

<b>Program Educational Objectives (PEOs)</b>
<b>I. Preparation</b>
To provide opportunity <b>to learn and acquire knowledge</b> of basic mathematical, professional and technical fundamentals, so as to <b>prepare students</b> to succeed in technical <b>profession</b> at global level and to enable them to excel in <b>further education</b> .
<b>II. Core competence</b>
To <b>develop ability</b> among students to innovate, communicate, analyze, interpret and apply technical concepts to solve real life problems and <b>to create novel products</b> .
<b>III. Breadth</b>
To aware and <b>achieve scientific and engineering breadth</b> amongst student through various curricular, co-curricular and extra-curricular activities.
<b>IV. Professionalism</b>
<b>To inculcate professional and ethical attitude in students</b> , enable them to excel in engineering profession.
<b>V. Learning Environment</b>
To accomplish overall development of the students; with the aid of <b>activity and project based learning environment</b> .

<b>PROGRAM OUTCOMES (POs)</b>
<b>PO1 Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO2 Problem analysis:</b> Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO3 Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
<b>PO4 Conduct investigations of complex problems:</b> Use research - based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>PO5 Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
<b>PO6 The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
<b>PO7 Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO8 Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9 Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO10 Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
<b>PO11 Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO12 Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological Change

**First Year Engineering Science Syllabus 2019 Course W.E.F. A.Y. 2019-20**

COURSE	CODE	SUBJECT	Course OUTCOMES
107001 SEM I	C101	Engineering Mathematics-I	CO1: Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
			CO2: the Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.
			CO3: to deal with derivative of functions of several variables that are essential in various branches of Engineering
			CO4: to apply the concept of Jacobian to find partial derivative of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function.
			CO5: the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and orthogonal transformations, Eigen values and Eigen vectors applicable to engineering problems
107002	C102	Engineering	
107009	C103	Engineering Chemistry	CO1: Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
			CO2: Select appropriate electro-technique and method of material analysis
			CO3: Demonstrate the knowledge of advanced engineering materials for various engineering applications.
			CO4: Analyze fuel and suggest use of alternative fuels.
			CO5: Identify chemical compounds based on their structure.
			CO6: Explain causes of corrosion and methods for minimizing corrosion.
102003	C104	Systems in Mechanical	CO1: Describe and compare the conversion of energy from renewable and non-renewable energy sources
			CO2: Explain basic laws of thermodynamics, heat transfer and their applications
			CO3: List down the types of road vehicles and their specifications
			CO4: Illustrate various basic parts and transmission system of a road vehicle
			CO5: Discuss several manufacturing processes and identify the suitable process
			CO6: Explain various types of mechanism and its application
103004	C105	Basic Electrical Engineering	CO1: Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.
			CO2: Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic
			CO3: Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.
			CO4: Relate phase and line electrical quantities in polyphase networks, demonstrate the operation of single phase transformer and calculate efficiency and regulation at different loading conditions
			CO5: Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.
			CO6: Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge.
104010	C106	Basic Electronics	CO1: Explain the working of P-N junction diode and its circuits.
			CO2: Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
			CO3: Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
			CO4: Use different electronics measuring instruments to measure various electrical parameters.
			CO5: Select sensors for specific applications.
110005	C107	Programming and	
101011	C108	Engineering	CO1: Determine resultant of various force systems
			CO2: Determine centroid, moment of inertia and solve problems related to friction
			CO3: Determine reactions of beams, calculate forces in cables using principles of equilibrium
			CO4: Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space
			CO5: Calculate position, velocity and acceleration of particle using principles of kinematics
			CO6: Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy
111006	C109	Workshop®	CO1: Familiar with safety norms to prevent any mishap in workshop.
			CO2: Able to handle appropriate hand tool, cutting tool and machine tools to manufacture a job.
			CO3: Able to understand the construction, working and functions of machine tools and their parts.
			CO4: Able to know simple operations (Turning and Facing) on a centre lathe
101007	C110	Audit Course I & Environmental	CO1: Demonstrate an integrative approach to environmental issues with a focus on sustainability.
			CO2: Explain and identify the role of the organism in energy transfers in different ecosystems.
			CO3: Distinguish between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources.
			CO4: Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.
107008 SEM II	C111	Engineering Mathematics-II	CO1: the effective mathematical tools for solutions of first order differential equations that model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.

			CO2: advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions needed in evaluating multiple integrals and their applications.
			CO3: to trace the curve for a given equation and measure arc length of various curves.
			CO4: the concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.
			CO5: evaluation of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.
107002	C112	Engineering	
107009	C113	Engineering Chemistry	CO1: Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
			CO2: Select appropriate electro-technique and method of material analysis.
			CO3: Demonstrate the knowledge of advanced engineering materials for various engineering applications.
			CO4: Analyze fuel and suggest use of alternative fuels.
			CO5: Identify chemical compounds based on their structure.
			CO6: Explain causes of corrosion and methods for minimizing corrosion.
103004	C114	Basic Electrical	
104010	C115	Basic Electronics	CO1: Explain the working of P-N junction diode and its circuits.
			CO2: Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
			CO3: Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
			CO4: Use different electronics measuring instruments to measure various electrical parameters.
			CO5: Select sensors for specific applications.
110005	C116	Programming and	CO1: Inculcate and apply various skills in problem solving.
			CO2: Choose most appropriate programming constructs and features to solve the problems in diversified domains.
			CO3: Exhibit the programming skills for the problems those require the writing of well- documented programs including use of the logical constructs of language, Python.
			CO4: Demonstrate significant experience with the Python program development environment
101011	C117	Engineering	CO1: Determine resultant of various force systems
			CO2: Determine centroid, moment of inertia and solve problems related to friction
			CO3: Determine reactions of beams, calculate forces in cables using principles of equilibrium
			CO4: Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space
			CO5: Calculate position, velocity and acceleration of particle using principles of kinematics
			CO6: Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy
102012	C118	Engineering	CO1: Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.
			CO2: Construct the various engineering curves using the drawing instruments.
			CO3: Apply the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
			CO4: Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.
			CO5: Draw the development of lateral surfaces for cut section of geometrical solids.
			CO6: Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.
110013	C119	Project Based	CO1: Project based learning will increase their capacity and learning through shared cognition
			CO2: Students able to draw on lessons from several disciplines and apply them in practical way.
			CO3: Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning
101014	C120	Audit Course 2 <sup>&amp;</sup>	CO1: Have an understanding of environmental pollution and the science behind those problems and potential solutions.
107015			CO2: Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.
			CO3: Assess the impact of ever increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.
			CO4: Learn skills required to research and analyze environmental issues scientifically and learn how to use those skills in applied situations such as careers that may involve environmental problems and/or issues.

#### **Program Specific Outcomes (PSOs)Computer dept.**

1. Professional Skills- The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexities.
2. Problem-Solving Skills- The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.
3. Successful Career and Entrepreneurship- The ability to employ modern computer languages, environments and platforms in creating innovative career paths to be an entrepreneur and to have a zest for higher studies.

#### **SE COMPUTER ENGINEERING 2019 COURSE W.E.F.A.Y. 2020-21)**

COURSE	CODE	SUBJECT	Course Outcomes
210241-SE	C201	Discrete Mathematics	On completion of the course, learner will be able to-

			CO1: Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.
			CO2: Apply appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.
			CO3: Design and analyze real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction.
			CO4: Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve new problems
			CO5: Calculate numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics
			CO6: Model and solve computing problem using tree and graph and solve problems using appropriate algorithms.
			CO7: Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.
210242	C202	Fundamentals of Data Structures	On completion of the course, learner will be able to–
			CO1: Design the algorithms to solve the programming problems, identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity.
			CO2: Discriminate the usage of various structures, Design/Program/Implement the appropriate data structures; use them in implementations of abstract data types and Identify the appropriate data structure in approaching the problem solution
			CO3: Demonstrate use of sequential data structures- Array and Linked lists to store and process data.
			CO4: Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application
			CO5: Compare and contrast different implementations of data structures (dynamic and static
			CO6: Understand, Implement and apply principles of data structures-stack and queue to solve computational problems
210243	C203	Object Oriented Programming (OOP)	On completion of the course, learner will be able to
			CO1: Apply constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing softwa
			CO2: Design object-oriented solutions for small systems involving multiple objects.
			CO3: Use virtual and pure virtual function and complex programming situations
			CO4: Apply object-oriented software principles in problem solving
			CO5: Analyze the strengths of object-oriented programming
			CO6: Develop the application using object oriented programming language(C++).
210244	C204	Computer Graphics	On completion of the course, learner will be able to–
			CO1: Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics
			CO2: Apply mathematics to develop Computer programs for elementary graphic operations.
			CO3: Illustrate the concepts of windowing and clipping and apply various algorithms to fill and clip polygons.
			CO4: Understand and apply the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.
			CO5: Understand the concepts of color models, lighting, shading models and hidden surface elimination
			CO6: Create effective programs using concepts of curves, fractals, animation and gaming
210245	C205	Digital Electronics and Logic Design	On completion of the course, learner will be able to–
			CO1: Simplify Boolean Expressions using K Map
			CO2: Design and implement combinational circuits
			CO3: Design and implement sequential circuits.
			CO4: Develop simple real-world application using ASM and PLD
			CO5: Differentiate and Choose appropriate logic families IC packages as per the given design specifications.
			CO6: Explain organization and architecture of computer system
210246	C206	Data Structures Laboratory	On completion of the course, learner will be able to–
			CO1: Use algorithms on various linear data structure using sequential organization to solve real life problems.
			CO2: Analyze problems to apply suitable searching and sorting algorithm to various applications
			CO3: Analyze problems to use variants of linked list and solve various real life problems
			CO4: Designing and implement data structures and algorithms for solving different kinds of problems.
210247	C207	OOP and Computer Graphics Laboratory	On completion of the course, learner will be able to–
			CO1: Understand and apply the concepts like inheritance, polymorphism, exception handling and generic structures for implementing reusable programming codes.
			CO2: Analyze the concept of file and apply it while storing and retrieving the data from secondary storages.
			CO3: Analyze and apply computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts
			CO4: Understand the concept of windowing and clipping and apply various algorithms to fill and clip polygons.
			CO5: Apply logic to implement, curves, fractals, animation and gaming programs
210248	C208	Digital Electronics Laboratory	On completion of the course, learner will be able to–
			CO1: Understand the working of digital electronic circuits
			CO2: Apply the knowledge to appropriate IC as per the design specifications

			CO3: Design and implement Sequential and Combinational digital circuits as per the specifications.
210249	C209	Business Communication Skills	On completion of the course, learner will be able to–
			CO1: Express effectively through verbal/oral communication and improve listening skills
			CO2: Write precise briefs or reports and technical documents.
			CO3: Prepare for group discussion / meetings / interviews and presentations
			CO4: Explore goal/target setting, self-motivation and practicing creative thinking.
			CO5: Operate effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership qualities.
210250	C210	Humanity and Social Sciences	On completion of the course, learner will be–
			CO1: Aware of the various issues concerning humans and society.
			CO2: Aware about their responsibilities towards society.
			CO3: Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes
			CO4: Able to understand the nature of the individual and the relationship between self and the community.
			CO5: Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures
210251	C211	Audit Course 3	On completion of the course, learner will be able to–
			CO1: Understand the importance of environment friendly society.
			CO2: Apply primary measures to reduce carbon emissions from their surroundings.
			CO3: Learn role of IT solutions in design of green buildings.
			CO4: Understand the use of software systems to complete statutory compliances involved in the design of a new home or office building through green construction
207003-SEM	C212	Engineering Mathematics III	On completion of the course learner will able to-
			CO1: Solve Linear differential equations, essential in modelling and design of computer-based systems.
			CO2: Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing
			CO3: Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
			CO4: Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
			CO5: Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
210252	C213	Data Structures and Algorithms	On completion of the course, learner will be able to–
			CO1: Identify and articulate the complexity goals and benefits of a good hashing scheme for real- world applications.
			CO2: Apply non-linear data structures for solving problems of various domain.
			CO3: Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.
			CO4: Analyze the algorithmic solutions for resource requirements and optimization
			CO5: Use efficient indexing methods and multiway search techniques to store and maintain data.
			CO6: Use appropriate modern tools to understand and analyze the functionalities confined to the secondary
210253	C214	Software Engineering	On completion of the course, learner will be able to-
			CO1: Analyze software requirements and formulate design solution for a software.
			CO2: Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.
			CO3: Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.
			CO4: Model and design User interface and component-level.
			CO5: Identify and handle risk management and software configuration management.
			CO6: Utilize knowledge of software testing approaches, approaches to verification and validation.
			CO7: Construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain efficient, reliable, robust and cost-effective software solutions.
210254	C215	Microprocessor	After successful completion of the course, the learner will be able to-
			CO1 Exhibit skill of assembly language programming for the application
			CO2: Classify Processor architectures
			CO3: Illustrate advanced features of 80386 Microprocessor.
			CO4: Compare and contrast different processor modes.
			CO5: Use interrupts mechanism in applications
			CO6: Differentiate between Microprocessors and Microcontrollers.
			CO7: Identify and analyze the tools and techniques used to design, implement, and debug microprocessor-based systems
210255	C216	Principles of Programming	On completion of the course, learner will be able to–
			CO1: Make use of basic principles of programming languages.
			CO2: Develop a program with Data representation and Computations.
			CO3: Develop programs using Object Oriented Programming language : Java
			CO4: Develop application using inheritance, encapsulation, and polymorphism
			CO5: Demonstrate Multithreading for robust application development.

			CO6: Develop a simple program using basic concepts of Functional and Logical programming paradigm.
210256	C217	Data Structures and Algorithms	On completion of the course, learner will be able to–
			CO1: Understand the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem.
			CO2: Choose most appropriate data structures and apply algorithms for graphical solutions of the problems.
			CO3: Apply and analyze non linear data structures to solve real world complex problems.
			CO4: Apply and analyze algorithm design techniques for indexing, sorting, multi-way searching, file organization and compression
			CO5: Analyze the efficiency of most appropriate data structure for creating efficient solutions for engineering design situations.
210257	C218	Microprocessor Technology	On completion of the course, learner will be able to–
			CO1. Understand and apply various addressing modes and instruction set to implement assembly language programs
			CO2. Apply logic to implement code conversion
			CO3. Analyze and apply logic to demonstrate processor mode of operation
210258	C219	Project Based Learning II	CO1: Identify the real life problem from societal need point of view
			CO2: Choose and compare alternative approaches to select most feasible one
			CO3: Analyze and synthesize the identified problem from technological perspective
			CO4: Design the reliable and scalable solution to meet challenges
			CO5: Evaluate the solution based on the criteria specified
			CO6: Inculcate long life learning attitude towards the societal problems
210259	C220	Code of Conduct	On completion of the course, learner will be able to–
			CO1: Understand the basic perception of profession, professional ethics, various moral and social issues, industrial standards, code of ethics and role of professional ethics in engineering field
			CO2: Aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis
			CO3: Understand the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development
			CO4: Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives
210260	C221	Audit Course 4	On completion of the course, learner will be able to–
			CO1: Understand the global water cycle and its various processes
			CO2: Understand climate change and their effects on water systems
			CO3: Understand Drinking treatment and quality of groundwater and surface water
			CO4: Understand the Physical, chemical, and biological processes involved in water treatment and distribution

**Program Specific Outcomes (PSOs) Mechanical dept.**

1. Ability to critical analysis and problem-solving skills required in the field of Thermal, Production and design engineering for carrying out research activities.
2. Ability to conduct experiment and simulate the real life situations involved in engineering using computational techniques and instrumentation; and can work independently in research or industrial environments.

