>76.</b>	<b>Analysis of Determinate Structures</b>	<b>15CV42</b>
	<ol style="list-style-type: none"> <li>1. Evaluate the forces in determinate trusses by method of joints and sections.</li> <li>2. Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods</li> <li>3. Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames.</li> <li>4. Determine the stress resultants in arches and cables.</li> <li>5. Understand the concept of influence lines and construct the ILD diagram for the moving loads.</li> </ol>	
<b>77.</b>	<b>Applied Hydraulics</b>	<b>15CV43</b>
	<ol style="list-style-type: none"> <li>1. Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters</li> <li>2. Design the open channels of various cross sections including economical channel sections</li> <li>3. Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation, Compute water surface profiles at different conditions</li> <li>4. Design turbines for the given data, and to know their operation characteristics under different operating conditions</li> </ol>	
<b>78.</b>	<b>Concrete Technology</b>	<b>15CV 44</b>
	<ol style="list-style-type: none"> <li>1. Relate material characteristics and their influence on microstructure of concrete.</li> <li>2.Distinguish concrete behaviour based on its fresh and hardened properties.</li> <li>3. Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.</li> </ol>	
<b>79.</b>	<b>Basic Geotechnical Engineering</b>	<b>15CV45</b>
	<ol style="list-style-type: none"> <li>1. Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties</li> <li>2. Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures</li> <li>3. Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure</li> <li>4. Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.</li> <li>5. Ability to solve practical problems related to estimation of consolidation settlement of soil deposits also time required for the same.</li> </ol>	
<b>80.</b>	<b>Advanced Surveying</b>	<b>15CV46</b>
	<ol style="list-style-type: none"> <li>1. Apply the knowledge of geometric principles to arrive at surveying problems</li> <li>2. Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.</li> <li>3. Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;</li> <li>4. Design and implement the different types of curves for deviating type of alignments.</li> </ol>	

<b>81.</b>	<b>Fluid Mechanics Laboratory</b>	<b>15CVL47</b>
	<ul style="list-style-type: none"> <li>• Properties of fluids and the use of various instruments for fluid flow measurement.</li> <li>• Working of hydraulic machines under various conditions of working and their characteristics.</li> </ul>	
<b>82.</b>	<b>Engineering Geology Laboratory</b>	<b>15CVL48</b>
	<ol style="list-style-type: none"> <li>1. Identifying the minerals and rocks and utilize them effectively in civil engineering practices.</li> <li>2. Understanding and interpreting the geological conditions of the area for the implementation of civil engineering projects.</li> <li>3. Interpreting subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.</li> <li>4. The techniques of drawing the curves of electrical resistivity data and its interpretation for geotechnical and aquifer boundaries</li> </ol>	
<b>83.</b>	<b>Management and Entrepreneurship Development</b>	<b>15ES51</b>
	<ol style="list-style-type: none"> <li>1. Understand the fundamental concepts of Management and Entrepreneurship</li> <li>2. Select a best Entrepreneurship model for the required domain of establishment</li> <li>3. Describe the functions of Managers, Entrepreneurs and their social responsibilities</li> <li>4. Compare various types of Entrepreneurs</li> <li>5. Analyze the Institutional support by various state and central government agencies</li> </ol>	
<b>84.</b>	<b>Digital Signal Processing</b>	<b>15EC52</b>
	<ol style="list-style-type: none"> <li>1. Determine response of LTI systems using time domain and DFT techniques.</li> <li>2. Compute DFT of real and complex discrete time signals.</li> <li>3. Computation of DFT using FFT algorithms and linear filtering approach.</li> <li>4. Solve problems on digital filter design and realize using digital computations.</li> </ol>	
<b>85.</b>	<b>Verilog HDL</b>	<b>15EC53</b>
	<ol style="list-style-type: none"> <li>1. Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.</li> <li>2. Write simple programs in VHDL in different styles.</li> <li>3. Design and verify the functionality of digital circuit/system using test benches.</li> <li>4. Identify the suitable Abstraction level for a particular digital design.</li> <li>5. Write the programs more effectively using Verilog tasks and directives.</li> <li>6. Perform timing and delay Simulation.</li> </ol>	
<b>86.</b>	<b>Information Theory &amp; Coding</b>	<b>15EC54</b>
	<ol style="list-style-type: none"> <li>1. Explain concept of Dependent &amp; Independent Source, measure of information, Entropy, Rate of Information and Order of a source</li> <li>2. Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms</li> <li>3. Model the continuous and discrete communication channels using input, output and joint probabilities</li> <li>4. Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes &amp; convolutional codes</li> <li>5. Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.</li> </ol>	
<b>87.</b>	<b>Professional Elective-1(nanoelectronics)</b>	<b>15EC551</b>
	<ol style="list-style-type: none"> <li>1. Know the principles behind Nanoscience engineering and Nanoelectronics.</li> <li>2. Know the effect of particles size on mechanical, thermal, optical and electrical properties of nanomaterials.</li> <li>3. Know the properties of carbon and carbon nanotubes and its applications.</li> <li>4. Know the properties used for sensing and the use of smart dust sensors.</li> <li>5. Apply the knowledge to prepare and characterize nanomaterials.</li> <li>6. Analyse the process flow required to fabricate state-of-the-art transistor technology.</li> </ol>	
<b>88.</b>	<b>Professional Elective-1(operating system)</b>	<b>15EC553</b>
	<ol style="list-style-type: none"> <li>1. Explain the goals, structure, operation and types of operating systems.</li> <li>2. Apply scheduling techniques to find performance factors.</li> <li>3. Explain organization of file systems and IOCS.</li> <li>4. Apply suitable techniques for contiguous and non-contiguous memory allocation.</li> <li>5. Describe message passing, deadlock detection and prevention methods.</li> </ol>	
<b>89.</b>	<b>Open Elective-1(object oriented programming using c++)</b>	<b>15EC562</b>

