Engineering Sciences And Allied Engineering Sem-I

A.Y. 2020-21, Sem-I		
Sr.No.	**Course code Course name**	**Course outcome**
Engineering Sciences And Allied Engineering Sem-I (2019 COURSE)		
1	Subject code : 107001 subject name : Engineering Mathematics I	1. Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
		2. The Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.
		3. To deal with derivative of functions of several variables that are essential in various branches of Engineering.
		4. 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.
		5. 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
2	Subject code 107009 subject name : Engineering Chemistry	1. Apply different water softening methods and techniques as commodity.
		2. Select suitable electro-analytic technique and system for material investigation.
		3. Reveal the information of advanced engineering materials for various engineering applications.
		4. Analysis of fuel and recommend alternative fuels.
		5. Determination of organic compound based on their structure.
		6. Identify causes of corrosion and preventive measures to minimize corrosion.
2	Subject code 107002 subject name : Engineering Physics	1. Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.
		2. Learn basics of lasers and optical fibers and their use in some applications.
		3. Understand concepts and principles in quantum mechanics. Relate them to some applications.
		4. Understand theory of semiconductors and their applications in some semiconductor devices.
		5. Summarize basics of magnetism and superconductivity. Explore few of their technological applications.
		6. Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterials and their application.
3	Subject code :110005 subject name : Programming and Problem Solving	1.Apply various skills in problem solving and also explain basic features and future of python programming to solve the problem.
		2.Discuss various types of data types with it's methods and to solve problem by using decision control and loop statement.
		3.Define functions and discuss various standard library modules, packages.
		4.Enlist built in strings methods , strings formatting operator and perform the operations on strings

		5.To solve problem by object oriented programming using python & apply various features, methods to solve problem.
		6.To perform various operations , methods on files & dictionaries
4	Subject code 101011 subject name : Engineering Mechanics	1. Determine the resultant of various force system.
		2. Determine Centroid, moment of Inertia and solve problems related to friction
		3. Determine reactions of beam,and apply principle of equilibrium to forces in space.
		4. Able to solve for internal forces acting on any member of a pined jointed truss structure ,frame and cables
		5. Calculate position,velocity and acceleration of particle using principle of kinematics.
		6. Calculate position, velocity and acceleration of particle using principle of kinetics and Work Power, Energy.6.
5	Subject code :104010 subject name : Basic Electronic Engineering OR	1.Explain the working of P-N junction diode and its circuits.
		2.Understand and describe specifications, features of electronic ideal diode and ideal diode circuits.
		3.Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
		4.Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
		5.Use different electronics measuring instruments to measure various electrical parameters.
		6.Select sensors for specific applications.
5	Subject code :103004 Basic Electrical Engineering	1.Compare electrical & magnetic circuit stating similarities & dissimilarities
		2.Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic Derive expression for RMS value & average value in terms of peak value to find form factor and peak factor for sinusoidal current & voltage.
		3.Estimate efficiency & regulation of single phase transformer by performing direct load test on it. Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram
		4.Verify the relationship between phase voltage, line voltage line current, phase current in a three phase star and delta connected load analytically & by drawing relevant phasor diagram
		5.Differentiate electrical networks & apply various network theorems to solve the circuit. Apply and analyze the resistive circuits using star-delta conversion KVL, KCL .
		6.Solve numericals based on work, power & energy by studying basic concepts of electrical engineering such as emf, pd, current and resistance.
6	Subject code :102003 subject name : Systems in Mechanical Engineering	1.Describe and compare the conversion of energy from renewable and non-renewable energy sources
		2.Explain basic laws of thermodynamics, heat transfer and their applications
		3.List down the types of road vehicles and their specifications
		4.Illustrate various basic parts and transmission system of a road vehicle
		5.Discuss several manufacturing processes and identify the suitable process
		6.Explain various types of mechanism and its application
		1.Familiar with safety norms to prevent any mishap in workshop

7	Subject code : 111006 subject name : Workshop	2.Able to handle appropriate hand tool, cutting tool and machine tools to manufacture a job
		3.Able to understand the construction, working and functions of machine tools and their parts
		4.Able to know simple operations (Turning and Facing) on a centre lathe
8	Subject code : 101007 subject name : Environmenta Studies I (Audit course)	1. Demonstrate an integrative approach to environmental issues with a focus on sustainability
		2. Explain and identify the role of the organism in energy transfers in different ecosystems.
		3.Distinguish between andprovide examples of renewable and nonrenewable resources ans analyze personal consumption of resources.
		4. Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.