**SE Mechanical and Automobile Engineering 2019 Course W.E.F.A.Y.2020-21**

COURSE	CODE	SUBJECT	Course Outcomes
202041 - SEM.I	C201	Solid Mechanics	On completion of the course, learner will be able to
			CO1. DEFINE various types of stresses and strain developed on determinate and indeterminate members.
			CO2. DRAW Shear force and bending moment diagram for various types of transverse loading and support
			CO3. COMPUTE the slope & deflection, bending stresses and shear stresses on a beam
			CO4. CALCULATE torsional shear stress in shaft and buckling on the column.
			CO5. APPLY the concept of principal stresses and theories of failure to determine stresses on a 2-D element
			CO6. UTILIZE the concepts of SFD & BMD, torsion and principal stresses to solve combined loading application based problems
202042	C202	Solid Modeling and	On completion of the course, learner will be able to
			CO1. UNDERSTAND basic concepts of CAD system, need and scope in Product Lifecycle Management
			CO2. UTILIZE knowledge of curves and surfacing features and methods to create complex solid geometry
			CO3. CONSTRUCT solid models, assemblies using various modeling techniques & PERFORM mass property analysis, including creating and using a coordinate system
			CO4. APPLY geometric transformations to simple 2D geometries
			CO5. USE CAD model data for various CAD based engineering applications viz. production drawings, 3D printing, FEA, CFD, MBD, CAE, CAM, etc.
			CO6. USE PMI & MBD approach for communication
202043	C203	Engineering	On completion of the course, learner will be able to
			CO1. DESCRIBE the basics of thermodynamics with heat and work interactions.
			CO2. APPLY laws of thermodynamics to steady flow and non-flow processes.
			CO3. APPLY entropy, available and non available energy for an Open and Closed System,
			CO4. DETERMINE the properties of steam and their effect on performance of vapour power cycle.
			CO5. ANALYSE the fuel combustion process and products of combustion.
			CO6. SELECT various instrumentations required for safe and efficient operation of steam generator

202044	C204	Engineering	On completion of the course, learner will be able to
			CO1. COMPARE crystal structures and ASSESS different lattice parameters
			CO2. COMPARE crystal structures and ASSESS different lattice parameters
			CO3.DIFFERENTIATE and DETERMINE mechanical properties using destructive and non- destructive testing of materials
			CO4 IDENTIFY & ESTIMATE different parameters of the system viz., phases, variables, component, grains, grain boundary, and degree of freedom. Etc
			CO5. ANALYSE effect of alloying element & heat treatment on properties of ferrous & nonferrous alloy.
			CO6. SELECT appropriate materials for various applications
203156	C205	Electrical and	On completion of the course, learner will be able to
			CO1. APPLY programming concepts to UNDERSTAND role of Microprocessor and Microcontroller in embedded systems
			CO2. DEVELOP interfacing of different types of sensors and other hardware devices with Atmega328 based Arduino Board
			CO3.UNDERSTAND the operation of DC motor, its speed control methods and braking
			CO4. DISTINGUISH between types of three phase induction motor and its characteristic features
			CO5. EXPLAIN about emerging technology of Electric Vehicle (EV) and its modular subsystems
			CO6. CHOOSE energy storage devices and electrical drives for EVs
202045	C206	Geometric Dimensioning and	On completion of the course, learner will be able to
			CO1. SELECT appropriate IS and ASME standards for drawing CO2. READ & ANALYSE variety of industrial drawings
			CO2. READ & ANALYSE variety of industrial drawings
			CO3. APPLY geometric and dimensional tolerance, surface finish symbols in drawing
			CO4. EVALUATE dimensional tolerance based on type of fit, etc.
			CO5. SELECT an appropriate manufacturing process using DFM, DFA, etc
207002 -	C207	Engineering	On completion of the course, learner will be able to
			CO1. SOLVE higher order linear differential equations and its applications to model and analyze mass spring systems.
			CO2. APPLY Integral transform techniques such as Laplace transform and Fourier transform to solve differential equations involved in vibration theory, heat transfer and related mechanical engineering applications
			CO3.APPLY Statistical methods like correlation, regression in analyzing and interpreting experimental data applicable to reliability engineering and probability theory in testing and quality control.
			CO4. PERFORM Vector differentiation & integration, analyze the vector fields and APPLY to fluid flow problems.
			CO5.SOLVE Partial differential equations such as wave equation, one and two dimensional heat flow equations.
202047	C208	Kinematics of	On completion of the course, learner will be able to
			CO1. APPLY kinematic analysis to simple mechanisms
			CO2. ANALYZE velocity and acceleration in mechanisms by vector and graphical method
			CO3. SYNTHESIZE a four bar mechanism with analytical and graphical methods
			CO4. APPLY fundamentals of gear theory as a prerequisite for gear design
			CO5. CONSTRUCT cam profile for given follower motion
202048	C209	Applied	On completion of the course, learner will be able to
			CO1.DETERMINE COP of refrigeration system and ANALYZE psychrometric processes.
			CO2.DISCUSS basics of engine terminology,air standard, fuel air and actual cycles.
			CO3.IDENTIFY factors affecting the combustion performance of SI and CI engines.
			CO4.DETERMINE performance parameters of IC Engines and emission control
			CO5.EXPLAIN working of various IC Engine systems and use of alternative fuels.
			CO6.CALCULATE performance of single and multi stage reciprocating compressors and DISCUSS rotary positive displacement compressors
202049	C210	Fluid Mechanics	On completion of the course, learner will be able to
			CO1.DETERMINE various properties of fluid
			CO2.APPLY the laws of fluid statics and concepts of buoyancy
			CO3.IDENTIFY types of fluid flow and terms associated in fluid kinematics
			CO4.APPLY principles of fluid dynamics to laminar flow
			CO5.ESTIMATE friction and minor losses in internal flows and DETERMINE boundary layer formation over an external surface
			CO6.CONSTRUCT mathematical correlation considering dimensionless parameters, also ABLE to predict the performance of prototype using model laws
202050	C211	Manufacturing	On completion of the course, learner will be able to
			CO1.SELECT appropriate moulding, core making and melting practice and estimate pouring time, solidification rate and DESIGN riser size and location for sand casting process
			CO2.UNDERSTAND mechanism of metal forming techniques and CALCULATE load required for flat rolling
			CO3.DEMONSTRATE press working operations and APPLY the basic principles to DESIGN dies and tools for forming and shearing operations
			CO4.CLASSIFY and EXPLAIN different welding processes and EVALUATE welding characteristics

			CO5.DIFFERENTIATE thermoplastics and thermosetting and EXPLAIN polymer processing techniques
			CO6.UNDERSTAND the principle of manufacturing of fibre-reinforce composites and metal matrix composites
202051	C212	Machine Shop	On completion of the course, learner will be able to
			CO1.PERFORM welding using TIG/ MIG/ Resistance/Gas welding technique
			CO2.MAKE Fibre-reinforced Composites by hand lay-up process or spray lay-up techniques
			CO3.PERFORM cylindrical/surface grinding operation and CALCULATE its machining time
			CO4.DETERMINE number of indexing movements required and acquire skills to PRODUCE a spur gear on a horizontal milling machine
			CO5.PREPARE industry visit report
			CO6.UNDERSTAND procedure of plastic processing
202052	C213	Project Based	On completion of the course, learner will be able to
			CO1.IDENTIFY the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives
			CO2.ANALYZE the results and arrive at valid conclusions.
			CO3.PROPOSE a suitable solution based on the fundamentals of mechanical engineering by possibly integration of previously acquired knowledge.
			CO4.CONTRIBUTE to society through proposed solutions by strictly following professional ethics and safety measures.
			CO5.USE of technology in proposed work and demonstrate learning in oral and written form
			CO6.DEVELOP ability to work as an individual and as a team member.
			<b>Program Specific Outcomes (PSOs) ITdept</b>
			1.An ability to apply the theoretical concepts and practical knowledge of Information Technology in analysis, design, development and management of information processing systems and applications in the interdisciplinary domain.
			2.An ability to analyze a problem, and identify and define the computing infrastructure and operations requirements appropriate to its solution. IT graduates should be able to work on large-scale computing systems.
			3.An understanding of professional, business and business processes, ethical, legal, security and social issues and responsibilities
			<b>SE -INFORMATION TECHNOLOGY ( INFO.TECH 2019 COURSE W.E.F.A.Y. 2020-21)</b>
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
214441 SEM.I	C201	Discrete Mathemat	On completion of the course, students will be able to–
			CO1: Formulate and apply formal proof techniques and solve the problems with logical reasoning.
			CO2: Analyze and evaluate the combinatorial problems by using probability theory
			CO3: Apply the concepts of graph theory to devise mathematical models.
			CO4: Analyze types of relations and functions to provide solution to computational problems.
			CO5: Identify techniques of number theory and its application.
			CO6: Identify fundamental algebraic structures
214442	C202	Logic Design and	On completion of the course, students will be able to–
			CO1: Perform basic binary arithmetic & simplify logic expressions.
			CO2: Grasp the operations of logic ICs and Implement combinational logic functions using ICs.
			CO3: Comprehend the operations of basic memory cell types and Implement sequential logic functions using ICs.
			CO4: Elucidate the functions & organization of various blocks of CPU.
			CO5: Understand CPU instruction characteristics, enhancement features of CPU.
			CO6: Describe an assortment of memory types (with their characteristics) used in computer systems and basic principle of interfacing input, output devices
214443	C203	Data Structures	On completion of the course, students will be able to–
			CO1: Perform basic analysis of algorithms with respect to time and space complexity.
			CO2: Select appropriate searching and/or sorting techniques in the application development.
			CO3: Implement abstract data type (ADT) and data structures for given application.
			CO4: Design algorithms based on techniques like brute -force, divide and conquer, greedy, etc
			CO5: Apply implement learned algorithm design techniques and data structures to solve problems.
			CO6: Design different hashing functions and use files organizations.
214444	C204	Object Oriented	On completion of the course, students will be able to–
			CO1: Differentiate various programming paradigms.
			CO2: Identify classes, objects, methods, and handle object creation, initialization, and Destruction to model real-world problems
			CO3: Identify relationship among objects using inheritance and polymorphism principles.
			CO4: Handle different types of exceptions and perform generic programming
			CO5: Use of files for persistent data storage for real world application.
			CO6: Apply appropriate design patterns to provide object-oriented solutions.
214445	C205	Basics of	On completion of the course, students will be able to–
			CO1: Understand and explain the concepts of communication theory and compare functions of OSI and TCP/IP model.
			CO2: Analyze data link layer services, error detection and correction, linear block codes, cyclic Codes, framing and flow control protocols.



			CO3: Compare different access techniques, channelization and IEEE standards.
			CO4: Apply the skills of subnetting, supernetting and routing mechanisms
			CO5: Differentiate IPv4 and IPv6.
			CO6: Illustrate services and protocols used at transport layer.
214446	C206	Logic Design Computer	On completion of the course, students will be able to–
			CO1: Use logic function representation for simplification with K-Maps and design Combinational logic circuits using SSI & MSI chips.
			CO2: Design Sequential Logic circuits: MOD counters using synchronous counters.
			CO3: Understand the basics of simulator tool & to simulate basic blocks such as ALU & memory
214447	C207	Data Structures	On completion of the course, students will be able to–
			CO1: Analyze algorithms and to determine algorithm correctness and time efficiency class.
			CO2: Implement abstract data type (ADT) and data structures for given application.
			CO3: Design algorithms based on techniques like brute -force, divide and conquer, greedy, etc.).
			CO4: Solve problems using algorithmic design techniques and data structures.
			CO5: Analyze of algorithms with respect to time and space complexity
214448	C208	Object Oriented	On completion of the course, students will be able to–
			CO1: Differentiate various programming paradigms.
			CO2: Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems.
			CO3: Identify relationship among objects using inheritance and polymorphism.
			CO4: Handle different types of exceptions and perform generic programming.
			CO5: Use file handling for real world application.
			CO6: Apply appropriate design patterns to provide object-oriented solutions
214449	C209	Soft Skill Lab	On completion of the course, students will be able to–
			CO1: Introspect about individual's goals, aspirations by evaluating one's SWOC and think creatively.
			CO2: Develop effective communication skills including Listening, Reading, Writing and Speaking.
			CO3: Constructively participate in group discussion, meetings and prepare and deliver Presentations.
			CO4: Write precise briefs or reports and technical documents.
			CO5: Practice professional etiquette, present oneself confidently and successfully handle personal interviews .
			CO6: Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.
214450	C210	Mandatory Audit	On completion of this course students will be able to-
			CO1: Adapt the global ethical principles and modern ethical issues.
			CO2: Apprehend ethics in the business relationships and practices of IT.
			CO3: Implement trustworthy computing to manage risk and security vulnerabilities.
			CO4: Analyse concerns of privacy, privacy rights in information-gathering practices in IT
207003 SEM.	C211	Engineering Mather	On completion of this course student will be able to –
			CO1: Solve Linear differential equations, essential in modelling and design of computer-based systems.
			CO2: Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
			CO3: Apply Statistical methods like correlation& regression analysis and probability theory for data analysis and predictions in machine learning.
			CO4: Solve Algebraic & Transcendental equations and System of linear equations using numerical techniques
			CO5: Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing
214451	C212	Processor	On completion of this course student will be able to –
			CO1: Apprehend architecture and memory organization of PIC 18 microcontroller.
			CO2: Implement embedded C programming for PIC18
			CO3: Use concepts of timers and interrupts of PIC 18.
			CO4: Demonstrate real life applications using PIC 18.
			CO5: Analyze architectural details of ARM processor
214452	C213	Database	On completion of this course student will be able to --
			CO1: Apply fundamental elements of database management systems.
			CO2: Design ER-models to represent simple database application scenarios.
			CO3: Formulate SQL queries on data for relational databases.
			CO4: Improve the database design by normalization & to incorporate query processing.
			CO5: Apply ACID properties for transaction management and concurrency control.
			CO6: Analyze various database architectures and technologies
214453	C214	Computer	On completion of the course, students will be able to–
			CO1: Apply mathematical and logical aspects for developing elementary graphics operations like scan conversion of points, lines, circle, and apply it for problem solving.
			CO2: Employ techniques of geometrical transforms to produce, position and manipulate Objects in 2 dimensional and 3-dimensional space respectively.