	<ol style="list-style-type: none"> <li>1. Explain the basics of Object Oriented Programming concepts.</li> <li>2. Apply the object initialization and destroy concept using constructors and destructors.</li> <li>3. Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.</li> <li>4. Use the concept of inheritance to reduce the length of code and evaluate the usefulness.</li> <li>5. Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.</li> <li>6. Use I/O operations and file streams in programs.</li> </ol>	
<b>90.</b>	<b>Open Elective-1(microcontroller)</b>	<b>15EC563</b>
	<ol style="list-style-type: none"> <li>1. Explain the difference between Microprocessors &amp; Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.</li> <li>2. Write 8051 Assembly level programs using 8051 instruction set.</li> <li>3. Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051.</li> <li>4. Write 8051 Assembly language program to generate timings and waveforms using 8051 timers, to send &amp; receive serial data using 8051 serial port and to generate an external interrupt using a switch.</li> <li>5. Write 8051 C programs to generate square wave on 8051 I/O port pin using interrupt and to send &amp; receive serial data using 8051 serial port.</li> <li>6. Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.</li> </ol>	
<b>91.</b>	<b>DSP Lab</b>	<b>15ECL57</b>
	<ol style="list-style-type: none"> <li>1. Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals.</li> <li>2. Modelling of discrete time signals and systems and verification of its properties and results.</li> <li>3. Implementation of discrete computations using DSP processor and verify the results.</li> <li>4. Realize the digital filters using a simulation tool and a DSP processor and verify the frequency and phase response.</li> </ol>	
<b>92.</b>	<b>HDL Lab</b>	<b>15ECL58</b>
	<ol style="list-style-type: none"> <li>1. Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.</li> <li>2. Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.</li> <li>3. Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.</li> <li>4. Interface the hardware to the programmable chips and obtain the required output.</li> </ol>	
<b>93.</b>	<b>Management and Entrepreneurship for IT Industry</b>	<b>15CS51</b>
	<ul style="list-style-type: none"> <li>• Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship</li> <li>• Utilize the resources available effectively through ERP</li> <li>• Make use of IPRs and institutional support in entrepreneurship</li> </ul>	
<b>94.</b>	<b>Computer Networks</b>	<b>15CS52</b>
	<ul style="list-style-type: none"> <li>• Explain principles of application layer protocols</li> <li>• Recognize transport layer services and infer UDP and TCP protocols</li> <li>• Classify routers, IP and Routing Algorithms in network layer</li> <li>• Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard</li> <li>• Describe Multimedia Networking and Network Management</li> </ul>	
<b>95.</b>	<b>Database Management System</b>	<b>15CS53</b>
	<ul style="list-style-type: none"> <li>• Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.</li> <li>• Use Structured Query Language (SQL) for database manipulation.</li> <li>• Design and build simple database systems</li> <li>• Develop application to interact with databases.</li> </ul>	
<b>96.</b>	<b>Automata theory and Computability</b>	<b>15CS54</b>
	<ul style="list-style-type: none"> <li>• Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation</li> <li>• Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).</li> <li>• Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.</li> <li>• Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.</li> <li>• Classify a problem with respect to different models of Computation.</li> </ul>	

<b>97.</b>	<b>object oriented programming and modelling</b>	<b>15CS551</b>
	<ul style="list-style-type: none"> <li>• Describe the concepts of object-oriented and basic class modelling.</li> <li>• Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.</li> <li>• Choose and apply a befitting design pattern for the given problem.</li> </ul>	
<b>98.</b>	<b>Cloud computing</b>	<b>15CS565</b>
	<ul style="list-style-type: none"> <li>• Explain the concepts and terminologies of cloud computing</li> <li>• Demonstrate cloud frameworks and technologies</li> <li>• Define data intensive computing</li> <li>• Demonstrate cloud applications</li> </ul>	
<b>99.</b>	<b>Computer Network Laboratory</b>	<b>15CSL57</b>
	<ul style="list-style-type: none"> <li>• Analyze and Compare various networking protocols.</li> <li>• Demonstrate the working of different concepts of networking.</li> <li>• Implement, analyze and evaluate networking protocols in NS2 / NS3</li> </ul>	
<b>100.</b>	<b>DBMS Laboratory with mini project</b>	<b>15CSL58</b>
	<ul style="list-style-type: none"> <li>• Create, Update and query on the database.</li> <li>• Demonstrate the working of different concepts of DBMS</li> <li>• Implement, analyze and evaluate the project developed for an application.</li> </ul>	
<b>101.</b>	<b>Management and Engineering Economics</b>	<b>15ME51</b>
	<ol style="list-style-type: none"> <li>1. Understand needs, functions, roles, scope and evolution of Management</li> <li>2. Understand importance, purpose of Planning and hierarchy of planning and also analyze its types</li> <li>3. Discuss Decision making, Organizing, Staffing, Directing and Controlling</li> <li>4. Select the best economic model from various available alternatives</li> <li>5. Understand various interest rate methods and implement the suitable one.</li> <li>6. Estimate various depreciation values of commodities</li> <li>7. Prepare the project reports effectively.</li> </ol>	
<b>102.</b>	<b>Dynamics of Machinery</b>	<b>15ME52</b>
	<ol style="list-style-type: none"> <li>1. Determine the forces and couples for static and dynamic conditions of four bar and slider crank mechanisms to keep the system in equilibrium.</li> <li>2. Determine magnitude and angular position of balancing masses under static and dynamic condition of rotating masses in same and different planes.</li> <li>3. Determine unbalanced primary, secondary forces and couples in single and multi-cylinder engine.</li> <li>4. Determine sensitiveness, isochronism, effort and power of porter and hartnell governors.</li> <li>5. Determine gyroscopic couple and effects related to 2, 4 wheeler, plane disc, ship and aeroplanes.</li> <li>6. Understand types of vibration, SHM and methods of finding natural frequencies of simple mechanical systems.</li> <li>7. Determine equation of motion, natural frequency, damping factor, logarithmic decrement of damped free vibration (SDOF) systems.</li> <li>8. Determine the natural frequency, force and motion transmissibility of single degree freedom systems.</li> <li>9. Determine equation of motion of rotating and reciprocating unbalance systems, magnification factor, and transmissibility of forced vibration (SDOF) systems.</li> </ol>	
<b>103.</b>	<b>Turbo Machines</b>	<b>15ME53</b>
	<ul style="list-style-type: none"> <li>• Able to give precise definition of turbomachinery</li> <li>• Identify various types of turbo machinery</li> <li>• Apply the Euler's equation for turbomachinery to analyse energy transfer in turbomachines</li> <li>• Understand the principle of operation of pumps, fans, compressors and turbines.</li> <li>• Perform the preliminary design of turbomachines (pumps, rotary compressors and turbines)</li> <li>• Analyze the performance of turbo machinery.</li> </ul>	
<b>104.</b>	<b>Design of Machine Elements - I</b>	<b>15ME54</b>
	<ol style="list-style-type: none"> <li>1. Describe the design process, choose materials.</li> <li>2. Apply the codes and standards in design process.</li> <li>3. Analyze the behavior of machine components under static, impact, fatigue loading using failure theories.</li> <li>4. Design shafts, joints, couplings.</li> <li>5. Design of riveted and welded joints.</li> <li>6. Design of threaded fasteners and power screws</li> </ol>	
<b>105.</b>	<b>Professional Elective-I(non traditional machining)</b>	<b>15ME554</b>

	<ol style="list-style-type: none"> <li>1. Understand the compare traditional and non-traditional machining process and recognize the need for Non-traditional machining process.</li> <li>2. Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM, AJM and WJM.</li> <li>3. Identify the need of Chemical and electro-chemical machining process along with the constructional features, process parameters, process characteristics, applications, advantages and limitations.</li> <li>4. Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM &amp; PAM.</li> <li>5. Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanism of metal removal, applications, advantages and limitations LBM &amp; EBM.</li> </ol>	
<b>106.</b>	<b>Open Elective-I(energy and environment)</b>	<b>15ME562</b>
	<ol style="list-style-type: none"> <li>1. Summarize the basic concepts of energy, its distribution and general Scenario.</li> <li>2. Explain different energy storage systems, energy management, audit and economic analysis.</li> <li>3. Summarize the environment eco system and its need for awareness.</li> <li>4. Identify the various types of environment pollution and their effects.</li> <li>5. Discuss the social issues of the environment with associated acts.</li> </ol>	
<b>107.</b>	<b>Fluid Mechanics &amp; Machinery Lab</b>	<b>15MEL57</b>
	<ol style="list-style-type: none"> <li>1. Perform experiments to determine the coefficient of discharge of flow measuring devices.</li> <li>2. Conduct experiments on hydraulic turbines and pumps to draw characteristics.</li> <li>3. Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.</li> <li>4. Determine the energy flow pattern through the hydraulic turbines and pumps</li> <li>5. Exhibit his competency towards preventive maintenance of hydraulic machines</li> </ol>	
<b>108.</b>	<b>Energy Lab</b>	<b>15MEL58</b>
	<ol style="list-style-type: none"> <li>1. Perform experiments to determine the properties of fuels and oils.</li> <li>2. Conduct experiments on engines and draw characteristics.</li> <li>3. Test basic performance parameters of I.C. Engine and implement the knowledge in industry.</li> <li>4. Identify exhaust emission, factors affecting them and report the remedies.</li> <li>5. Determine the energy flow pattern through the I C Engine</li> <li>6. Exhibit his competency towards preventive maintenance of IC engines.</li> </ol>	
<b>109.</b>	<b>Design of RC Structural Elements</b>	<b>15CV51</b>
	<ol style="list-style-type: none"> <li>1. understand the design philosophy and principles</li> <li>2. solve engineering problems of RC elements subjected to flexure, shear and torsion</li> <li>3. demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings</li> <li>4. owns professional and ethical responsibility</li> </ol>	
<b>110.</b>	<b>Analysis of Indeterminate Structures</b>	<b>15CV52</b>
	<ol style="list-style-type: none"> <li>1. Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope deflection method</li> <li>2. Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.</li> <li>3. Construct the bending moment diagram for beams and frames by Kani's method.</li> <li>4. Construct the bending moment diagram for beams and frames using flexibility method</li> <li>5. Analyze the beams and indeterminate frames by system stiffness method.</li> </ol>	
<b>111.</b>	<b>Applied Geotechnical Engineering</b>	<b>15CV53</b>
	<ol style="list-style-type: none"> <li>1. Ability to plan and execute geotechnical site investigation program for different civil engineering projects</li> <li>2. Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils</li> <li>3. Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures</li> <li>4. Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure</li> <li>5. Capable of estimating load carrying capacity of single and group of piles</li> </ol>	
<b>112.</b>	<b>Computer Aided Building Planning and Drawing</b>	<b>15CV54</b>
	<ol style="list-style-type: none"> <li>1. Gain a broad understanding of planning and designing of buildings</li> <li>2. Prepare, read and interpret the drawings in a professional set up.</li> <li>3. Know the procedures of submission of drawings and Develop working and submission drawings for building</li> <li>4. Plan and design a residential or public building as per the given requirements</li> </ol>	

<b>113.</b>	<b>Professional Elective-1(air pollution and control)</b>	<b>15CV551</b>
	<ol style="list-style-type: none"> <li>1. Identify the major sources of air pollution and understand their effects on health and environment.</li> <li>2. Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.</li> <li>3. Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.</li> <li>4. Choose and design control techniques for particulate and gaseous emissions.</li> </ol>	
<b>114.</b>	<b>Open Elective-1(traffic engineering)</b>	<b>15CV561</b>
	<ol style="list-style-type: none"> <li>1. Understand the human factors and vehicular factors in traffic engineering design.</li> <li>2. Conduct different types of traffic surveys and analysis of collected data using statistical concepts.</li> <li>3. Use an appropriate traffic flow theory and to comprehend the capacity &amp; signalized intersection analysis.</li> <li>4. Understand the basic knowledge of Intelligent Transportation System.</li> </ol>	
<b>115.</b>	<b>Geotechnical Engineering Laboratory</b>	<b>15CVL57</b>
	<ol style="list-style-type: none"> <li>1. Physical and index properties of the soil</li> <li>2. Classify based on index properties and field identification</li> <li>3. To determine OMC and MDD, plan and assess field compaction program</li> <li>4. Shear strength and consolidation parameters to assess strength and deformation characteristics</li> <li>5. In-situ shear strength characteristics (SPT- Demonstration)</li> </ol>	
<b>116.</b>	<b>Concrete and Highway Materials Laboratory</b>	<b>15CVL58</b>
	<ol style="list-style-type: none"> <li>1. Conduct appropriate laboratory experiments and interpret the results</li> <li>2. Determine the quality and suitability of cement</li> <li>3. Design appropriate concrete mix</li> <li>4. Determine strength and quality of concrete</li> <li>5. Test the road aggregates and bitumen for their suitability as road material.</li> <li>6. Test the soil for its suitability as sub grade soil for pavements</li> </ol>	
<b>117.</b>	<b>Digital Communication</b>	<b>15EC61</b>
	<ol style="list-style-type: none"> <li>1. Associate and apply the concepts of Bandpass sampling to well specified signals and channels.</li> <li>2. Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels.</li> <li>3. Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.</li> <li>4. Demonstrate by simulation and emulation that bandpass signals subjected to corrupted and distorted symbols in a bandlimited channel, can be demodulated and estimated at receiver to meet specified performance criteria</li> </ol>	
<b>118.</b>	<b>ARM Microcontroller &amp; Embedded Systems</b>	<b>15EC62</b>
	<ol style="list-style-type: none"> <li>1. Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.</li> <li>2. Apply the knowledge gained for Programming ARM Cortex M3 for different applications.</li> <li>3. Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.</li> <li>4. Develop the hardware /software co-design and firmware design approaches.</li> <li>5. Explain the need of real time operating system for embedded system applications.</li> </ol>	
<b>119.</b>	<b>VLSI Design</b>	<b>15EC63</b>
	<ol style="list-style-type: none"> <li>1. Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.</li> <li>2. Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.</li> <li>3. Interpret Memory elements along with timing considerations</li> <li>4. Demonstrate knowledge of FPGA based system design</li> <li>5. Interpret testing and testability issues in VLSI Design</li> <li>6. Analyze CMOS subsystems and architectural issues with the design constraints.</li> </ol>	
<b>120.</b>	<b>Computer Communication Networks</b>	<b>15EC64</b>
	<ol style="list-style-type: none"> <li>1. Identify the protocols and services of Data link layer.</li> <li>2. Identify the protocols and functions associated with the transport layer services.</li> <li>3. Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite.</li> <li>4. Distinguish the basic network configurations and standards associated with each network.</li> <li>5. Construct a network model and determine the routing of packets using different routing algorithms.</li> </ol>	
<b>121.</b>	<b>Professional Elective-2(digital switching systems)</b>	<b>15EC654</b>