			CO3: Describe mapping from a world coordinates to device coordinates, clipping, and projections in order to produce 3D images on 2D output device
			CO4: Apply concepts of rendering, shading, animation, curves and fractals using computer graphics tools in design, development and testing of 2D, 3D modeling applications.
			CO5: Perceive the concepts of virtual reality.
214454	C215	Software	On completion of the course, students will be able to --
			CO1: Classify various software application domains.
			CO2: Analyze software requirements by using various modeling techniques.
			CO3: Translate the requirement models into design models.
			CO4: Apply planning and estimation to any project.
			CO5: Use quality attributes and testing principles in software development life cycle.
			CO6: Discuss recent trends in Software engineering by using CASE and agile tools
214455	C216	Programming Skill	On completion of this course student will be able to --
			CO1: Apply concepts related to embedded C programming.
			CO2: Develop and Execute embedded C program to perform array addition, block transfer, sorting operations
			CO3: Perform interfacing of real-world input and output devices to PIC18FXXX microcontroller.
			CO4: Use source prototype platform like Raspberry-Pi/Beagle board/Arduino.
214456	C217	Database	On completion of this course student will be able to
			CO1: Install and configure database systems.
			CO2: Analyze database models & entity relationship models.
			CO3 : Design and implement a database schema for a given problem-domain
			CO4: Implement relational database systems.
			CO5: Populate and query a database using SQL DDL / DML / DCL commands.
			CO6 :Design a backend database of any one organization: CASE STUDY
214457	C218	Computer	On completion of this course student will be able to --
			CO1: Apply line& circle drawing algorithms to draw the objects.
			CO2: Apply polygon filling methods for the object.
			CO3: Apply polygon clipping algorithms for the object.
			CO4: Apply the 2D transformations on the object.
			CO5: Implement the curve generation algorithms.
			CO6: Demonstrate the animation of any object using animation principles
214458	C219	Project Based	On completion of the course, student will be able to --
			CO1: Design solution to real life problems and analyze its concerns through shared cognition.
			CO2: Apply learning by doing approach in PBL to promote lifelong learning.
			CO3: Tackle technical challenges for solving real world problems with team efforts.
			CO4: Collaborate and engage in multi-disciplinary learning environments
214459	C220	Mandatory Audit	On completion of the course, learner will be able to --
			CO1:Relate the relations between the environment and ecology, estimating water requirement for public water supply scheme.
			CO2:Assess the quality of water as per BIS and select the appropriate treatment method required for the water source.
			CO3: Analyze the suitable distribution system for a locality and know the appurtenances used.
			CO4: Summarize the arrangement of water supply and fittings in a building.
			CO5: Determine the need of conservation of water and rural water supply.
			CO6: Identify the sources of water pollution and suitable control measures.
<b>Program Specific Outcomes (PSOs)Electrical dept.</b>			
			1.Able to apply the knowledge gained during the course of the program from Mathematics, Basic Computing, Basic Sciences and Social Sciences in general and all electrical courses in particular to identify, formulate and solve real life problems faced in industries and/or during research work.
			2. Able to provide practically/socially acceptable technical solutions to electrical engineering problems with the application of appropriate techniques.
			3.Able to apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.
			4.Recognize the need for professionalism, excellence, and continuous improvement
<b>SE -ELECTRICAL ENGINEERING 2019 COURSE W.E.F.A.Y. 2020-21)</b>			
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
207006	C201	Engineering Mathematics III	At the end of this course, students will be able to:
			CO1:Solve higher order linear differential equation using appropriate techniques to model and analyze electrical circuits.
			CO2: Apply Integral transforms such as Laplace transform, Fourier transform and Z-Transform to solve problems related to signal processing and control systems
			CO3: Apply Statistical methods like correlation, regression and Probability theory as applicable to analyze and interpret experimental data related to energy management, power systems, testing and quality control
			CO4: Perform Vector differentiation and integration, analyze the vector fields and apply to wave theory and electro-magnetic fields.
			CO5: Analyze Complex functions, conformal mappings, and perform contour integration in the study of electrostatics, signal and image processing.

203141	C202	Power Generation Technologies	Upon successful completion of this course, the students will be able to: CO1: Identify components and elaborate working principle of conventional power plants. CO2: Recognize the importance and opportunities of renewable energies. CO3: Calculate and control power output of wind solar, and hydro power plant. CO4: Describe process of grid interconnection of distributed generation and requirements. CO5: Interpret the environmental and social impact of various generation technologies
203142	C203	Material Science	Upon successful completion of this course, the students will be able to : CO1: Discuss classification,properties and characteristics of different electrical engineering materials CO2: State various applicationsmeasuring methods for parameters of different classes of electrical engineering materials. CO3: Solve simple problems based on dielectric, magnetic and conducting materials. CO4: Apply knowledge of Nano-technology to electrical engineering. CO5: Execute tests ondielectric, insulating, magnetic, conducting, resistive materials as per IS to decide the quality of thematerials. CO6: Create learning resource material ethically to demonstrate self learning leading to lifelong learning skills and usage of ICT/ online technology through collaborative/active learning activities.
203143	C204	Analog and Digital Electronics	Upon successful completion of this course, the students will be able to :- CO1: Design logical, sequential and combinational digital circuit using K-Map. . CO2: Demonstrate different digital memories and programmable logic families CO3: Apply and analyze applications of OPAMP in open and closed loop condition. CO4: Design uncontrolled rectifier with given specifications
203144	C205	Electrical Measurement 2	After completion of this course, the students will be able to: CO1: Define various characteristic and classify measuring instruments along with range extension techniques. CO2: Apply measurement techniques for measurement of resistance, inductance and capacitance CO3: Demonstrate construction, working principle of electrodynamic type and induction type instruments for measurement of power and energy CO4: Make use of CRO for measurement of voltage, current and frequency. CO5: Classify transducer and apply it for measurement of physical parameters in real time
203150	C206	Applications of Mathematics in	At the end of this course, learner will be able to CO1: Apply fundamentals of mathematics in solving electrical engineering problem mathematical techniques. CO2: Analyze complex electrical engineering problem using CO3: Implement program and simulation for problems in electrical engineering. CO4: Demonstrate self lifelong learning skills with applications of mathematics in electrical engineering through software.
203151	C207	Soft Skill	Students will be able to :- CO1: DoSWOC analysis. CO2: Develop presentation and take part in group discussion. CO3: Understand and implement etiquette in workplace and in society at large. CO4: Work in team with team spirit. CO5: Utilize the techniques for time management and stress management.
203152	C208	Audit Course-III	Student will be able to CO1: Differentiate between types of solar Concentrators CO2: Apply software tool for solar concentrators CO3: Design different types of Solar collectors and balance of plant
203145 SEM- II	C209	Power System-I	Upon successful completion of this course, the students will be able to: CO1: Recognize different patterns of load curve and calculate associated different factors with it and tariff. CO2: Draft specifications of electrical equipment in power station. CO3: Design electrical and mechanical aspects in overhead transmission and underground cables. CO4: Evaluate the inductance and capacitance of different transmission line configurations. CO5: Analyse the performance of short and medium transmission lines
203146	C210	Electrical Machines I	Upon successful completion of this course, the students will be able to: CO1: Evaluate performance parameters of transformer with experimentation and demonstrate construction along with specifications as per standards. CO2: Distinguish between various types of transformer connections as per vector groups with application and to perform parallel operation of single/three phase transformers CO3: Select and draft specifications of DC machines and Induction motors for various applications along with speed control methods. CO4: Justify the need of starters in electrical machines with merits and demerits. CO5: Test and evaluate performance of DC machines and Induction motors as per IS standard
203147	C211	Network Analysis	Upon successful completion of this course, the students will be able to CO1: Calculate current/voltage in electrical circuits using simplification techniques, Mesh, Nodal analysis and network theorems. CO2: Analyze the response of RLC circuit with electrical supply in transient and stead state. CO3: Apply Laplace transform to analyze behaviour of an electrical circuit. CO4: Derive formula and solve numerical of two port network and Design of filters

			CO5: Apply knowledge of network theory to find transfer function, poles and zeroes location to perform stability analysis and parallel resonance
203148	C212	Numerical Methods &	On completion of the course, student will be able to
			CO1: Demonstrate types of errors in computation and their causes of occurrence.
			CO2: Calculate root of algebraic and transcendental equations using various methods.
			CO3: Apply numerical methods for various mathematical problems such as interpolation, numerical differentiation, integration and ordinary differential equation.
			CO4: Solve linear simultaneous equation using direct and indirect method.
			CO5: Develop algorithms and write computer programs for various numerical methods
203149	C213	Fundamental of Microcontroller	Upon successful completion of this course, the students will be able to:-
			CO1: Describe the architecture and features of various types of the microcontroller.
			CO2: Illustrate addressing modes and execute programs in assembly language for the microcontroller.
			CO3: Write programs in C language for microcontroller 8051.
			CO4: Elaborate interrupt structure of 8051 and program to handle interrupt and ADC809
			CO5: Define the protocol for serial communication and understand the microcontroller development systems.
			CO6: Interface input output devices and measure electrical parameters with 8051 in real time
203152	C214	Project Based Learning	At the end of this project-based learning, students will be able to
			CO1: Identify, formulate, and analyze the simple project problem.
			CO2: Apply knowledge of mathematics, basic sciences, and electrical engineering fundamentals to develop solutions for the project.
			CO3: Learn to work in teams, and to plan and carry out different tasks that are required during a project.
			CO4: Understand their own and their team-mate's strengths and skills.
			CO5: Draw information from a variety of sources and be able to filter and summarize the relevant points.
			CO6: Communicate to different audiences in oral, visual, and written forms
203153	C215	Audit Course-IV	Students will be able to
			CO1: design of Solar PV system for small and large installations
			CO2: handle software tools for Solar PV systems

**Program Specific Outcomes (PSOs) E&TC dept.**

1. Apply the fundamental concepts of electronics and telecommunication engineering to design a variety of systems for applications including embedded systems, VLSI, signal processing, image processing, communication, networking and control system.
2. An ability to isolate and solve complex problems in the domain of Electronics and Communication using latest hardware and software tools, along with analytical and managerial skills to arrive at cost effective and optimum solutions

**S.E (Electronics & Telecommunication Engineering Course 2019) (w.e.f. June 2020)**

COURSE	CODE	SUBJECT	Course Outcomes
207005 SEM	C201	Engineering	On completion of the course, learner will be able to –
			CO1: Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
			CO2: Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems
			CO3: Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing
			CO4: Perform vector differentiation & integration, analyze the vector fields and apply to electro- magnetic fields & wave theory.
			CO5: Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.
204181	C202	Electronic Circuits	On completion of the course, learner will be able to -
			CO1: Assimilate the physics, characteristics and parameters of MOSFET towards its application as amplifier.
			CO2: Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications.
			CO3: Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
			CO4: Explain internal schematic of Op-Amp and define its performance parameters.
			CO5: Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
			CO6: Understand and compare the principles of various data conversion techniques and PLL with their applications.
204182	C203	Digital Circuits	On completion of the course, learner will be able to
			CO1: Identify and prevent various hazards and timing problems in a digital design.
			CO2: Use the basic logic gates and various reduction techniques of digital logic circuit
			CO3: Analyze, design and implement combinational logic circuits.
			CO4: Analyze, design and implement sequential circuits.
			CO5: Differentiate between Mealy and Moore machines
			CO6: Analyze digital system design using PLD.

204183	C204	Electrical Circuits	On completion of the course, learner will be able to
			CO1: Analyze the simple DC and AC circuit with circuit simplification techniques.
			CO2: Formulate and analyze driven and source free RL and RC circuits
			CO3: Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
			CO4: Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
			CO5: Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
			CO6: Analyze and select a suitable motor for different applications.
204184	C205	Data structures	On completion of the course, learner will be able to
			CO1: Solve mathematical problems using C programming language.
			CO2: Implement sorting and searching algorithms and calculate their complexity
			CO3: Develop applications of stack and queue using array
			CO4: Demonstrate applicability of Linked List
			CO5: Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity
			CO6: Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.
204185	C206	Electronic Circuit Lab	
204186	C207	Digital circuits Lab	
204187	C208	Electrical Circuit	
204188	C209	Data Structures	
204189	C210	Electronic Skill	
204190	C211	Mandatory Aeronautics Course 2	
204191 SEM.	C212	Signals & Systems	On completion of the course, learner will be able to
			CO1: Identify, classify basic signals and perform operations on signals
			CO2: Identify, Classify the systems based on their properties in terms of input output relation and in terms of impulse response and will be able to determine the convolution between to signals.
			CO3: Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform
			CO4: Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms.
			CO5: Define and Describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF
			CO6: Compute the mean, mean square, variance and standard deviation for given random variables using PDF.
204192	C213	Control Systems	On completion of the course, learner will be able to -
			CO1: Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
			CO2: Determine the (absolute) stability of a closed-loop control system.
			CO4: Perform frequency domain analysis of control systems required for stability analysis.
			CO5: Apply root-locus, Frequency Plots technique to analyze control systems.
			CO6: Express and solve system equations in state variable form.
			CO7: Differentiate between various digital controllers and understand the role of the controllers in Industrial automation.
204193	C214	Principles of Communication	On completion of the course, learner will be able to
			CO1: To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
			CO2: Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
			CO3: Explain generation and detection of FM systems and compare with AM systems.
			CO4: Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
			CO5: Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
			CO6: Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission
204194	C215	Object Oriented Programming	On completion of the course, learner will be able to -
			CO1: Describe the principles of object oriented programming. CO2: Apply the concepts of data encapsulation, inheritance in C++.
			CO3: Understand Operator overloading and friend functions in C++.
			CO4: Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
			CO5: Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
			CO6: Describe and use of File handling in C++.
204195	C216	Signals & Control	
204196	C217	Principle of	
204197	C218	Object Oriented Programming Lab	
204198	C219	Data Analytics Lab	
204199	C220	Employability Skill Development	On completion of the course, learner will be able to
			CO1: Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.