	<ul style="list-style-type: none"> <li>· Describe the electromechanical switching systems and its comparison with the digital switching.</li> <li>· Determine the telecommunication traffic and its measurements.</li> <li>· Define the technologies associated with the data switching operations.</li> <li>· Describe the software aspects of switching systems and its maintenance.</li> </ul>	
<b>122.</b>	<b>Open Elective-2(digital system design using verilog)</b>	<b>15EC663</b>
	<ol style="list-style-type: none"> <li>1· Construct the combinational circuits, using discrete gates and programmable logic devices.</li> <li>2· Describe Verilog model for sequential circuits and test pattern generation. 111</li> <li>3· Design a semiconductor memory for specific chip design.</li> <li>4· Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.</li> <li>5· Synthesize different types of processor and I/O controllers that are used in embedded system.</li> </ol>	
<b>123.</b>	<b>Embedded Controller Lab</b>	<b>15ECL67</b>
	<ol style="list-style-type: none"> <li>1· Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.</li> <li>2· Develop assembly language programs using ARM Cortex M3 for different applications.</li> <li>3· Interface external devices and I/O with ARM Cortex M3.</li> <li>4· Develop C language programs and library functions for embedded system applications.</li> </ol>	
<b>124.</b>	<b>Computer Networks Lab</b>	<b>15ECL68</b>
	<ol style="list-style-type: none"> <li>1· Use the network simulator for learning and practice of networking algorithms.</li> <li>2· Illustrate the operations of network protocols and algorithms using C programming.</li> <li>3· Simulate the network with different configurations to measure the performance parameters.</li> <li>4· Implement the data link and routing protocols using C programming.</li> </ol>	
<b>125.</b>	<b>Cryptography, Network Security and Cyber Law</b>	<b>15CS61</b>
	<ul style="list-style-type: none"> <li>• Discuss cryptography and its need to various applications</li> <li>• Design and develop simple cryptography algorithms</li> <li>• Understand cyber security and need cyber Law</li> </ul>	
<b>126.</b>	<b>Computer Graphics and Visualization</b>	<b>15CS62</b>
	<ul style="list-style-type: none"> <li>• Design and implement algorithms for 2D graphics primitives and attributes.</li> <li>• Illustrate Geometric transformations on both 2D and 3D objects.</li> <li>• Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.</li> <li>• Decide suitable hardware and software for developing graphics packages using OpenGL.</li> </ul>	
<b>127.</b>	<b>System Software and Compiler Design</b>	<b>15CS63</b>
	<ul style="list-style-type: none"> <li>• Explain system software such as assemblers, loaders, linkers and macroprocessors</li> <li>• Design and develop lexical analyzers, parsers and code generators</li> <li>• Utilize lex and yacc tools for implementing different concepts of system software</li> </ul>	
<b>128.</b>	<b>Operating Systems</b>	<b>15CS64</b>
	<ul style="list-style-type: none"> <li>• Demonstrate need for OS and different types of OS</li> <li>• Apply suitable techniques for management of different resources</li> <li>• Use processor, memory, storage and file system commands</li> <li>• Realize the different concepts of OS in platform of usage through case studies</li> </ul>	
<b>129.</b>	<b>OPERATIONS RESEARCH</b>	<b>15CS653</b>
	<ul style="list-style-type: none"> <li>• Select and apply optimization techniques for various problems.</li> <li>• Model the given problem as transportation and assignment problem and solve.</li> <li>• Apply game theory for decision support system.</li> </ul>	
<b>130.</b>	<b>PYTHON APPLICATION PROGRAMMING</b>	<b>15CS664</b>
	<ul style="list-style-type: none"> <li>• Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.</li> <li>• Demonstrate proficiency in handling Strings and File Systems.</li> <li>• Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.</li> <li>• Interpret the concepts of Object-Oriented Programming as used in Python.</li> <li>• Implement exemplary applications related to Network Programming, Web Services and Databases in Python.</li> </ul>	
<b>131.</b>	<b>System Software and Operating System Laboratory</b>	<b>15CSL67</b>

	<ul style="list-style-type: none"> <li>• Implement and demonstrate Lexer's and Parser's</li> <li>• Evaluate different algorithms required for management, scheduling, allocation and communication used in operating system.</li> </ul>	
<b>132.</b>	<b>Computer Graphics Laboratory with mini project</b>	<b>15CSL68</b>
	<ul style="list-style-type: none"> <li>• Apply the concepts of computer graphics</li> <li>• Implement computer graphics applications using OpenGL</li> <li>• Animate real world problems using OpenGL</li> </ul>	
<b>133.</b>	<b>Finite Element Analysis</b>	<b>15ME61</b>
	<ol style="list-style-type: none"> <li>1.Understand the concepts behind formulation methods in FEM.</li> <li>2.Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.</li> <li>3.Develop element characteristic equation and generation of global equation.</li> <li>4.Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi symmetric and dynamic problems and solve them displacements, stress and strains induced.</li> </ol>	
<b>134.</b>	<b>Computer integrated Manufacturing</b>	<b>15ME62</b>
	<ol style="list-style-type: none"> <li>1.Able to define Automation, CIM, CAD, CAM and explain the differences between these concepts. Solve simple problems of transformations of entities on computer screen.</li> <li>2.Explain the basics of automated manufacturing industries through mathematical models and analyze different types of automated flow lines.</li> <li>3.Analyze the automated flow lines to reduce down time and enhance productivity.</li> <li>4.Explain the use of different computer applications in manufacturing, and able to prepare part programs for simple jobs on CNC machine tools and robot programming.</li> <li>5.Visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing.</li> </ol>	
<b>135.</b>	<b>Heat Transfer</b>	<b>15ME63</b>
	<ul style="list-style-type: none"> <li>• Understand the basic modes of heat transfer.</li> <li>• Compute temperature distribution in steady-state and unsteady-state heat conduction</li> <li>• Understand and interpret heat transfer through extended surfaces.</li> <li>• Interpret and compute forced and free convective heat transfer.</li> <li>• Explain the principles of radiation heat transfer and understand the numerical formula for heat conduction problems.</li> <li>• Design heat exchangers using LMTD and NTU methods.</li> </ul>	
<b>136.</b>	<b>Design of Machine Elements -II</b>	<b>15ME64</b>
	<ol style="list-style-type: none"> <li>1.Apply engineering design tools to product design.</li> <li>2.Design mechanical systems involving springs,belts and pulleys.</li> <li>3.Design different types of gears and simple gear boxes for different applications.</li> <li>4.Design brakes and clutches.</li> <li>5.Design hydrodynamic bearings for different applications.</li> <li>6.Select Anti friction bearings for different applications using the manufacturers, catalogue.</li> <li>7.Develop proficiency to generate production drawings using CAD software.</li> <li>8.Become good design engineers through learning the art of working in a team with morality and ethics.</li> </ol>	
<b>137.</b>	<b>Professional Elective-II(automobile engineering)</b>	<b>15ME655</b>
	<ul style="list-style-type: none"> <li>• To identify the different parts of an automobile and it's working</li> <li>• To understand the working of transmission and braking systems</li> <li>• To comprehend the working of steering and suspension systems</li> <li>• To learn various types of fuels and injection systems</li> <li>• To know the cause of automobile emissions ,its effects on environment and methods to reduce the emissions.</li> </ul>	
<b>138.</b>	<b>Open Elective-II(total quality management)</b>	<b>15ME664</b>
	<ol style="list-style-type: none"> <li>1. Explain the various approaches of TQM</li> <li>2. Infer the customer perception of quality</li> <li>3. Analyze customer needs and perceptions to design feedback systems.</li> <li>4. Apply statistical tools for continuous improvement of systems</li> <li>5. Apply the tools and technique for effective implementation of TQM.</li> </ol>	
<b>139.</b>	<b>Heat Transfer Lab</b>	<b>15MEL67</b>
	<ul style="list-style-type: none"> <li>• Perform experiments to determine the thermal conductivity of a metal rod</li> <li>• Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.</li> <li>• Estimate the effective thermal resistance in composite slabs and efficiency in pin-fin</li> <li>• Determine surface emissivity of a test plate</li> </ul>	

	<ul style="list-style-type: none"> <li>• Estimate performance of a refrigerator and effectiveness of fin</li> <li>• Calculate temperature distribution of study and transient heat conduction through plane wall, cylinder and fin using numerical approach.</li> </ul>	
<b>140.</b>	<b>Modeling and Analysis Lab(FEA)</b>	<b>15MEL68</b>
	<ul style="list-style-type: none"> <li>• Demonstrate the basic features of an analysis package.</li> <li>• Use the modern tools to formulate the problem, and able to create geometry, discretize, apply boundary condition to solve problems of bars, truss, beams, plate to find stress with different loading conditions.</li> <li>• Demonstrate the deflection of beams subjected to point, uniformly distributed and varying loads further to use the available results to draw shear force and bending moment diagrams.</li> <li>• Analyze the given problem by applying basic principle to solve and demonstrate 1D and 2D heat transfer with conduction and convection boundary conditions.</li> <li>• Carry out dynamic analysis and finding natural frequencies for various boundary conditions and also analyze with forcing function.</li> </ul>	
<b>141.</b>	<b>Construction Management and Entrepreneurship</b>	<b>15CV61</b>
	<ol style="list-style-type: none"> <li>1. Understand the construction management process.</li> <li>2. Understand and solve variety of issues that are encountered by every professional in discharging professional duties.</li> <li>3. Fulfill the professional obligations effectively with global outlook</li> </ol>	
<b>142.</b>	<b>Design of Steel Structural Elements</b>	<b>15CV62</b>
	<ol style="list-style-type: none"> <li>1. Possess a knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel</li> <li>2. Understand the Concept of Bolted and Welded connections.</li> <li>3. Understand the Concept of Design of compression members, built-up columns and columns splices.</li> <li>4. Understand the Concept of Design of tension members, simple slab base and gusseted base.</li> <li>5. Understand the Concept of Design of laterally supported and un-supported steel beams.</li> </ol>	
<b>143.</b>	<b>Highway Engineering</b>	<b>15CV63</b>
	<ol style="list-style-type: none"> <li>1. Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.</li> <li>2. Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.</li> <li>3. Design road geometrics, structural components of pavement and drainage.</li> <li>4. Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.</li> </ol>	
<b>144.</b>	<b>Water Supply and Treatment Engineering</b>	<b>15CV64</b>
	<ol style="list-style-type: none"> <li>1. Estimate average and peak water demand for a community.</li> <li>2. Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.</li> <li>3. Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.</li> <li>4. Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.</li> </ol>	
<b>145.</b>	<b>Professional Elective 2(alternative building materials)</b>	<b>15CV653</b>
	<ol style="list-style-type: none"> <li>1. Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;</li> <li>2. Suggest appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.</li> <li>3. Analyse different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of suggesting suitable agro and industrial wastes as a building material.</li> <li>4. Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material.</li> </ol>	
<b>146.</b>	<b>Open Elective 2(water resource management)</b>	<b>15CV661</b>
	<ol style="list-style-type: none"> <li>1. Assess the potential of groundwater and surface water resources.</li> <li>2. Address the issues related to planning and management of water resources.</li> <li>3. Know how to implement IWRM in different regions.</li> <li>4. Understand the legal issues of water policy.</li> <li>5. Select the method for water harvesting based on the area.</li> </ol>	
<b>147.</b>	<b>Software Application Lab</b>	<b>15CVL67</b>

	use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work	
<b>148.</b>	<b>Extensive Survey Project /Camp</b>	<b>15CVP68</b>
	<ol style="list-style-type: none"> <li>1. Apply Surveying knowledge and tools effectively for the projects</li> <li>2. Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.</li> <li>3. Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills.</li> <li>4. Professional etiquettes at workplace, meeting and general</li> <li>5. Establishing trust based relationships in teams &amp; organizational environment</li> <li>6. Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques</li> </ol>	
<b>149.</b>	<b>Microwave and Antennas</b>	<b>15EC71</b>
	<ol style="list-style-type: none"> <li>1. Describe the use and advantages of microwave transmission</li> <li>2. Analyze various parameters related to microwave transmission lines and waveguides</li> <li>3. Identify microwave devices for several applications</li> <li>4. Analyze various antenna parameters necessary for building an RF system</li> <li>5. Recommend various antenna configurations according to the applications</li> </ol>	
<b>150.</b>	<b>Digital Image Processing</b>	<b>15EC72</b>
	<ol style="list-style-type: none"> <li>1. Understand image formation and the role human visual system plays in perception of gray and color image data.</li> <li>2. Apply image processing techniques in both the spatial and frequency (Fourier) domains.</li> <li>3. Design image analysis techniques in the form of image segmentation and to evaluate the Methodologies for segmentation.</li> <li>4. Conduct independent study and analysis of Image Enhancement techniques.</li> </ol>	
<b>151.</b>	<b>Power Electronics</b>	<b>15EC73</b>
	<ol style="list-style-type: none"> <li>1. Describe the characteristics of different power devices and identify the various applications associated with it.</li> <li>2. Illustrate the working of power circuit as DC-DC converter.</li> <li>3. Illustrate the operation of inverter circuit and static switches.</li> <li>4. Determine the output response of a thyristor circuit with various triggering options.</li> <li>5. Determine the response of controlled rectifier with resistive and inductive loads.</li> </ol>	
<b>152.</b>	<b>Professional Elective-3(real time system)</b>	<b>15EC743</b>
	<ol style="list-style-type: none"> <li>1. Understand the fundamentals of Real time systems and its classifications.</li> <li>2. Understand the concepts of computer control, operating system and the suitable computer hardware requirements for real-time applications.</li> <li>3. Develop the software languages to meet Real time applications.</li> <li>4. Apply suitable methodologies to design and develop Real-Time Systems.</li> </ol>	
<b>153.</b>	<b>Professional Elective-4(Sattelite communication)</b>	<b>15EC755</b>
	<ol style="list-style-type: none"> <li>1. Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.</li> <li>2. Describe the electronic hardware systems associated with the satellite subsystem and earth station.</li> <li>3. Describe the various applications of satellite with the focus on national satellite system.</li> <li>4. Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.</li> </ol>	
<b>154.</b>	<b>Advanced Communication Lab</b>	<b>15ECL76</b>
	<ol style="list-style-type: none"> <li>1. Determine the characteristics and response of microwave devices and optical waveguide.</li> <li>2. Determine the characteristics of microstrip antennas and devices and compute the parameters associated with it.</li> <li>3. Simulate the digital modulation schemes with the display of waveforms and computation of performance parameters.</li> <li>4. Design and test the digital modulation circuits/systems and display the waveforms.</li> </ol>	
<b>155.</b>	<b>VLSI Lab</b>	<b>15ECL77</b>
	<ol style="list-style-type: none"> <li>1. Write test bench to simulate various digital circuits.</li> <li>2. Interpret concepts of DC Analysis, AC Analysis and Transient Analysis in analog circuits.</li> <li>3. Design and simulate basic CMOS circuits like inverter, common source amplifier and differential amplifiers.</li> <li>4. Use basic amplifiers and further design higher level circuits like operational amplifie and analog/digital converters to meet desired parameters.</li> </ol>	