			CO2: Develop effective communication skills (listening, reading, writing, and speaking), self- management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace
			CO3: Be a part of a multi-cultural professional environment and work effectively by enhancing inter-personal relationships, conflict management and leadership skills
			CO4: Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout certified career.
			CO5: Develop practically deployable skill set involving critical thinking, effective presentations and leadership qualities to hone the opportunities of employability and excel in the professional environment.
204200	C221	Project based Learning	On completion of the course, learner will be able to -
			CO1: Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aim and objectives
			CO2: Contribute to society through proposed solution by strictly following professional ethics and safety measures.
			CO3: Propose a suitable solution based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge.
			CO4: Analyze the results and arrive at valid conclusion.
			CO5: Use of technology in proposed work and demonstrate learning in oral and written form.
			CO6: Develop ability to work as an individual and as a team member.
204201	C222	Mandatory Audit Course 4	

TE Electrical Engineering ( 2015 COURSE W.E.F.A.Y. 2017-18)			
COURSE	CODE	SUBJECT	Course Outcomes
311121 SEM-I	C301	Industrial and Technology	1. Differentiate between different types of business organization and discuss the fundamentals of economics and management. 2.Explain the importance of technology management and quality management. 3.Describe the characteristics of marketing and its types. 4. Discuss the qualities of a good leader.
303141	C302	Advance Microcontroller	1.Explain architecture of PIC18F458 microcontroller, its instructions and the addressing modes. 2.Develop and debug program in assembly language or C language for specific applications 3. Use of an IDE for simulating the functionalities of PIC microcontroller and its use for software and hardware development 4. Interface a microcontroller to various devices.
303142	C303	Electrical Machines II	1. Learn construction & working principle of three phase synchronous machines. 2.Define regulation of alternator & calculate it by direct and indirect methods. 3. Study the methods of starting 3- phase synchronous motor, & its operation under Different conditions. 4. Learn Speed control methods of three phase induction motor. 5.Develop phasor diagram & circle diagram of a c series motor. 6.Develop equivalent circuit of single phase induction motor.
303143	C304	Power Electronics	1. Develop characteristics of different power electronic switching devices. 2. Reproduce working principle of power electronic converters for different types of loads. 3.Analyse the performance of power electronic converters.
303144	C305	Electrical Installation,M	1. Classify distribution systems, its types and substations. 2.Design of different earthing systems for residential and industrial premises. 3.Select methods of condition monitoring and testing of various Electrical Equipments. 4.Estimate and Costing of residential and industrial premises.
303145	C306	Seminar and Technical	1. Relate with the current technologies and innovations in Electrical engineering. 2.Improve presentation and documentation skill. 3.Apply theoretical knowledge to actual industrial applications and research activity. 4. Communicate effectively.
303146 SEM-II	C308	Power System II	1.Solve problems involving modelling, design and performance evaluation of HVDC and EHVAC power transmission lines. 2.Evaluate power flow in power transmission networks and apply power flow results to solve simple planning problems. 3. Calculate currents and voltages in a faulted power system under both symmetrical and asymmetrical faults, and relate fault currents to circuit breaker ratings.
303147	C309	Control System I	1.Model physical system, 2.Determine time response of linear system, 3.Analyse stability of LTI system, 4.Design PID controller for LTI system
303148	C310	Utilization of Electrical	1.Ensure that the knowledge acquired can be applied in various fields such as electric heating, illumination, chemical processes, and electric traction. 2. Make the students aware about the importance of maximizing the energy efficiency by optimum utilization of electrical energy. 3. Develop ability amongst the students to design -heating element for resistance furnaces and design- illumination schemes. To develop ability amongst the students to analyze the performance of arc furnaces, electric traction, different sources of light, illumination schemes 4.Provide know how about Refrigeration, Air Conditioning 5. Provide know about electrochemical processes and applications of these in practical world, modern welding techniques.

			6. Develop self and lifelong learning skills, introduce professionalism for successful career.
303149	C311	Design of Electrical Machines	1. Calculate main dimensions and Design of single phase and three phase transformer. 2. Calculate main dimensions of three phase Induction motor. 3. Determine the parameters of transformer. 4. Determine parameters of three phase Induction motor.
303150	C312	Energy Audit and Management	1. To get knowledge of BEE Energy policies, Electricity Acts. 2. Use various energy measurement and audit instruments. 3. Carry out preliminary energy audit of various sectors 4. Enlist energy conservation and demand side measures for electrical, thermal and utility Systems. 5. Solve simple problems on cost benefit analysis.
303151	C313	Electrical Workshop	1. Integrate electrical/electronic circuits for useful applications 2. Acquire hardware skills to fabricate circuits designed. 3. Read data manuals/data sheets of different items involved in the circuits. 4. Test and debug circuits. 5. Produce the results of the testing in the form of report.

**TE Information Tecgnology ( 2015 COURSE W.E.F.A.Y. 2017-18)**

COURSE	CODE	SUBJECT	Course Outcomes
314441 SEM-I	C301	Theory of Automata	1. To construct finite state machines to solve problems in computing. 2. To write mathematical expressions for the formal languages 3. To apply well defined rules for syntax verification. 4. To construct and analyze Push Down, Post and Turing Machine for formal languages. 5. To express the understanding of the decidability and decidability problems. 6. To express the understanding of computational complexity.
314442	C302	Database Management	1. To define basic functions of DBMS & RDBMS. 2. To analyze database models & entity relationship models. 3. To design and implement a database schema for a given problem-domain. 4. To populate and query a database using SQL DML/DDI commands. 5. Do Programming in PL/SQL including stored procedures, stored functions, cursors and packages. 6. To appreciate the impact of analytics and big data on the information industry and the external ecosystem for analytical and data services.
314443	C303	Software Engineering & Project Management	1. To identify unique features of various software application domains and classify software applications. 2. To choose and apply appropriate lifecycle model of software development. 3. To describe principles of agile development, discuss the SCRUM process and distinguish agile process model from other process models. 4. To analyze software requirements by applying various modeling techniques. 5. To list and classify CASE tools and discuss recent trends and research in software engineering. 6. To understand IT project management through life cycle of the project and future trends in IT Project Management.
314444	C304	Operating System	1. Fundamental understanding of the role of Operating Systems. 2. To understand the concept of a process and thread. 3. To apply the cons of process/thread scheduling. 4. To apply the concept of process synchronization, mutual exclusion and the deadlock. 5. To realize the concept of I/O management and File system. 6. To understand the various memory management techniques
314445	C305	Human -Computer Interaction	1. To explain importance of HCI study and principles of user-centred design (UCD) approach. 2. To develop understanding of human factors in HCI design. 3. To develop understanding of models, paradigms and context of interactions. 4. To design effective user-interfaces following a structured and organized UCD process. 5. To evaluate usability of a user-interface design. 6. To apply cognitive models for predicting human-computer-interactions.
314446	C306	Software Laboratory- I	1. Understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation. 2. To provide a strong formal foundation in database concepts, recent technologies and best industry practices. 3. To give systematic database design approaches covering conceptual design, logical design and an overview of physical design. 4. To learn the SQL and NoSQL database system. 5. To learn and understand various Database Architectures and its use for application development. 6. To programme PL/SQL including stored procedures, stored functions, cursors and packages.
314447	C307	Software Laboratory- II	1. To understand the basics of Linux commands and program the shell of Linux. 2. To develop various system programs for the functioning of operating system. 3. To implement basic building blocks like processes, threads under the Linux. 4. To develop various system programs for the functioning of OS concepts in user space like concurrency control and file handling in Linux. 5. To design and implement Linux Kernel Source Code. 6. To develop the system program for the functioning of OS concepts in kernel space like embedding the system call in any Linux kernel
314448	C308	Software Laboratory- III	1. To identify the needs of users through requirement gathering. 2. To apply the concepts of Software Engineering process models for project development. 3. To apply the concepts of HCI for user-friendly project development.

			4. To deploy website on live webserver and access through URL.
			5. To understand, explore and apply various web technologies.
			6. To develop team building for efficient project development.
314449	C309	Audit Course 3	
		AC3- I : Green Construc	1. To understand the importance of environment friendly society.
			2. To apply primary measures to reduce carbon emissions from their surroundings.
			3. To learn role of IT solutions in design of green buildings.
			4. To understand the use of software systems to complete statutory compliancesinvolved in the design of a new home or office building through green construction.
		Audit Course 3 - II : Leadership and	1. To exhibit responsible decision-making and personal accountability
			2. To demonstrate an understanding of group dynamics and effective teamwork
			3. To develop a range of leadership skills and abilities such as effectively leading change, resolving conflict, and motivating others.
			4. To develop overall personality.
		Audit Course 3 – III : Professional Ethics	1. To summarize the principles of proper courtesy as they are practiced in the workplace.
			2. To describe ways to apply proper courtesy in different professional situations.
			3. To practice appropriate etiquettes in the working environment and day to day life.
			4. To learn and build proper practices for global corporate world.
		Audit Course 3 – IV : Digital & Social Media	1. Develop a far deeper understanding of the changing digital landscape.
			2. Identify some of the latest digital marketing trends and skill sets needed for today's marketer.
			3. Successful planning, prediction, and management of digital marketing campaigns.
			4. Implement smart management of different digital assets for marketing needs. Assess digital marketing as a long term career opportunity.
314450 SEM-I	C310	Computer Network Tec	1. To know Responsibilities, services offered and protocol used at each layer of network.
			2. To understand different addressing techniques used in network.
			3. To know the difference between different types of network.
			4. To know the different wireless technologies and IEEE standards.
			5. To use and apply the standards and protocols learned, for application development.
			6. To understand and explore recent trends in network domain.
314451	C311	Systems Programming	1. To learn independently modern software development tools and creates novel solutions for language processing applications.
			2. To design and implement assemblers and macro processors.
			3. To use tool LEX for generation of Lexical Analyzer.
			4. To use YACC tool for generation of syntax analyzer.
			5. To generate output for all the phases of compiler.
			6. To apply code optimization in the compilation process.
314452	C312	Design and Analysis of	1. To calculate computational complexity using asymptotic notations for various algorithms.
			2. To apply Divide & Conquer as well as Greedy approach to design algorithms.
			3. To practice principle of optimality.
			4. To illustrate different problems using Backtracking.
			5. To compare different methods of Branch and Bound strategy.
			6. To explore the concept of P, NP, NP-complete, NP-Hard and parallel algorithms.
314453	C313	Cloud Computing	1. To understand the need of Cloud based solutions.
			2. To understand Security Mechanisms and issues in various Cloud Applications
			3. To explore effective techniques to program Cloud Systems.
			4. To understand current challenges and trade-offs in Cloud Computing.
			5. To find challenges in cloud computing and delve into it to effective solutions.
			6. To understand emerging trends in cloud computing.
314454	C314	Data Science & Big Data	1. To understand Big Data primitives.
			2. To learn and apply different mathematical models for Big Data.
			3. To demonstrate their Big Data learning skills by developing industry or research applications.
			4. To analyze each learning model come from a different algorithmic approach and it will perform differently under different datasets.
			5. To understand needs, challenges and techniques for big data visualization.
			6. To learn different programming platforms for big data analytics.
314455	C315	Software Laboratory- IV	1. To implement small size network and its use of various networking commands.
			2. To understand and use various networking and simulations tools.
			3. To configure various client/server environments to use application layer protocols
			4. To understand the protocol design at various layers.
			5. To explore use of protocols in various wired and wireless applications.
			6. To develop applications on emerging trends.
314456	C316	Software Laboratory- V	1. To design and implement two pass assembler for hypothetical machine instructions.
			2. To design and implement different phases of compiler ( Lexical Analyzer, Parser, Intermediate code generation)
			3. To use the compile generation tools such as "Lex" and "YACC".
			4. To apply algorithmic strategies for solving various problems.
			5. To compare various algorithmic strategies.
			6. To analyze the solution using recurrence relation.
314457	C317	Software Laboratory- V	1. To apply Big data primitives and fundamentals for application development.



			2. To explore different Big data processing techniques with use cases.
			3. To apply the Analytical concept of Big data using R/Python.
			4. To visualize the Big Data using Tableau.
			5. To design algorithms and techniques for Big data analytics.
			6. To design Big data analytic application for emerging trends.
314458	C318	Project Based Seminar	1. To Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
			2. To write a technical report summarizing state-of-the-art on an identified topic.
			3. Present the study using graphics and multimedia presentations.
			4. Define intended future work based on the technical review.
			5. To explore and enhance the use of various presentation tools and techniques.
			6. To understand scientific approach for literature survey and paper writing.
314459	C319	Audit Course 4	
		Audit Course 4 - I : Intellectual Property	1. To understand Intellectual Property Rights (IPR).
			2. To explore applications of Trademark, Industrial Designs, Copyright and Trade Secret.
			3. To understand function of USPTO, EPO.
			4. To know the process of filing patent with IPO.
			5. To understand the process of copyright and licensing.
<b>TE Mechanical Engineering ( 2015 COURSE W.E.F.A.Y. 2017-18)</b>			
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
302041 SEM I	C301	Design of Machine Elements	1. Ability to identify and understand failure modes for mechanical elements and design of machine elements based on strength.
			2. Ability to design Shafts, Keys and Coupling for industrial applications.
			3. Ability to design machine elements subjected to fluctuating loads.
			4. Ability to design Power Screws for various applications.
			5. Ability to design fasteners and welded joints subjected to different loading conditions.
			6. Ability to design various Springs for strength and stiffness.
302142	C302	Heat Transfer	CO 1: Analyze the various modes of heat transfer and implement the basic heat conduction equations for steady one dimensional thermal system.
			CO 2: Implement the general heat conduction equation to thermal systems with and without internal heat generation and transient heat conduction.
			CO 3: Analyze the heat transfer rate in natural and forced convection and evaluate through experimentation investigation.
			CO 4: Interpret heat transfer by radiation between objects with simple geometries. CO 5: Analyze the heat transfer equipment and investigate the performance.
302043	C303	Theory of Machines -II	1. Student will be able to understand fundamentals of gear theory which will be the prerequisite for gear design.
			2. Student will be able to perform force analysis of Spur, Helical, Bevel, Worm and Worm gear.
			3. The student to analyze speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design.
			4. Student will be able to design cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves.
			5. The student will synthesize a four bar mechanism with analytical and graphical methods.
			6. a. The student will analyze the gyroscopic couple or effect for stabilization of Ship Aeroplane and Four wheeler vehicle. b. Student will choose appropriate drive for given application (stepped / step-less).
302044	C304	Turbo Machines	1. Apply thermodynamics and kinematics principles to turbo machines.
			2. Analyze the performance of turbo machines.
			3. Ability to select turbo machine for given application.
			4. Predict performance of turbo machine using model analysis.
302045	C305	Metrology and Quality	1. Understand the methods of measurement, selection of measuring instruments / standards of measurement, carryout data collection and its analysis.
			2. Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design
			3. Understand and use/apply Quality Control Techniques/ Statistical Tools appropriately.
			4. Develop an ability of problem solving and decision making by identifying and analyzing the cause for variation and recommend suitable corrective actions for quality improvement.
302047 SEM I	C307	Numerical Methods and Optimization	1. Use appropriate Numerical Methods to solve complex mechanical engineering problems.
			2. Formulate algorithms and programming.
			3. Use Mathematical Solver.
			4. Generate Solutions for real life problem using optimization techniques.
			5. Analyze the research problem
302048	C308	Design of Machine Elements	CO 1: To understand and apply principles of gear design to spur gears and industrial spur gear boxes.
			CO 2 : To become proficient in Design of Helical and Bevel Gear
			CO 3: To develop capability to analyse Rolling contact bearing and its selection from manufacturer's Catalogue.
			CO 4: To learn a skill to design worm gear box for various industrial applications.
			CO 5: To inculcate an ability to design belt drives and selection of belt, rope and chain drives. CO 6: To achieve an expertise in design of Sliding contact bearing in industrial applications.
302049	C309	Refrigeration and Air Conditioning	1. Illustrate the fundamental principles and applications of refrigeration and air conditioning system