	5. Use transistors to design gates and fu	
<b>156.</b>	<b>Web Technology and its applications</b>	<b>15CS71</b>
	<ul style="list-style-type: none"> <li>• Adapt HTML and CSS syntax and semantics to build web pages.</li> <li>• Construct and visually format tables and forms using HTML and CSS</li> <li>• Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.</li> <li>• Appraise the principles of object oriented development using PHP</li> <li>• Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.</li> </ul>	
<b>157.</b>	<b>Advanced Computer Architectures</b>	<b>15CS72</b>
	<ul style="list-style-type: none"> <li>• Explain the concepts of parallel computing and hardware technologies</li> <li>• Compare and contrast the parallel architectures</li> <li>• Illustrate parallel programming concepts</li> </ul>	
<b>158.</b>	<b>Machine Learning</b>	<b>15CS73</b>
	<ul style="list-style-type: none"> <li>• Identify the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning.</li> <li>• Explain theory of probability and statistics related to machine learning</li> <li>• Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,</li> </ul>	
<b>159.</b>	<b>INFORMATION AND NETWORK SECURITY</b>	<b>15CS743</b>
	<ul style="list-style-type: none"> <li>• Analyze the Digital security lapses</li> <li>• Illustrate the need of key management</li> </ul>	
<b>160.</b>	<b>STORAGE AREA NETWORKS</b>	<b>15CS754</b>
	<ul style="list-style-type: none"> <li>• Identify key challenges in managing information and analyze different storage networking technologies and virtualization</li> <li>• Explain components and the implementation of NAS</li> <li>• Describe CAS architecture and types of archives and forms of virtualization</li> <li>• Illustrate the storage infrastructure and management activities</li> </ul>	
<b>161.</b>	<b>Machine Learning Laboratory</b>	<b>15CSL76</b>
	<ol style="list-style-type: none"> <li>1. Understand the implementation procedures for the machine learning algorithms.</li> <li>2. Design Java/Python programs for various Learning algorithms.</li> <li>3. Apply appropriate data sets to the Machine Learning algorithms.</li> <li>4. Identify and apply Machine Learning algorithms to solve real world problems.</li> </ol>	
<b>162.</b>	<b>Web Technology Laboratory with mini project</b>	<b>15CSL77</b>
	<ul style="list-style-type: none"> <li>• Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.</li> <li>• Have a good understanding of Web Application Terminologies, Internet Tools other web services.</li> <li>• Learn how to link and publish web sites</li> </ul>	
<b>163.</b>	<b>Energy Engineering</b>	<b>15ME71</b>
	<ul style="list-style-type: none"> <li>• Summarize the basic concepts of thermal energy systems,</li> <li>• Identify renewable energy sources and their utilization.</li> <li>• Understand the basic concepts of solar radiation and analyze the working of solar PV and thermal systems.</li> <li>• Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas.</li> <li>• Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator.</li> <li>• Identify methods of energy storage for specific applications</li> </ul>	
<b>164.</b>	<b>Fluid Power Systems</b>	<b>15ME72</b>
	<ol style="list-style-type: none"> <li>1. Identify and analyse the functional requirements of a fluid power transmission system for a given application.</li> <li>2. Visualize how a hydraulic/pneumatic circuit will work to accomplish the function.</li> <li>3. Design an appropriate hydraulic or pneumatic circuit or combination circuit like electrohydraulics, electro-pneumatics for a given application.</li> <li>4. Select and size the different components of the circuit.</li> <li>5. Develop a comprehensive circuit diagram by integrating the components selected for the given application.</li> </ol>	
<b>165.</b>	<b>Control Engineering</b>	<b>15ME73</b>

	1. Recognize control system and its types , control actions .2. Determine the system governing equations for physical models(Electrical, Thermal,Mechanical, Electro Mechanical).3. Calculate the gain of the system using block diagram and signal flow graph.4.Illustrate the response of 1st and 2nd order systems.5.Determine the stability of transfer functions in complex domain and frequency domain.6. Employ state equations to study the controllability and observability .	
<b>166.</b>	<b>Professional Elective - III(tribology)</b>	<b>15ME742</b>
	1.Understand the fundamentals of tribology and associated parameters. 2.Apply concepts of tribology for the performance analysis and design of components experiencing relative motion. 3.Analyse the requirements and design hydrodynamic journal and plane slider bearings for a given application. 4.Select proper bearing materials and lubricants for a given tribological application.5.Apply the principles of surface engineering for different applications of tribology.	
<b>167.</b>	<b>Professional Elective-IV(automotive electronics)</b>	<b>15ME751</b>
	1. Explain the electronics systems used for control of automobiles 2. Select sensors, actuators and control systems used in automobiles 3. Diagnose the faults in the sub systems and systems used automobile	
<b>168.</b>	<b>Design Lab</b>	<b>15MEL76</b>
	1. To understand the working principles of machine elements such as Governors, Gyroscopes etc., 2. To identify forces and couples in rotating mechanical system components. 3. To identify vibrations in machine elements and design appropriate damping methods and to determine the critical speed of a rotating shaft. 4. To measure strain in various machine elements using strain gauges. 5. To determine the minimum film thickness, load carrying capacity, frictional torque and pressure distribution of journal bearing. 6. To determine strain induced in a structural member using the principle of photo-elasticity.	
<b>169.</b>	<b>CIM Lab</b>	<b>15MEL77</b>
	1.Generate CNC Lathe part program for Turning, Facing, Chamfering, Grooving, Step turning, Taper turning, Circular interpolation etc. 2.Generate CNC Mill Part programming for Point to point motions, Line motions, Circular interpolation, Contour motion, Pocket milling- circular, rectangular, Mirror commands etc. 3.Use Canned Cycles for Drilling, Peck drilling, Boring, Tapping, Turning, Facing, Taper turning Thread cutting etc. 4.Simulate Tool Path for different Machining operations of small components using CNC Lathe & CNC Milling Machine. 5.Use high end CAM packages for machining complex parts; use state of art cutting tools and related cutting parameters; optimize cycle time. 6.Understand & write programs for Robotcontrol;understand the operating principles of hydraulics, pneumatics and electropneumatic systems. Apply this knowledge to automate & improve efficiency of manufacturing.	
<b>170.</b>	<b>Municipal and Industrial Waste Water Engineering</b>	<b>15CV71</b>
	1. Acquires capability to design sewer and Sewerage treatment plant. 2. Evaluate degree of treatment and type of treatment for disposal, reuse and recycle. 3. Identify waste streams and design the industrial waste water treatment plant. 4. Manage sewage and industrial effluent issues.	
<b>171.</b>	<b>Design of RCC and Steel Structures</b>	<b>15CV72</b>
	1.Students will acquire the basic knowledge in design of RCC and Steel Structures. • 2.Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members.	
<b>172.</b>	<b>Hydrology and Irrigation Engineering</b>	<b>15CV73</b>
	1. Understand the importance of hydrology and its components. 2. Measure precipitation and analyze the data and analyze the losses in precipitation. 3. Estimate runoff and develop unit hydrographs. 4. Find the benefits and ill-effects of irrigation. 5. Find the quantity of irrigation water and frequency of irrigation for various crops. 6. Find the canal capacity, design the canal and compute the reservoir capacity.	
<b>173.</b>	<b>Professional Elective 3(Design Concept of Building Services)</b>	<b>15CV743</b>
	1. Describe the basics of house plumbing and waste water collection and disposal. 2. Discuss the safety and guidelines with respect to fire safety. 3. Describe the issues with respect to quantity of water, rain water harvesting and roof top harvesting.	

	4. Understand and implement the requirements of thermal comfort in buildings	
<b>174.</b>	<b>Professional Elective 4(Urban Transportation and Planning)</b>	<b>15CV751</b>
	1. Design, conduct and administer surveys to provide the data required for transportation planning. 2. Supervise the process of data collection about travel behavior and analyze the data for use in transport planning. 3. Develop and calibrate modal split, trip generation rates for specific types of land use developments. 4. Adopt the steps that are necessary to complete a long-term transportation plan.	
<b>175.</b>	<b>Environmental Engineering Laboratory</b>	<b>15CVL76</b>
	1. Acquire capability to conduct experiments and estimate the concentration of different parameters. 2. Compare the result with standards and discuss based on the purpose of analysis. 3. Determine type of treatment, degree of treatment for water and waste water. 4. Identify the parameter to be analyzed for the student project work in environmental stream	
<b>176.</b>	<b>Computer Aided Detailing of Structures</b>	<b>15CVL77</b>
	Prepare detailed working drawings	
<b>177.</b>	<b>Wireless Cellular and LTE 4G Broadband</b>	<b>15EC81</b>
	1. Understand the system architecture and the functional standard specified in LTE 4G. 2. Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users. 3. Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios. 4. Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.	
<b>178.</b>	<b>Fiber Optics &amp; Networks</b>	<b>15EC82</b>
	1. Classification and working of optical fiber with different modes of signal propagation. 2. Describe the transmission characteristics and losses in optical fiber communication. 3. Describe the construction and working principle of optical connectors, multiplexers and amplifiers. 4. Describe the constructional features and the characteristics of optical sources and detectors. 5. Illustrate the networking aspects of optical fiber and describe various standards associated with it.	
<b>179.</b>	<b>Professional Elective-5(network and cyber security)</b>	<b>15EC835</b>
	1. Explain network security protocols 2. Understand the basic concepts of cyber security 3. Discuss the cyber security problems 4. Explain Enterprise Security Framework 5. Apply concept of cyber security framework in computer system administration	
<b>180.</b>	<b>Internet of Things and Applications</b>	<b>15CS81</b>
	<ul style="list-style-type: none"> <li>• Interpret the impact and challenges posed by IoT networks leading to new architectural models.</li> <li>• Compare and contrast the deployment of smart objects and the technologies to connect them to network.</li> <li>• Appraise the role of IoT protocols for efficient network communication.</li> <li>• Elaborate the need for Data Analytics and Security in IoT.</li> <li>• Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.</li> </ul>	
<b>181.</b>	<b>Big Data Analytics</b>	<b>15CS82</b>
	<ul style="list-style-type: none"> <li>• Master the concepts of HDFS and MapReduce framework</li> <li>• Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration</li> <li>• Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making</li> <li>• Infer the importance of core data mining techniques for data analytics</li> <li>• Compare and contrast different Text Mining Techniques</li> </ul>	
<b>182.</b>	<b>SYSTEM MODELLING AND SIMULATION</b>	<b>15CS834</b>
	<ul style="list-style-type: none"> <li>• Explain the system concept and apply functional modeling method to model the activities of a static system</li> <li>• Describe the behavior of a dynamic system and create an analogous model for a dynamic system;</li> <li>• Simulate the operation of a dynamic system and make improvement according to the simulation results.</li> </ul>	
<b>183.</b>	<b>Operations Research</b>	<b>15ME81</b>