			2. Obtain cooling capacity and coefficient of performance by conducting test on vapour compression refrigeration systems
			3. Present the properties, applications and environmental issues of different refrigerants.
			4. Calculate cooling load for air conditioning systems used for various.
			5. Operate and analyze the refrigeration and air conditioning systems.
302050	C310	Mechatronics	1. Identification of key elements of mechatronics system and its representation in terms of block diagram.
			2. Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O.
			3. Interfacing of Sensors, Actuators using appropriate DAQ micro-controller.
			4. Time and Frequency domain analysis of system model (for control application)
			5. PID control implementation on real time systems
			6. Development of PLC ladder programming and implementation of real life system.
302051	C311	Manufacturing Process	1. Student should be able to apply the knowledge of various manufacturing processes.
			2. Student should be able to identify various process parameters and their effect on processes.
			3. Student should be able to figure out application of modern machining.
			4. Students should get the knowledge of Jigs and Fixtures for variety of operations.
302052	C312	MACHINE SHOP – II	1. Ability to develop knowledge about the working and programming techniques for various machines and tools
302053	C313	Mechanical & Automot	1. Establish motivation for any topic of interest and develop a thought process for technical presentation.
			2. Organize a detailed literature survey and build a document with respect to technical publications.
			3. Analysis and comprehension of proof-of-concept and related data.
			4. Effective presentation and improve soft skills.
			5. Make use of new and recent technology (e.g. Latex) for creating technical reports
302054	C314	Audit Course	
		Fire & Safety Techno	1. To create and sustain a community of learning in which students acquire knowledge in fire, safety and hazard management and learn to apply it professionally with due consideration for ethical, human life & property safety issues.
			2. To pursue research and development in fire safety engineering, hazard management and disseminate its findings.
			3. To meet the challenges of today and tomorrow in the most effective, efficient and contemporary educational manner.
			4. To help in building national capabilities in fire safety engineering, disaster management, hazard management, industrial safety education through practical training to ensure a fire safe nation.
		Audit Course II - Entrepreneurship	1. Appreciate the concept of Entrepreneurship
			2. Identify entrepreneurship opportunity.
			3. Develop winning business plans
		Audit Course IV - Lean Management	1. Will be able to do practice Lean Management at the workplace
			2. Will be able to contribute in Continuous Improvement program of the Organization
		Audit Course V - Smart Manufacturing	1. Comfortable with terminology and practices in Smart Manufacturing
			2. Able to face the challenges in Industry & also contribute towards advancement.
			3. Active part of Industry 4.0 (Fourth Industrial Revolution)
<b>TE E &amp; TC ( 2015 COURSE W.E.F.A.Y. 2017-18)</b>			
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
304181 SEM I	C301	Digital Communication	1) Understand working of waveform coding techniques and analyse their performance.
			2) Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
			3) Perform the time and frequency domain analysis of the signals in a digital communication system.
			4) Design of digital communication system.
			5) Understand working of spread spectrum communication system and analyze its performance.
304182	C302	Digital Signal Processing	1) Analyze the discrete time signals and system using different transform domain techniques.
			2) Design and implement LTI filters for filtering different real world signals.
			3) Develop different signal processing applications using DSP processor.
304183	C303	Electromagnetics	1) Understand the basic mathematical concepts related to electromagnetic vector fields.
			2) Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density.
			3) Apply the principles of magnetostatics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.
			4) Understand the concepts related to Faraday's law, induced emf and Maxwell's equations.
			5) Apply Maxwell's equations to solutions of problems relating to transmission lines and uniform plane wave propagation.
304184	C304	Microcontrollers	1) Learn importance of microcontroller in designing embedded application.
			2) Learn use of hardware and software tools.
			3) Develop interfacing to real world devices.
304185	C305	Mechantronics	1 Identification of key elements of mechatronics system and its representation in terms of block diagram.
			2 Understanding basic principal of Sensors and Transducer.
			3. Able to prepare case study of the system given.
304193	C308	Electronics System Design	1. Apply the fundamental concepts and working principles of electronics devices to design electronics systems.
			2. Shall be able to interpret datasheets and thus select appropriate components and devices
			3. Select appropriate transducer and signal conditioning circuit to design prototype of Data Acquisition system.
			4. Design an electronic system/sub-system and validate its performance by simulating the same.

			5. Shall be able to use an EDA tool for circuit schematic and simulation.
			6. Create, manage the database and query handling using suitable tools.
304186 SEM I	C310	Power Electronics	1.Design & implement a triggering / gate drive circuit for a power device
			2.Understand, perform & analyze different controlled converters.
			3.Evaluate battery backup time & design a battery charger.
			4. Design & implement over voltage / over current protection circuit.
304187	C311	Information Theory, Coding and	1. Perform information theoretic analysis of communication system.
			2.Design a data compression scheme using suitable source coding technique.
			3. Design a channel coding scheme for a communication system.
			4. Understand and apply fundamental principles of data communication and networking.
			5.Apply flow and error control techniques in communication networks.
304188	C312	Business Management	1. Get overview of Management Science aspects useful in business.
			2.Get motivation for Entrepreneurship
			3.Get Quality Aspects for Systematically Running the Business
			4.To Develop Project Management aspect and Entrepreneurship Skills.
304189	C313	Advanced Processors	1.Describe the ARM microprocessor architectures and its feature.
			2. Interface the advanced peripherals to ARM based microcontroller
			3.Design embedded system with available resources.
			4.Use of DSP Processors and resources for signal processing applications.
304190	C314	System Programming	1) Demonstrate the knowledge of Systems Programming and Operating Systems
			2) Formulate the Problem and develop the solution for same.
			3) Compare and analyse the different implementation approach of system programming operating system abstractions.
			4) Interpret various OS functions used in Linux / Ubuntu
304196	C317	Employability Skill and Mini Project	1.Understand, plan and execute a Mini Project with team.
			2. Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting e
			3.Prepare a technical report based on the Mini project.
			4.Deliver technical seminar based on the Mini Project work carried out.
<b>TE COMPUTE ENGINEERING ( 2015 COURSE W.E.F.A.Y. 2017-18)</b>			
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
310241 SEM-I	C301	Theory of Computation	1.design deterministic Turing machine for all inputs and all outputs
			2.subdivide problem space based on input subdivision using constraints
			3.apply linguistic theory
310242	C302	Database Management	1.Design E-R Model for given requirements and convert the same into database tables.
			2. Use database techniques such as SQL & PL/SQL.
			3. Use modern database techniques such as NOSQL.
			4. Explain transaction Management in relational database System.
			5.Describe different database architecture and analyses the use of appropriate architecture in real time environment.
			6.Use advanced database Programming concepts
310243	C303	Software Engineering &	1. Decide on a process model for a developing a software project
			2.Classify software applications and Identify unique features of various domains
			3. Design test cases of a software system.
			4.Understand basics of IT Project management.
			5.Plan, schedule and execute a project considering the risk management.
			6.Apply quality attributes in software development life cycle.
310244	C304	Information Systems &	1.Understand the need, usage and importance of an Information System to an organization.
			2.Understand the activities that are undertaken while managing, designing, planning, implementation, and deployment of computerized information system in an organization.
			3.Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organizations
			4.Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.
			5. Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
			6.Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
310245	C305	Computer Network (CN)	1. Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies
			2. Demonstrate design issues, flow control and error control
			3. Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols.
			4.Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.
			5.Illustrate Client-Server architectures and prototypes by the means of correct standards and technology.
			6.Demonstrate different routing and switching algorithms
310246	C306	Skill Development Lab	1. Evaluate problems and analyze data using current technologies in a wide variety of business and organizational contexts.
			2.Create data-driven web applications
			3.Incorporate best practices for building applications

			4. Employ Integrated Development Environment(IDE) for implementing and testing of software solution
			5. Construct software solutions by evaluating alternate architectural patterns.
310247	C307	Database Management	1.Develop the ability to handle databases of varying complexities
			2.Use advanced database Programming concepts
310248	C308	Computer Networks I	1.Demonstrate LAN and WAN protocol behavior using Modern Tools.
			2. Analyze data flow between peer to peer in an IP network using Application, Transport and Network Layer Protocols.
			3.Demonstrate basic configuration of switches and routers.
			4.Develop Client-Server architectures and prototypes by the means of correct standards and technology.
310249	C309	Audit Course 3	
	C310	AC3-I Cyber Security	1. Compare the interrelationships among security roles and responsibilities in a modern information-driven enterprise—to include interrelationships across security domains (IT, physical, classification, personnel, and so on)
			2. Assess the role of strategy and policy in determining the success of information security;
			3.Estimate the possible consequences of misaligning enterprise strategy, security policy, and security plans;
	C311	AC3-II Professional Eth	1.understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
			2.Understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
			3.Follow Ethics as an engineering professional and adopt good standards & norms of engineering practice.
			4.apply ethical principles to resolve situations that arise in their professional lives
	C312	AC3 - III Emotional Inte	1. Expand your knowledge of emotional patterns in yourself and others
			2.Discover how you can manage your emotions, and positively influence yourself and others
			3. Build more effective relationships with people at work and at home
			4. Positively influence and motivate colleagues, team members, managers
			5.Increase your leadership effectiveness by creating an atmosphere that engages others
			6.Apply EI behaviors and supports high performance
310250 SEM-II	C315	Design & Analysis of Al	1.Formulate the problem
			2.Analyze the asymptotic performance of algorithms
			3.Decide and apply algorithmic strategies to solve given problem
			4.Find optimal solution by applying various methods
310251	C316	Systems Programming & I	1.Analyze and synthesize system software
			2.Use tools like LEX & YACC.
			3.Implement operating system functions.
310252	C317	Embedded Systems & I	1.Implement an architectural design for IoT for specified requirement
			2.Solve the given societal challenge using IoT
			3.Choose between available technologies and devices for stated IoT challenge
310253	C318	Software Modeling and	1. Analyze the problem statement (SRS) and choose proper design technique for designing web- based/ desktop application
			2.Design and analyze an application using UML modeling as fundamental tool
			3.Apply design patterns to understand reusability in OO design
			4.Decide and apply appropriate modern tool for designing and modeling
			5.Decide and apply appropriate modern testing tool for testing web-based/desktop application
310254	C319	Web Technology	1.analyze given assignment to select sustainable web development and design methodology
			2.develop web based application using suitable client side and server side web technologies
			3.develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
310255	C320	Seminar & Technical Co	1.be able to be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation.
			2. be able to improve skills to read, understand, and interpret material on technology.
			3.improve communication and writing skills
310256	C321	Web Technology Lab	1.develop web based application using suitable client side and server side web technologies
			2.develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
310257	C322	System Programming	1. Understand the internals of language translators
			2.Handle tools like LEX & YACC.
			3.Understand the Operating System internals and functionalities with implementation point of view
310258	C323	Embedded Systems & I	1.Design the minimum system for sensor based application
			2.Solve the problems related to the primitive needs using IoT
			3.Develop full fledged IoT application for distributed environment
310259	C324	Audit Course 4	
	C325	AC4-I Digital and Social	1.Create editorial calendars to manage content distribution.
			2.Use Social Listening tools to create timely, relevant content.
			3.Create Social Media policies that combine business objectives with appropriate use of social media channels and content.
	C326	AC4-II Green Computin	1. Understand the concept of green IT and relate it to sustainable development.
			2.Apply the green computing practices to save energy.
			3. Discuss how the choice of hardware and software can facilitate a more sustainable operation,
			4.Use methods and tools to measure energy consumption

	C327	AC4 -III Sustainable Energy	1.Demonstrate an overview of the main sources of renewable energy. 2.Understand benefits of renewable and sustainable energy systems.
	C328	AC4 -IV Leadership and Personality	1. Enhance holistic development of students and improve employability skills
<b>BE FINAL YEAR COMPUTER ENGINEERING 2015 COURSE W.E.F.A.Y. 2018-19</b>			
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
410241 SEM	401	High Performance Computing	
			1 Describe different parallel architectures, inter-connect networks, programming models
			2 Develop an efficient parallel algorithm to solve given problem
			3 Analyze and measure performance of modern parallel computing systems
			4 Build the logic to parallelize the programming task
410242	402	Artificial Intelligence and Robotics	
			1 Identify and apply suitable Intelligent agents for various AI applications
			2 Design smart system using different informed search / uninformed search or heuristic approaches.
			3 Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
			4 Apply the suitable algorithms to solve AI problems
410243	403	Data Analytics	
			1.Write case studies in Business Analytic and Intelligence using mathematical models
			2.Present a survey on applications for Business Analytic and Intelligence
			3 Provide problem solutions for multi-core or distributed, concurrent/Parallel environments
410244 (A)	404	Digital Signal Processing	
			1. Understand the mathematical models and representations of DT Signals and System
			2. Apply different transforms like Fourier and Z-Transform from applications point of view
			3. Understand the design and implementation of DT systems as DT filters with filter structures and different transforms
			4. Demonstrate the knowledge of signals and systems for design and analysis of systems
			5.Apply knowledge and use the signal transforms for digital processing applications
410244 (B)	405	Software Architecture and Design	
			1.Express the analysis and design of an application
			2.Specify functional semantics of an application
			3. Evaluate software architectures
			4 Select and use appropriate architectural styles and software design patterns
410244 (C)	406	Pervasive and Ubiquitous Computing	
			1. Design and implement primitive pervasive applications
			2. Analyze and estimate the impact of pervasive computing on future computing applications and society
			3. Develop skill sets to propose solutions for problems related to pervasive computing system
			4.Design a preliminary system to meet desired needs within the constraints of a particular problem space
410244 (D)	407	Data Mining and Warehousing	
			1.Apply basic, intermediate and advanced techniques to mine the data
			2.Analyze the output generated by the process of data mining
			3. Explore the hidden patterns in the data
			4. Optimize the mining process by choosing best data mining technique
410245 (A)	408	Distributed Systems	
			1. Able to learn and apply the concept of remote method invocation and Remote Procedure Calls
			2.Able to analyze the mechanism of peer to peer systems and Distributed File Systems
			3. Demonstrate an understanding of the challenges faced by current and future distributed systems
410245 (B)	409	Software Testing and Quality	
			1. Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance.
			2.Design and develop project test plan, design test cases, test data, and conduct test operations
			3. Apply recent automation tool for various software testing for testing software
			4.Apply different approaches of quality management, assurance, and quality standard to software system
			5.Apply and analyze effectiveness Software Quality Tools
410245 (C)	410	Operations Research	
			1. Use appropriate decision making approaches and tools
			2. Build various dynamic and adaptive models
			3. Develop critical thinking and objective analysis of decision problems
			4.Apply the OR techniques for efficacy
410245 (D)	411	Mobile Communication	
			1. Justify the Mobile Network performance parameters and design decisions.
			2. Choose the modulation technique for setting up mobile network.
			3. Formulate GSM/CDMA mobile network layout considering futuristic requirements which conforms to the technology.
			4. Use the 3G/4G technology based network with bandwidth capacity planning.
			5. Percept to the requirements of next generation mobile network and mobile applications.
410246	412	I	

			1. Practical hands on is the absolute necessity as far as employability of the learner is concerned. The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses
410247	413	II	
			Practical hands on is the absolute necessity as far as employability of the learner is concerned. The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses. Enough choice is provided to the learner to choose an elective of one's interest.
410248	414	Project Work Stage I	
			1. Solve real life problems by applying knowledge.
			2. Analyze alternative approaches, apply and use most appropriate one for feasible solution.
			3. Write precise reports and technical documents in a nutshell.
			4. Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work, Inter-personal relationships, conflict management and leadership quality.
410249	415	Audit Course 5	
		AC5-I Entrepreneurship Development	
			1. Understand the legalities in product development
			2. Undertake the process of IPR, Trademarks, Copyright and patenting
			3. Understand and apply functional plans
			4. Manage Entrepreneurial Finance
			5. Inculcate managerial skill as an entrepreneur
		AC5-II: Botnet of Things	
			1. Implement security as a culture and show mistakes that make applications vulnerable to attacks.
			2. Understand various attacks like DoS, buffer overflow, web specific, database specific, web - spoofing attacks.
			3. Demonstrate skills needed to deal with common programming errors that lead to most security problems and to learn how to develop secure applications
		AC5-III 3D Printing	
			1. Apply models for 3D printing
			2. Plan the resources for 3D printing
			3. Apply principles in 3D printing in real world
		AC5-IV: Industrial Safety and Environment	
			1. Formulate the plan for Safety performance
			2. Formulate the action plan for accidents and hazards
			3. Follow the safety and security norms in the industry
			4. Consider critically the environmental issues of Industrialization
		AC5-V: Emotional Intelligence	
			1. Expand your knowledge of emotional patterns in yourself and others
			2. Discover how you can manage your emotions, and positively influence yourself and others
			3. Build more effective relationships with people at work and at home
			4. Positively influence and motivate colleagues, team members, managers
			5. Increase the leadership effectiveness by creating an atmosphere that engages others
		AC5-VI: MOOC- Learn New Skills	
			On completion of the course, learner will acquire additional knowledge and skill.
410250 SE	418	Machine Learning	
			1. Distinguish different learning based applications
			2. Apply different preprocessing methods to prepare training data set for machine learning.
			3. Design and implement supervised and unsupervised machine learning algorithm.
			4. Implement different learning models
			5. Learn Meta classifiers and deep learning concepts
410251	419	Cyber Security	
			1. Gauge the security protections and limitations provided by today's technology.
			2. Identify information security and cyber security threats.
			3. Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.
			4. Build appropriate security solutions against cyber-attacks.
410252 (A)	420	Advanced Digital Signal Processing	
			1. Understand and apply different transforms for the design of DT/Digital systems
			2. Explore the knowledge of adaptive filtering and Multi-rate DSP
			3. Design DT systems in the field/area of adaptive filtering, spectral estimation and multi-rate DSP
			4. Explore use of DCT and WT in speech and image processing
			5. Develop algorithms in the field of speech, image processing and other DSP applications
410252 (B)	421	Compilers	
			1. Design and implement a lexical analyzer and a syntax analyzer
			2. Specify appropriate translations to generate intermediate code for the given programming language construct
			3. Compare and contrast different storage management schemes
			4. Identify sources for code optimization
410252 (C)	422	Embedded and Real Time Operating Systems	

			1. Recognize and classify embedded and real-time systems
			2. Explain communication bus protocols used for embedded and real-time systems
			3. Classify and exemplify scheduling algorithms
			4. Apply software development process to a given RTOS application
			5. Design a given RTOS based application
410252 (D)	423	Soft Computing and Optimization Algorithms	
			1. Apply soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy inference systems and genetic algorithms
			2. Design and development of certain scientific and commercial application using computational neural network models, fuzzy models, fuzzy clustering applications and genetic algorithms in specified applications.
410253 (A)	424	Software Defined Networks	
			1. Interpret the need of Software Defined Networking solutions.
			2. Analyze different methodologies for sustainable Software Defined Networking solutions.
			3. Select best practices for design, deploy and troubleshoot of next generation networks.
			4. Develop programmability of network elements.
			5. Demonstrate virtualization and SDN Controllers using OpenFlow protocol
410253 (B)	425	Human Computer Interface	
			1. Evaluate the basics of human and computational abilities and limitations.
			2. Inculcate basic theory, tools and techniques in HCI.
			3. Apply the fundamental aspects of designing and evaluating interfaces.
			4. Apply appropriate HCI techniques to design systems that are usable by people
410253 (C)	426	Cloud Computing	
			1. To install cloud computing environments.
			2. To develop any one type of cloud
			3. To explore future trends of cloud computing
410253 (D)	427	Open Elective	
410254	428	Laboratory Practice III	
			Practical hands on is the absolute necessity as far as employability of the learner is concerned. The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses.
410255	429	Laboratory Practice IV	
			solely intended to enhance the competency by undertaking the laboratory assignments of the elective courses. Enough choice is provided to the learner to choose an elective of one's interest.
410256	430	Project Work Stage II	
			1. Show evidence of independent investigation
			2. Critically analyze the results and their interpretation.
			3. Report and present the original results in an orderly way and placing the open questions in the right perspective.
			4. Link techniques and results from literature as well as actual research and future research lines with the research.
410257	431	Audit Course 6	
			1. Apply the concepts of Business Intelligence in real world applications
			2. Explore and use the data warehousing wherever necessary
			3. Design and manage practical BI systems
410257		AC6-I: Business Intelligence	
			1. Apply the concepts of Business Intelligence in real world applications
			2. Explore and use the data warehousing wherever necessary
			3. Design and manage practical BI systems
410257		AC6-II: Gamification	
			1. To write survey on the gamification paradigms.
			2. To write programs to solve problems using gamification and open source tools.
			3. To solve problems for multi-core or distributed, concurrent/Parallel environments
410257		Usability Engineering	
			1. Describe the human centered design process and usability engineering process and their roles in system design and development.
			2. Discuss usability design guidelines, their foundations, assumptions, advantages, and weaknesses.
			3. Design a user interface based on analysis of human needs and prepare a prototype system.
			4. Assess user interfaces using different usability engineering techniques.
410257		AC6-V: Conversational Interfaces	
			1. Develop an effective interface for conversation
			2. Explore advanced concepts in user interface
BE	BE Final Year of Mechanical Engineering ( 2015 COURSE W.E.F.A.Y. 2018-19)		
COURSE	CODE	SUBJECT	Course Outcomes
402041 SEM-I	401	Hydraulics and Pneumatics	
			1. Understand working principle of components used in hydraulic & pneumatic systems

			2. Identify various applications of hydraulic & pneumatic systems
			3. Selection of appropriate components required for hydraulic and pneumatic systems
			4. Analyse hydraulic and pneumatic systems for industrial/mobile applications
402042	402	CAD CAM	
			1. Apply homogeneous transformation matrix for geometrical transformations of 2D CAD entities for basic geometric transformations.
			2. Use analytical and synthetic curves and surfaces in part modeling.
			3. Do real times analysis of simple mechanical elements like beams, trusses, etc. and comment on safety of engineering components using analysis software.
			4. Generate CNC program for Turning / Milling and generate tool path using CAM software.
			5. Demonstrate understanding of various rapid manufacturing techniques and develop competency in designing and developing products using rapid manufacturing technology.
			6. Understand the robot systems and their applications in manufacturing industries
402043	403	Dynamics of	
			1. Apply balancing technique for static and dynamic balancing of multi cylinder inline and radial engines.
			2. Estimate natural frequency for single DOF undamped & damped free vibratory systems.
			3. Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
			4. Estimate natural frequencies, mode shapes for 2 DOF undamped free longitudinal and torsional vibratory systems.
			5. Describe vibration measuring instruments for industrial / real life applications along with suitable method for vibration control.
			6. Explain noise, its measurement & noise reduction techniques for industry and day today life problems.
402044 A	404	Finite Element	
			1. Understand the different techniques used to solve mechanical engineering problems.
			2. Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods to solve for displacements and stresses.
			3. Apply mechanics of materials and machine design topics to provide preliminary results used for testing the reasonableness of finite element results.
			4. Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis.
			5. Use commercial finite element analysis software to solve complex problems in solid mechanics and heat transfer.
			6. Interpret the results of finite element analyses and make an assessment of the results in terms of modeling (physics assumptions) errors, discretization (mesh density and refinement toward convergence) errors, and numerical (round-off) errors.
402044 B	405	Computational	
			1. Analyze and model fluid flow and heat transfer problems.
			2. Generate high quality grids and interpret the correctness of numerical results with physics.
			3. Conceptualize the programming skills.
			4. Use a CFD tool effectively for practical problems and research
402044 C	406	Heating Ventilation and Air Conditioning	
			1. Determine the performance parameters of trans-critical & ejector refrigeration systems
			2. Estimate thermal performance of compressor, evaporator, condenser and cooling tower.
			3. Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system.
			4. Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system.
			5. Estimate heat transmission through building walls using CLTD and decrement factor & time lag methods with energy-efficient and cost-effective measures for building envelope.
			6. Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.
402045 A	407	Automobile Engineering	
			1. To compare and select the proper automotive system for the vehicle.
			2. To analyse the performance of the vehicle.
			3. To diagnose the faults of automobile vehicles.
			4. To apply the knowledge of EVs, HEVs and solar vehicles
402045 B	408	Operation Research	
			1. Apply LPP and Decision Theory to solve the problems
			2. Apply the concept of transportation models to optimize available resources.
			3. Decide optimal strategies in conflicting situations.
			4. Implement the project management techniques.
			5. Minimize the process time
			6. Optimize multi stage decision making problems
402045 C	409	Energy Audit and	
			1. Compare energy scenario of India and World.
			2. Carry out Energy Audit of the Residence / Institute/ Organization.
			3. Evaluate the project using financial techniques
			4. Identify and evaluate energy conservation opportunities in Thermal Utilities.
			5. Identify and evaluate energy conservation opportunities in Electrical Utilities.



			6. Identify the feasibility of Cogeneration and WHR Use a CFD tool effectively for practical problems and research.
402046	411	Project Stage-I	
			1. Find out the gap between existing mechanical systems and develop new creative new mechanical system.
			2. Learn about the literature review
			3. Get the experience to handle various tools, tackles and machines.
402047 SEM-II	412	Energy Engineering	1. Describe the power generation scenario, the layout components of thermal power plant and analyze the improved Rankin cycle, Cogeneration cycle
			2. Analyze the steam condensers, recognize the an environmental impacts of thermal power plant and method to control the same
			3. Recognize the layout, component details of hydroelectric power plant and nuclear power plant
			4. Realize the details of diesel power plant, gas power plant and analyze gas turbine power cycle
			5. Emphasize the fundamentals of non-conventional power plants
			6. Describe the different power plant electrical instruments and basic principles of economics of power generation
402048	413	Mechanical System	1. Understand the difference between component level design and system level design.
			2. Design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. for the specifications stated/formulated.
			3. Learn optimum design principles and apply it to mechanical components.
			4. Handle system level projects from concept to product.
402049	414	Elective-III	
402049 A	415	Tribology	1. The course will enable the students to know the importance of Tribology in Industry.
			2. The course will enable the students to know the basic concepts of Friction, Wear, Lubrications and their measurements
			3. This course will help students to know the performance of different types of bearings and analytical analysis thereof.
			4. This course will help students to apply the principles of surface engineering for different applications of tribology.
402049 B	416	Industrial Engineering	1. Apply the Industrial Engineering concept,
			2. Understand, analyze and implement different concepts involved in method study.
			3. Design and Develop different aspects of work system and facilities.
			4. Understand and Apply Industrial safety standards, financial management practices.
			5. Undertake project work based on modeling & simulation area.
402049 C	417	Robotics	1. Identify different type of robot configuration with relevant terminology.
			2. Select suitable sensors, actuators and drives for robotic systems.
			3. Understand kinematics in robotic systems.
			4. Design robot with desired motion with suitable trajectory planning.
			5. Select appropriate robot programming for given application.
			6. Understand need of IoT, machine learning, simulation in robotics.
402050	418	Elective-IV	
402050 A	419	Advanced Manufactur	1. Classify and analyze special forming processes
			2. Analyze and identify applicability of advanced joining processes
			3. Understand and analyze the basic mechanisms of hybrid non-conventional machining techniques
			4. Select appropriate micro and nano fabrication techniques for engineering applications
			5. Understand and apply various additive manufacturing technology for product development
			6. Understand material characterization techniques to analyze effects of chemical composition, composition variation, crystal structure, etc.
402050 B	420	Solar & Wind Energy	1. Design of solar food drier for domestic purpose referring existing system
			2. Design of parabolic dish solar cooker for domestic purpose referring existing system
			3. Design of solar photovoltaic system for domestic purpose referring existing system
			4. Design miniature wind mill for domestic purpose referring existing system
402050 C	421	Product Design and De	1. Understand essential factors for product design
			2. Design product as per customer needs and satisfaction
			3. Understand Processes and concepts during product development
			4. Understand methods and processes of Forward and Reverse engineering
			5. Carry various design processes as DFA, DFMEA, design for safety
			6. Understand the product life cycle and product data management
BE	<b>BE Final Year of Electrical Engineering ( 2015 COURSE W.E.F.A.Y. 2018-19)</b>		
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
403141 SEM-I	401	Power System	1. Identify and analyze the dynamics of power system and suggest means to improve stability of system.
			2. Comprehend the effect of reactive power on Power system and suggest the suitable means of reactive power management.
			3. Selection of appropriate FACTS devices
			4. Analyze the generation-load balance in real time operation and its effect on frequency and develop automatic control strategies with mathematical relations.
			5. Formulate objective functions for optimization tasks such as unit commitment and economic load dispatch and get solution using computational techniques.
			6. Evaluate reliability indices of Power system
403142	402	PLC and SCADA Applic	1. Develop block diagram of PLC and explain the working.
			2. Classify input and output interfacing devices with PLC.