	<ol style="list-style-type: none"> <li>1. Understand the meaning, definitions, scope, need, phases and techniques of operations research.</li> <li>2. Formulate as L.P.P and derive optimal solutions to linear programming problems by graphical method, Simplex method, Big-M method and Dual Simplex method.</li> <li>3. Formulate as Transportation and Assignment problems and derive optimum solutions for transportation, Assignment and travelling salesman problems.</li> <li>4. Solve problems on game theory for pure and mixed strategy under competitive environment.</li> <li>5. Solve waiting line problems for M/M/1 and M/M/K queuing models.</li> <li>6. Construct network diagrams and determine critical path, floats for deterministic and PERT networks including crashing of Networks.</li> <li>7. Determine minimum processing times for sequencing of n jobs-2 machines, n jobs-3 machines, n jobs-m machines and 2 jobs-n machines using Johnson's algorithm.</li> </ol>	
<b>184.</b>	<b>Additive Manufacturing</b>	<b>15ME82</b>
	<ol style="list-style-type: none"> <li>1. Understand the different process of Additive Manufacturing. using Polymer, Powder and Nano materials manufacturing.</li> <li>2. Analyse the different characterization techniques.</li> <li>3. Describe the various NC, CNC machine programming and Automation techniques.</li> </ol>	
<b>185.</b>	<b>Professional Elective - V (product life cycle management)</b>	<b>15ME835</b>
	<ol style="list-style-type: none"> <li>1. Explain the various strategies of PLM and Product Data Management</li> <li>2. Describe decomposition of product design and model simulation</li> <li>3. Apply the concept of New Product Development and its structuring.</li> <li>4. Analyze the technological forecasting and the tools in the innovation.</li> <li>5. Apply the virtual product development and model analysis</li> </ol>	
<b>186.</b>	<b>Quantity Surveying and Contracts Management</b>	<b>15CV81</b>
	<ol style="list-style-type: none"> <li>1. Prepare detailed and abstract estimates for roads and building.</li> <li>2. Prepare valuation reports of buildings.</li> <li>3. Interpret Contract document's of domestic and international construction works</li> </ol>	
<b>187.</b>	<b>Design of Pre Stressed Concrete Elements</b>	<b>15CV82</b>
	<ol style="list-style-type: none"> <li>1. Understand the requirement of PSC members for present scenario.</li> <li>2. Analyse the stresses encountered in PSC element during transfer and at working.</li> <li>3. Understand the effectiveness of the design of PSC after studying losses</li> <li>4. Capable of analyzing the PSC element and finding its efficiency.</li> <li>5. Design PSC beam for different requirements.</li> </ol>	
<b>188.</b>	<b>Professional Elective 5 (Pavement Design)</b>	<b>15CV833</b>
	<ol style="list-style-type: none"> <li>1. Systematically generate and compile required data's for design of pavement (Highway &amp; Airfield).</li> <li>2. Analyze stress, strain and deflection by boussinesq's, burmister's and westergaard's theory.</li> <li>3. Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.</li> <li>4. Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.</li> </ol>	
<b>189.</b>	<b>Advances in Operating Systems</b>	<b>16SCS11</b>
	<ol style="list-style-type: none"> <li>1. Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system</li> <li>2. Learn the various resource management techniques for distributed systems</li> <li>3. Identify the different features of real time and mobile operating system</li> <li>4. Modify existing open source kernels in terms of functionality or features used</li> </ol>	
<b>190.</b>	<b>Cloud Computing</b>	<b>16SCS12</b>
	<ol style="list-style-type: none"> <li>1. Compare the strengths and limitations of cloud computing</li> <li>2. Identify the architecture, infrastructure and delivery models of cloud computing</li> <li>3. Apply suitable virtualization concept.</li> <li>4. Choose the appropriate cloud player</li> <li>5. Address the core issues of cloud computing such as security, privacy and interoperability</li> <li>6. Design Cloud Services</li> <li>7. Set a private cloud</li> </ol>	
<b>191.</b>	<b>Advances in Data Base Management System</b>	<b>16SCS13</b>
	<ol style="list-style-type: none"> <li>1. Select the appropriate high performance database like parallel and distributed database</li> <li>2. Infer and represent the real world data using object oriented database</li> </ol>	



	3. Interpret rule set in the database to implement data warehousing of mining 4. Discover and design database for recent applications database for better interoperability	
<b>192.</b>	<b>Probability Statistics and Queuing Theory</b>	<b>16SCS14</b>
	1. Demonstrate use of probability and characterize probability models using probability mass (density) functions & cumulative distribution functions. 2. Explain the techniques of developing discrete & continuous probability distributions and its applications. 3. Describe a random process in terms of its mean and correlation functions. 4. Outline methods of Hypothesis testing for goodness of fit. 5. Define the terminology & nomenclature appropriate queuing theory and also distinguish various queuing models.	
<b>193.</b>	<b>Course Electives – I(ADVANCES IN STORAGE AREA NETWORKS )</b>	<b>16SCS153</b>
	1. Identify the need for performance evaluation and the metrics used for it 2. Apply the techniques used for data maintenance. 3. Realize strong virtualization concepts 4. Develop techniques for evaluating policies for LUN masking, file systems	
<b>194.</b>	<b>Operating Systems and ADBMS Laboratory</b>	<b>16SCS16</b>
	1. Work on the concepts of Software Testing and ADBMS at the practical level 2. Compare and pick out the right type of software testing process for any given real world problem 3. Carry out the software testing process in efficient way 4. Establish a quality environment as specified in standards for developing quality software 5. Model and represent the real world data using object oriented database 6. Embed the rules set in the database to implement various features of ADBMS 7. Choose, design and implement recent applications database for better interoperability	
<b>195.</b>	<b>Seminar</b>	<b>16SCS17</b>
	1. Conduct survey on recent technologies 2. Infer and interpret the information from the survey conducted 3. Motivated towards research	
<b>196.</b>	<b>Managing Big Data</b>	<b>16SCS21</b>
	<ul style="list-style-type: none"> <li>• Describe big data and use cases from selected business domains</li> <li>• Explain NoSQL big data management</li> <li>• Install, configure, and run Hadoop and HDFS</li> <li>• Perform map-reduce analytics using Hadoop</li> <li>• Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics</li> </ul>	
<b>197.</b>	<b>Advances in Computer Networks</b>	<b>16SCS22</b>
	<ul style="list-style-type: none"> <li>• List and classify network services, protocols and architectures, explain why they are layered.</li> <li>• Choose key Internet applications and their protocols, and apply to develop their own applications (e.g. Client Server applications, Web Services) using the sockets API.</li> <li>• Explain develop effective communication mechanisms using techniques like connection establishment, queuing theory, recovery Etc.</li> <li>• Explain various congestion control techniques.</li> </ul>	
<b>198.</b>	<b>Advanced Algorithms</b>	<b>16SCS23</b>
	<ul style="list-style-type: none"> <li>• Design and apply iterative and recursive algorithms.</li> <li>• Design and implement optimization algorithms in specific applications.</li> <li>• Design appropriate shared objects and concurrent objects for applications.</li> </ul>	
<b>199.</b>	<b>Internet of Things</b>	<b>16SCS24</b>
	<ul style="list-style-type: none"> <li>• Develop schemes for the applications of IOT in real time scenarios</li> <li>• Manage the Internet resources</li> <li>• Model the Internet of things to business</li> <li>• Understand the practical knowledge through different case studies</li> <li>• Understand data sets received through IoT devices and tools used for analysis</li> </ul>	
<b>200.</b>	<b>Course Elective - II</b>	<b>16SCS253</b>
	<ul style="list-style-type: none"> <li>• Analyze the vulnerabilities in any computing system and hence be able to design a security solution.</li> <li>• Identify the security issues in the network and resolve it.</li> <li>• Evaluate security mechanisms using rigorous approaches, including theoretical.</li> </ul>	

<b>201.</b>	<b>Mini-project</b>	<b>16SCS26</b>
	<ul style="list-style-type: none"> <li>• Design, develop and to analyze an application development.</li> <li>• Prepare report of the project.</li> </ul>	
<b>202.</b>	<b>Seminar</b>	<b>16SCS27</b>
	<ul style="list-style-type: none"> <li>• Conduct survey on recent technologies</li> <li>• Infer and interpret the information from the survey conducted</li> <li>• Motivated towards research</li> </ul>	
<b>203.</b>	<b>Machine Learning Techniques</b>	<b>16SCS41</b>
	<ul style="list-style-type: none"> <li>• Choose the learning techniques with this basic knowledge.</li> <li>• Apply effectively neural networks and genetic algorithms for appropriate applications.</li> <li>• Apply bayesian techniques and derive effectively learning rules.</li> <li>• Choose and differentiate reinforcement and analytical learning techniques</li> </ul>	