			3. Develop architecture of SCADA and explain the importance of SCADA in critical infrastructure.
			4. Execute, debug and test the programs developed for digital and analog operations.
			5. Describe various SCADA protocols along with their architecture.
			6. Observe development of various industrial applications using PLC and SCADA.
403143	403	Elective I	
403143 A)	404	Fundamentals of Microcontroller	1. Explain architecture of MSP430 microcontroller, its instructions and the addressing modes.
			2. Develop and debug program in C language for specific applications.
			3. Use of Code Composer Studio IDE for simulating the functionalities of MSP430 microcontroller
			4. Interface microcontroller MSP430 to various sensing devices.
			5. Develop IoT based application using MSP430.
403143 B)	405	Power Quality	1. Identify importance of various power quality issues.
			2. Carry out power quality monitoring
			3. List and explain various causes and effects of power quality problems
			4. Analyze power quality parameters and carry out power quality analysis
			5. Select cost effective mitigation technique for various power quality problems
			6. Use IEEE 519-2014 power quality standard for harmonic compliance
403143 C)	406	Renewable Energy Syst	1. Describe various renewable energy sources such as Solar Photovoltaic, Biomass, Wind, Fuel cell and Solar thermal.
			2. Explain different renewable energy sources as an alternate for conventional power sources in any application of energy.
			3. Identify and locate the use of renewable energy sources as per the requirement of the location.
			4. Analyze, assess and design renewable energy systems such as solar and wind sources.
			5. Compare the various storage sources for electrical energy.
			6. Describe the standards for renewable energy source integration and evaluate economics related to these sources.
403143 D)	407	Digital Signal Processing	1. Sample and reconstruct any analog signal.
			2. Construct frequency response of LTI system.
			3. Evaluate Fourier Transform of discrete signals.
			4. Design IIR filter and its implementation.
			5. Design FIR filter and implementation.
			6. Develop block diagram for DSP applications to electrical engineering.
403144	403	Elective II	
403144 A)	404	Restructuring and Dere	1. Enlist the functions of various key entities in India and explain the implications of various policies and acts on restructuring and deregulation.
			2. Describe the regulatory process in India along with various methods of regulations.
			3. List the components involved in tariff determination.
			4. Explain different power sector restructuring models
			5. Explain different types of electricity markets.
			6. State different transmission pricing methods and discuss congestion management
403144 B)	405	Electromagnetic Fields	1. Describe time varying Maxwell's equations and their applications in electromagnetic problems
			2. Interpret electric and magnetic field with the help of associated laws
			3. Solve simple electrostatic and magnetic boundary conditions
			4. Determine the relationship between time varying electric and magnetic fields and electromotive force
			5. Solve electromagnetic problems with the help of mathematical tools
403144 C)	406	EHVAC Transmission	1. Highlight need for EHV ac transmission.
			2. Calculate line and ground parameters.
			3. Enlist problems encountered in EHV transmission.
			4. Describe effect of electric and magnetic field on human being
			5. Express issues related to UHV transmission discussed
403144 D)	407	Electric and Hybrid Veh	1. Review history, Social and environmental importance of Hybrid and Electric vehicles.
			2. Describe the performance and selection of energy storage systems and Analyze battery management system.
			3. Distinguish between the performance and architecture of various drive trains.
			4. Describe the different Instrumentation and Control used for electric vehicles.
			5. Differentiate between Vehicle to Home, Vehicle to Vehicle and Vehicle to Grid energy systems concepts
403144 E)	408	Special Purpose Machin	1. To explain operation and performance of synchronous reluctance motors.
			2. To describe operation and performance of stepping motors.
			3. To elaborate operation and performance of switched reluctance motors.
			4. To familiarize with operation and performance of permanent magnet brushless D.C. motors.
			5. To illustrate operation and performance of permanent magnet synchronous motors.
403145	409	Control System II	1. Recognize the importance of digital control system.
			2. Derive pulse transfer function.
			3. Analyze digital controllers.
			4. Convert system in state space format.
			5. Solve state equation.
			6. Design observer for system.
403146	410	Project I	
403152	411	Audit Course V	
		Hydro Energy Systems	1. Explain and differentiate various types of hydro electric generators; pico, micro and small hydro
403147 SEM II	412	Switchgear and Protect	1. Describe arc interruption methods in circuit breaker.

			2. Derive expression for restriking voltage and RRRV in circuit breaker
			3. Explain construction and working of different high voltage circuit breakers such as ABCB, SF6 CB, and VCB.
			4. Classify and Describe different type of relays such as over current relay, Reverse power relay, directional over current relay, Differential relay, Distance relay, Static relay and numerical relay
			5. Describe various protection schemes used for transformer, alternator and busbar
			6. Describe transmission line protection schemes.
403148	413	Power Electronic Contr	1. Explain motor load dynamics and multi quadrant operation of drives
			2. Analyze operation of converter fed and chopper fed DC drives.
			3. Describe braking methods of D.C. and induction motor drive.
			4. Explain vector control for induction motor drives
			5. Describe synchronous motor drive.
			6. Identify classes and duty cycles of motor and applications of drives in industries.
403149	414	Elective III	
403149 A)	415	High Voltage Engineerin	1. Identify, describe and analyze the breakdown theories of solid, liquid and gaseous materials
			2. Describe as well as use different methods of generation of high AC, DC, impulse voltage and current.
			3. Demonstrate and use different methods of measurement of high AC, DC, impulse voltage and current.
			4. Identify the occurrence of overvoltage and to provide remedial solutions
			5. Demonstrate an ability to carry out different tests on high voltage equipment and devices as well as ability to design the high voltage laboratory with all safety measures
403149 B)	416	HVDC and FACTS	1. Compare HVDC and EHV AC systems for various aspects
			2. Reproduce the layout of HVDC system with various components including protective devices
			3. Differentiate VSC HVDC and conventional HVDC system
			4. Differentiate various types of Power Electronic Controllers
			5. Analyze modeling of FACTS Controllers
			6. Simulate various controllers and HVDC systems using softwares
403149 C)	417	Digital Control System	1. Analyze digital control system and its stability.
			2. Differentiate between various control systems
			3. Present system in state space format.
			4. Design observer for system.
			5. Understand digital controllers
			6. Elaborate applications such as digital temperature control and position control
403149 D)	418	Intelligent Systems and Applications in	1. Classify neural networks
			2. Compare various AI tools
			3. Develop algorithms for AI tools
			4. Apply AI tools for Applications in electrical engineering
403149 E)	419	Analog Electronics and Sensing Technology	1. Develop various analog circuits using operational amplifiers.
			2. Design filters and waveform generators and various signal converter circuits.
			3. Find characteristics of sensors used for system monitoring and protection.
			4. Interface various position sensors to microcontrollers.
			5. Find characteristics of sensors used for light and image sensing.
403150	420	Elective IV	
403150 A)	421	Smart Grid	1. Apply the knowledge to differentiate between Conventional and Smart Grid.
			2. Identify the need of Smart Grid, Smart metering, Smart storage, Hybrid Vehicles, Home Automation, Smart Communication, and GIS
			3. Comprehend the issues of micro grid
			4. Solve the Power Quality problems in smart grid
			5. Apply the communication technology in smart grid
403150 B)	422	Robotics and Automati	1. Differentiate between types of robots based on configuration, method of control, types of drives, sensors used etc.
			2. Choose a specific robot for specific application with given specifications.
			3. Analyze the robot arm dynamics for calculation of torques and forces required for different joints of robots for control of robot arm.
			4. Determine the D-H parameters for a robot configuration using concepts from robot arm kinematics which further leads to forward/inverse kinematics.
			5. Calculate the Jacobian matrix for robot arm velocity and decide the singular positions.
403150 C)	423	Illumination Engineerin	1. Define and reproduce various terms in illumination.
			2. Identify various parameters for illumination system design.
			3. Design indoor and outdoor lighting systems.
			4. Enlist state of the art illumination systems.
403150 D)	424	VLSI Design[Open Elect	1. To understand Modeling of Digital Systems Domains for different combinational and sequential circuits
			2. To understand Levels of Modeling using Modeling Language VHDL.
			3. To Understand Modeling and programming Concepts by Learning a New Language
			4. To develop of logic design and programming skills in HDL language.
			5. To study HDL based design approach.
			6. To learn digital CMOS logic design
403151	425	Project II	1. Work in team and ensure satisfactory completion of project in all respect.
			2. Handle different tools to complete the given task and to acquire specified knowledge in area of interest.
			3. Provide solution to the current issues faced by the society.
			4. Practice moral and ethical value while completing the given task.

			5.Communicate effectively findings in verbal and written forms.
403153	426	Audit Course VI	
		Energy Storage Systems	1. Explain and differentiate various types of energy storage systems
BE	<b>BE Final Year of Electronics &amp; Telecommunication ( 2015 COURSE W.E.F.A.Y. 2018-19)</b>		
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
404181 SEM-I	401	VLSI Design &	1. Write effective HDL coding for digital design. 2. Apply knowledge of real time issues in digital design. 3. Model digital circuit with HDL, simulate, synthesis and prototype in PLDs. 4. Design CMOS circuits for specified applications. 5. Analyze various issues and constraints in design of an ASIC 6. Apply knowledge of testability in design and build self test circuit.
404182	402	Computer Networks &	1. Understand fundamental underlying principles of computer networking 2. Describe and analyze the hardware, software, components of a network and their interrelations. 3. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies 4. Have a basic knowledge of installing and configuring networking applications. 5. Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols. 6. Have a basic knowledge of the use of cryptography and network security.
404183	403	Radiation & Microwave	1. Differentiate various performance parameters of radiating elements. 2. Analyze various radiating elements and arrays. 3. Apply the knowledge of waveguide fundamentals in design of transmission lines. 4. Design and set up a system consisting of various passive microwave components. 5. Analyze tube based and solid state active devices along with their applications. 6. Measure various performance parameters of microwave components.
404184	404	Elective I	
404184 1)	405	Digital Image and Video	1. Develop and implement basic mathematical operations on digital images. 2. Analyze and solve image enhancement and image restoration problems. 3. Identify and design image processing techniques for object segmentation and recognition. 4. Represent objects and region of the image with appropriate method. 5. Apply 2-D data compression techniques for digital images. 6. Explore video signal representation and different algorithm for video processing.
404184 2)	406	Industrial Drives and Control	1. Understand the basic principles of power electronics in drives and its control, types of drives and basic requirements placed by mechanical systems on electric drives for various applications 2. Understand the operation of 1 $\phi$ & 3 $\phi$ converter drives for separately excited & series DC motors, dual converter drives, 2 quadrant and 4 quadrant DC chopper drives, Open-loop & closed-loop control of DC drives with transfer function, Dynamic and regenerative braking. Protection circuits for DC drives 3. Learn speed control of induction motor drives in an energy efficient manner using power electronics. To study and understand the operation of both classical and modern induction motor drives like FOC or Vector control. 4. Learn and understand working of various types of synchronous motors and their drive systems 5. Learn stepper motors & drives, BLDC and SRM motors and drives 6. Understand modern control techniques of Fuzzy logic and ANN in motor drive application
404184 3)	407	Embedded Systems & Real Time	1. Understand design of embedded system 2. Use RTOS in embedded application 3. Use modern architecture for embedded system 4. Use Linux for embedded system development 5. Use open platform for embedded system development
404184 4)	408	Internet of Things	1. On completion of the course, student will be able to 2. Understand the various concepts, terminologies and architecture of IoT systems. 3. Use sensors and actuators for design of IoT. 4. Understand and apply various protocols for design of IoT systems 5. Use various techniques of data storage and analytics in IoT 6. Understand various applications of IoT
404185	409	Elective II	
404185 1)	410	Wavelets	1. On completion of the course, student will be able to 2. Explore and learn the basics of linear algebra. 3. Identify the need of Wavelet transform and its properties. 4. Analyze the 1-D and 2-D signal using discrete wavelet transform. 5. Analyze the signal using Multi resolution analysis 6. Use wavelet transform in different applications like data compression, denoising, enhancement etc.
404185 2)	411	Electronics Product Design	1. Understand various stages of hardware, software and PCB design. 2. Importance of product test & test specifications. 3. Special design considerations and importance of documentation
404185 3)	412	Optimization Techniques	1. Describe clearly a problem, identify its parts and analyze the individual functions. 2. Perform mathematical translation of the verbal formulation of an optimization problem. 3. Design algorithms, the repetitive use of which will lead reliably to finding an approximate solution 4. Discover, study and solve optimization problems. 5. Investigate, study, develop, organize and promote innovative solutions for various applications.
404185 4)	413	Artificial Intelligence	1. Design and implement key components of intelligent agents and expert systems. 2. To apply knowledge representation techniques and problem solving strategies to common AI applications.

			3. Apply and integrate various artificial intelligence techniques in intelligent system development as well as understand the importance of maintaining intelligent systems.
			4. Build rule-based and other knowledge-intensive problem solvers.
404185 5)	414	Electronics in agriculture	1. Understand Role of computers & virtual instrumentation.
			2. Provide communication solution for interpreting environmental parameters with Electronics systems.
			3. Describe Instrument technology used in agriculture.
			4. Apply knowledge of Electronics in Agriculture.
			5. Understand Greenhouse Technology & Role of Electronics Governance.
		Audit Course 5	
		1. Green Energy	1. List and generally explain the main sources of energy and their primary applications in the India, and the world.
			2. Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the environment.
			3. Discuss remedies/potential solutions to the supply and environmental issues associated with fossil fuels and other energy resources.
			4. List and describe the primary renewable energy resources and technologies.
			5. Describe/illustrate basic electrical concepts and system components.
			6. Convert units of energy—to quantify energy demands and make comparisons among energy uses, resources, and technologies.
			7. Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.
		2. Human Behaviour	1. Change in awareness levels, knowledge and understanding of student
			2. Change in attitudes / behavior of students with regards to their education improved teamwork, institutional leadership and other life skills
			3. Improvement in social health and attitude.
404189 SEM-I	418	Mobile Communication	1. Apply the concepts of switching technique and traffic engineering to design multistage networks.
			2. Explore the architecture of GSM.
			3. Differentiate thoroughly the generations of mobile technologies.
404190	419	Broadband Communication	1. Perform Link power budget and Rise Time Budget by proper selection of components and check its viability.
			2. Perform Satellite Link design for Up Link and Down Link.
404191	420	Elective III	
404191 1)	421	Machine Learning	1. To compare and contrast pros and cons of various machine learning techniques and to get an in sight of when to apply a particular machine learning approach.
			2. To mathematically analyze various machine learning approaches and paradigms.
			3. To implement convolution neural networks in recognition applications.
404191 2)	422	PLC s and Automation	1. Understand PLC architecture
			2. Develop PLC ladder programs for simple industrial applications
			3. Design Automation systems for industrial applications
			4. Implement the Engineering Automation using PLC approach.
404191 3)	423	Audio and Speech Processing	1. Design and implement algorithms for processing speech and audio signals considering the properties of acoustic signals and human hearing.
			2. Analyze speech signal to extract the characteristic of vocal tract (formants) and vocal cords (pitch).
			3. Analyze speech signal for extracting LPC and MFCC Parameters of speech signal.
			4. Apply the knowledge of speech and audio signal analysis to build speech processing applications like speech coding, speech recognition, speech enhancement and speaker recognition/verification.
404191 4)	424	Software Defined Radio	1. Compare SDR with traditional Hardware Radio HDR.
			2. Implement modern wireless system based on OFDM, MIMO & Smart Antenna.
			3. Build experiment with real wireless waveform and applications, accessing both PHY and MAC, Compare SDR versus MATLAB and Hardware Radio
			4. Work on open projects and explore their capability to build their own communication System.
404191 5)	425	Audio Video Engineering	1. Apply the fundamentals of Analog Television and Colour Television standards.
			2. Explain the fundamentals of Digital Television, DTV standards and parameters.
			3. Study and understand various HDTV standards and Digital TV broadcasting systems and acquainted with different types of analog, digital TV and HDTV systems.
			4. Understand acoustic fundamentals and various acoustic systems.
404192	426	Elective IV	
404192 1)	427	Robotics	1. Familiar with the history, concept development and key components of robotics technologies.
			2. Implement basic mathematics manipulations of spatial coordinate representation and transformation.
			3. Solve basic robot forward and inverse kinematic problems
			4. Understand and able to solve basic robotic dynamics, path planning and control problems
404192 2)	428	Biomedical Electronics	1. Model a biomedical system.
			2. Understand various methods of acquiring bio signals. Understand various sources of bio
			3. signal distortions and its remedial techniques.
			4. Get an Overview of major Devices currently used in Medical field
			5. The students will have an understanding of analyzing bio-signal and classifying them
404192 3)	429	Wireless Sensor Networks	1. Explain various concepts and terminologies used in WSN
			2. Describe importance and use of radio communication and link management in WSN
			3. Explain various wireless standards and protocols associated with WSN
			4. Recognize importance of localization and routing techniques used in WSN

			5. Understand techniques of data aggregation and importance of security in WSN
			6. Examine the issues involved in design and deployment of WSN
404192 4)	430	Renewable Energy Sys	1. Interpret energy reserves of India and potential of different energy sources.
			2. Measure the solar radiation parameters and performance of different solar collectors.
			3. Calculate different parameters of wind turbine rotor.
			4. Implicit the importance and applications of geothermal and ocean energy.
			5. Demonstrate knowledge in field of fuel cell and potential for power generation.
404192 5)	431	Open Elective*	
404193	432	Lab Practice –III	
404194	433	Lab Practice –IV	
404195	434	Project Stage II	
	435	Audit Course 6	
	436	1. Team Building, Leader	1. Change in awareness levels, knowledge and understanding of today's youth
			2. Change in attitudes / behavior of students with regards to their improved teamwork, institutional leadership and other life skills
			3. Increase in the body's fitness levels and also reduced health problems
			4. Improvement in social health and attitude.
	437	2. Environmental issues and Disaster	1. To learn the different environmental issues and disasters.
			2. To deal with problems associated with environment and effectively handle the disasters.
<b>BE</b>	<b>BE INFORMATION TECHNOLOGY 2015 COURSE WITH EFFECT FROM 2018-19</b>		
<b>COURSE</b>	<b>CODE</b>	<b>SUBJECT</b>	<b>Course Outcomes</b>
414453 SEM I	C401	Information and Cyber Security	1. Use basic cryptographic techniques in application development.
			2. Apply methods for authentication, access control, intrusion detection and prevention.
			3. To apply the scientific method to digital forensics and perform forensic investigations.
			4. To develop computer forensics awareness.
			5. Ability to use computer forensics tools.
414454	C402	Machine Learning	1. Model the learning primitives.
			2. Build the learning model.
			3. Tackle real world problems in the domain of Data Mining and Big Data Analytics, Information Retrieval, Computer vision, Linguistics and Bioinformatics.
414455	C403	Software Design	1. Understand object oriented methodologies, basics of Unified Modeling Language (UML).
			2. Understand analysis process, use case modeling, domain/class modeling
			3. Understand interaction and behavior modeling.
			4. Understand design process and business, access and view layer class design
			5. Get started on study of GRASP principles and GoF design patterns.
			6. Get started on study of architectural design principles and guidelines in the various type of application development.
414456	C404	Elective-I	
414456 A)	C405	Wireless	1. Understand the basics of propagation of radio signals.
			2. Understand the basic concepts of basic Cellular System and the design requirements.
			3. Have an understanding of the basic principles behind radio resource management techniques such as power control, channel allocation and handoffs.
			4. Gain insights into various mobile radio propagation models and how the diversity can be exploited to improve performance.
			5. Gain knowledge and awareness of the technologies for how to effectively share spectrum through multiple access techniques i.e. TDMA, CDMA, FDMA etc.
			6. Have in-depth understanding of the design consideration and architecture for different Wireless Systems like GSM, CDMA, GPRS etc.
			7. Understanding of the emerging trends in Wireless communication like WiFi, WiMAX, Software Defined Radio (SDR) and related issues and challenges.
414456 B)	C406	Natural Language	1. Understand automatic processing of human languages using computers.
			2. Understand various applications of natural language processing.
414456 C)	C407	Usability	1. Justify the theory and practice of usability evaluation approaches, methods and techniques.
			2. Compare and evaluate strengths and weaknesses of various approaches, methods and techniques for evaluating usability.
			3. Design and implement a usability test plan, based on modelling or requirements specification.
			4. Choose appropriate approaches, methods and techniques to evaluate the usability of a specified interactive system.
414456 D)	C408	Multicore and	1. Know types of parallel machine and to know multicore and concurrent systems in detail.
			2. Know the ways to measure the performance of multicore systems.
			3. Understand need of multicore and concurrent system programming.
			4. Know the different approaches for multicore and concurrent programming.
			5. Use and apply the approaches learned, for application development.
			6. Understand and explore recent trends in multicore and concurrent system programming.
414456 E)	C409	Business Analytics	1. Comprehend the Information Systems and development approaches of Intelligent Systems.
			2. Evaluate and rethink business processes using information systems.
			3. Propose the Framework for business intelligence.

			4. Get acquainted with the Theories, techniques, and considerations for capturing organizational intelligence.
			5. Align business intelligence with business strategy.
			6. Apply the techniques for implementing business intelligence systems.
414457	C410	Elective -II	
414457 A)	C411	software Defined	1. Acquire fundamental knowledge of SDN exploring the need, characteristics, and architecture of SDN.
			2. Recognize OpenFlow protocols and its forwarding, pipeline model.
			3. Understand different methodologies for sustainable SDN.
			4. Comprehend IT Infrastructure for SDN.
			5. Acquiring knowledge of OpenFlow protocols, visualization
414457 B)	C412	Soft Computing	1. Tackle problems of interdisciplinary nature.
			2. Find an alternate solution, which may offer more adaptability, resilience and optimization.
			3. Gain knowledge of soft computing domain which opens up a whole new career option.
			4. Tackle real world research problems
414457 C)	C413	Software Testing	1. Test the software by applying testing techniques to deliver a product free from bugs.
			2. Investigate the scenario and to select the proper testing technique.
			3. Explore the test automation concepts and tools and estimation of cost, schedule based on standard metrics.
			4. Understand how to detect, classify, prevent and remove defects.
			5. Choose appropriate quality assurance models and develop quality.
			6. Ability to conduct formal inspections, record and evaluate results of inspections.
414457 D)	C414	Compiler	1. Understand the structure of compilers.
			2. Understand the basic and advanced techniques used in compiler construction.
			3. Understand the basic data structures used in compiler construction such as abstract syntax.
			4. Cognitive skills (thinking and analysis)- Design and implement a compiler using a software engineering approach.
			5. Communication skills (personal and academic).
			6. Practical and subject specific skills (Transferable Skills) - Use generators (e.g. Lex and Yacc).
414457 E)	C415	Gamification	1. Write programs to solve problems using gamification and open source tools.
			2. Apply gamification for Mobile and Web Applications.
			3. Solve problems for multi-core or distributed, concurrent/Parallel environments.
414458	C416	Computer Laboratory-VII	1. The students will be able to implement and port controlled and secured access to software systems and networks.
			2. The students will be able to build learning software in various domains
414459	C417	Computer Laboratory-VIII	1. Draw, discuss different UML 2.0 diagrams, their concepts, notation, advanced notation, forward and reverse engineering aspects.
			2. Identify different software artifacts used to develop analysis and design model from requirements.
			3. Develop use case model.
			4. Develop, implement analysis model and design model.
			5. Develop, implement Interaction and behavior Model.
			6. Implement an appropriate design pattern to solve a design problem.
414460	C418	Project Phase-I	1. To show preparedness to study independently in chosen domain of Information Technology and programming languages and apply their acquired knowledge to variety of real time problem scenarios.
			2. To function effectively as a team to accomplish a desired goal.
			3. An understanding of professional, ethical, legal, security and social issues and responsibilities related to Information Technology Project.
414461	C419	Audit Course-V	
414461 A	C420	Emotional	1) Expand your knowledge of emotional patterns in yourself and others.
			2) Discover how you can manage your emotions, and positively influence yourself and others.
			3) Build more effective relationships with people at work and at home.
			4) Positively influence and motivate colleagues, team members, and managers.
			5) Increase your leadership effectiveness by creating an atmosphere that engages others.
			6) Apply EI behaviours and supports high performance.
414461 B	C421	Green Computing	1) Understand the concept of green IT and relate it to sustainable development.
			2) Apply the green computing practices to save energy.
			3) Discuss how the choice of hardware and software can facilitate a more sustainable operation.
			4) Use methods and tools to measure energy consumption
414461 C	C422	Critical Thinking	1) If students whole-heartedly participate in the course, they can expect to be smarter, stronger and more confident thinkers.
			2) They can embark on a life-long journey of "self-directed learning".
414461 D	C423	Statistical Learning Model Using R.	1) Students will be familiar with concepts related to "data science", "analytics", "machine learning", etc. These are important topics, and will enable students to embark on highly rewarding careers.
			2) Students will capable of learning "big data" concepts on their own
414462 SEM II	C424	Distributed Computing	1. Understand the principles and desired properties of distributed systems based on different application areas.
			2. Understand and apply the basic theoretical concepts and algorithms of distributed systems in problem solving.
			3. Recognize the inherent difficulties that arise due to distributed-ness of computing resources.

			4. Identify the challenges in developing distributed applications
414463	C425	Ubiquitous Computing	1. Demonstrate the knowledge of design of UbiComp and its applications.
			2. Explain smart devices and services used UbiComp.
			3. Describe the significance of actuators and controllers in real time application design.
			4. Use the concept of HCI to understand the design of automation applications.
			5. Classify UbiComp privacy and explain the challenges associated with UbiComp privacy.
			6. Get the knowledge of ubiquitous and service oriented networks along with UbiComp management.
414464	C426	Elective -III	
414464 A)	C427	(IoT)	1. Explain what is internet of things.
			2. Explain architecture and design of IoT.
			3. Describe the objects connected in IoT.
			4. Understand the underlying Technologies.
			5. Understand the platforms in IoT.
			6. Understand cloud interface to IoT.
414464A	C428	Laboratory	1. To understand IoT platforms such as Raspberry-Pi/Beagle board/Arduino.
			2. To understand operating systems for platforms such as Raspberry-Pi/Beagle board/Arduino.
			3. To communicate with objects using IoT platforms such as Raspberry-Pi/Beagle board/Arduino.
			4. To interface cloud environment for IoT application.
			5. To implement IoT related protocols such as MQTT / CoAP etc.
			6. To implement the web interface for IoT
414464 B)	C429	and Retrieval	1. Understand the concept of Information retrieval.
			2. Deal with storage and retrieval process of text and multimedia data
			3. Evaluate performance of any information retrieval system.
			4. Design user interfaces.
			5. Understand importance of recommender system.
			6. Understand concept of multimedia and distributed information retrieval.
	C430	Information Storage and Retrieval	1. Understand the concept, data structure and preprocessing algorithms of Information retrieval.
			2. Deal with storage and retrieval process of text and multimedia data.
			3. Evaluate performance of any information retrieval system.
			4. Design user interfaces.
			5. Understand importance of recommender system (Take decision on design parameters of recommender system).
			6. Understand concept of multimedia and distributed information retrieval.
			7. Map the concepts of the subject on recent developments in the Information retrieval field.
414464 C)	C431	Techniques	1. To create own file formats for specific application.
			2. To do some projects based on current trends in multimedia.
			3. To use open sources for authoring tool for animation and presentations.
			4. Understand some research areas of current multimedia techniques.
	C432	Techniques	1. To create own file formats for specific application.
			2. To do some projects based on current trends in multimedia.
			3. To use open sources for authoring tool for animation and presentations.
414464 D)	C433	Programming	1. Demonstrate static website using basic tools.
			2. Develop client side programming skills.
			3. Develop server side programming skills.
			4. Understand web services and handle content management tools.
			5. Develop mobile website using mobile web development tools.
			6. Understand aspects of web security and cyber ethics.
	C434	Programming	1. Use fundamental skills to develop and maintain website and web application.
			2. Apply scripting skills for Server side and Client-side Programming.
			3. Develop web services to transfer data and add interactive components to website.
			4. Combine multiple web technologies to create advanced web compon
414464 E)	C435	Optimization	1. Learn and implement various optimization techniques.
			2. Learn model real-world problems in optimization framework.
			3. Apply various optimization models to solve optimization problems in computer-science & IT Engineering.
	C436	Computational Optimization	1. Understand Transportation problem.
			2. Learn different measures in shortest path algorithms.
			3. Understand and learn Queuing Model.
414465	C437	Elective -IV	
414465 A)	C438	Rural Technologies and Community Development	1. Understand rural development model.
			2. Learn different measures in rural development and its impact on overall economy.
			3. Understand and learn importance of technologies in rural and community development.
			4. Understand challenges and opportunities in rural development
414465 B)	C439	Parallel Computing	1. Understand fundamentals in parallel computing.
			2. Understand and learn importance of technologies including different hardware structures used in parallel computing.
			3. Understand challenges and opportunities in parallel computing.
414465 C)	C440	Computer Vision	1. Implement fundamental image processing techniques required for computer vision.
			2. Implement boundary tracking techniques.



			3. Apply Hough Transform for line, circle, and ellipse detections.
			4. Implement motion related techniques.
			5. Develop skills to develop applications using computer vision techniques.
414465 D)	C441	Analytics	1. Understand the basics of Social Media Analytics.
			2. Explain the significance of Data mining in Social media.
			3. Demonstrate the algorithms used for text mining.
			4. Apply network measures for social media data.
			5. Explain Behavior Analytics techniques used for social media data.
			6. Apply social media analytics for Face book and Twitter kind of applications.
414465 E)	C442	Open Elective	
414466	C443	Computer Laboratory	1. Demonstrate knowledge of the core concepts and techniques in distributed systems.
			2. Learn how to apply principles of state-of-the-Art Distributed systems in practical application.
			3. Design, build and test application programs on distributed systems.
414467	C444	Computer Laboratory	1. Set up the Android environment and explain the Evolution of cellular networks.
			2. Develop the User Interfaces using pre-built Android UI components.
			3. Create applications for performing CURD SQLite database operations using Android.
			4. Create the smart android applications using the data captured through sensors.
			5. Implement the authentication protocols between two mobile devices for providing. Security.
			6. Analyze the data collected through android sensors using any machine learning algorithm.
414468	C445	Project Work	1. Learn teamwork.
			2. Be well aware about Implementation phase.
			3. Get exposure of various types of testing methods and tools.
			4. Understand the importance of documentation
414469	C446	Audit Course-VI	
414469 A)	C447	IoT Application in Engi	1. To get the detailed insight of Internet of Things.
			2. To learn the IoT terms in Engineering.
			3. To understand how IoT concepts can be implement.
			4. To know the protocols, Sensors and other elements for IoT implementation
414469 B)	C448	Entrepreneuship	1. Expand your knowledge of Entrepreneurship & Startups.
			2. Discover how you can use Entrepreneur Qualities.
			3. Expand the practical knowledge of Finance, Legal-Patents, Intellectual Property, and Business Associations.
			4. Expand the understanding of Deliverables & Achieving Target.
414469 C)	C449	Cognitive Computing	1. Understand and discuss what cognitive computing is, and how it differs from traditional approaches.
			2. Plan and use the primary tools associated with cognitive computing.
			3. Plan and execute a project that leverages cognitive computing.
			4. Understand and discuss the business implications of cognitive computing.
414469 D)	C450	AI and Robotics	1. The goal of this course is to familiarize the students with the basic concepts of robotics, artificial intelligence and intelligent machines.
			2. It will help students to understand and apply principles, methodology and techniques of intelligent systems to robotics.