Engineering Sciences And Allied Engineering Sem-II

A.Y. 2020-21, Sem-II		
Sr.No.	**Course code Course name**	**Course outcome**
Engineering Sciences And Allied Engineering Sem-II (2019 COURSE)		
1	Subject code : 107008 subject name : Engineering Mathematics -II	1. 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
		2. 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.
		3. To trace the curve for a given equation and measure arc length of various curves.
		4. The concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.
		5. Evaluation of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.
2	Subject code 107009 subject name : Engineering Chemistry	1. Apply different water softening methods and techniques as commodity.
		2. Select suitable electro-analytic technique and system for material investigation.
		3. Reveal the information of advanced engineering materials for various engineering applications.
		4. Analysis of fuel and recommend alternative fuels.
		5. Determination of organic compound based on their structure.
		6. Identify causes of corrosion and preventive measures to minimize corrosion.
2	Subject code 107002 subject name : Engineering Physics	1. Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.
		2. Learn basics of lasers and optical fibers and their use in some applications.
		3. Understand concepts and principles in quantum mechanics. Relate them to some applications.
		4. Understand theory of semiconductors and their applications in some semiconductor devices.
		5. Summarize basics of magnetism and superconductivity. Explore few of their technological applications.
		6. Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterials and their application.
3	Subject code :110005	1.Apply various skills in problem solving and also explain basic features and future of python programming to solve the problem.
		2.Discuss various types of data types with it's methods and to solve problem by using decision control and loop statement.

	subject name : Programming and Problem Solving	3.Define functions and discuss various standard library modules, packages.
		4.Enlist built in strings methods , strings formatting operator and perform the operations on strings
		5.To solve problem by object oriented programming using python & apply various features, methods to solve problem.
		6.To perform various operations , methods on files & dictionaries
4	Subject code 101011 subject name : Engineering Mechanics	1. Determine the resultant of various force system.
		2. Determine Centroid, moment of Inertia and solve problems related to friction
		3. Determine reactions of beam,and apply principle of equilibrium to forces in space.
		4. Able to solve for internal forces acting on any member of a pined jointed truss structure ,frame and cables
		5. Calculate position,velocity and acceleration of particle using principle of kinematics.
		6. Calculate position, velocity and acceleration of particle using principle of kinetics and Work Power, Energy.6.
5	Subject code :104010 subject name : Basic Electronic Engineering OR	1.Explain the working of P-N junction diode and its circuits.
		2.Understand and describe specifications, features of electronic ideal diode and ideal diode circuits.
		3.Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
		4.Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
		5.Use different electronics measuring instruments to measure various electrical parameters.
		6.Select sensors for specific applications.
6	Subject code :103004 Basic Electrical Engineering	1.Compare electrical & magnetic circuit stating similarities & dissimilarities
		2.Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic Derive expression for RMS value & average value in terms of peak value to find form factor and peak factor for sinusoidal current & voltage.
		3.Estimate efficiency & regulation of single phase transformer by performing direct load test on it. Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram
		4.Verify the relationship between phase voltage, line voltage line current, phase current in a three phase star and delta connected load analytically & by drawing relevant phasor diagram
		5.Differentiate electrical networks & apply various network theorems to solve the circuit. Apply and analyze the resistive circuits using star-delta conversion KVL, KCL .

		6.Solve numericals based on work, power & energy by studying basic concepts of electrical engineering such as emf, pd, current and resistance.
7	Subject code : 102012 subject name : Engineering Graphics	1.To acquire basic knowledge about engineering drawing language, line types, dimension methods, and simple geometrical construction.
		2.To draw conic sections by various methods, involutes, cycloid and spiral.
		3.To acquire basic knowledge about physical realization of engineering objects and shall be able to draw its different views.
		4.To visualize three dimensional engineering objects and shall be able to draw their isometric views.
		5.To imagine visualization of lateral development of solids.
		6.To acquire basic knowledge about the various CAD drafting software's and its basic commands required to construct the simple engineering objects.
8	Subject code : 110013 subject name : Project Based Learning	1. Project based learning will increase their capacity and learning through shared cognition
		2. Students able to draw on lessons from several disciplines and apply them in practical way.
		3. 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.
9	Subject code : 101014 subject name : Environmental Studies -II (Audit course)	1. Have an understanding of environmental pollution and the science behind those problems and potential solutions.
		2. Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.
		3. Asess theimpact of ever incresing human population on the biosphere: social,economic issues and role of humans in conservation of natural resources.
		4. 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 environmenatl problems/ and or issues.

Computer Department

A.Y. 2020-21, Sem-I		
Sr.No.	**Course code** **Course name**	**Course outcome**
SE Computer Sem-I (2019 COURSE)		
1	210241 Discrete Mathematics	1.Design and analyze real world engineering problems by applying set theory prapositional logic and construct proofs using mathematical Induction
		2.Specify Manipulate and apply equivalence relations,Construct and use functions and apply these concepts to solve new problem
		3.Calculate number of possible outcomes using permutation and combination,to model and analyse computational processes using combinotrics
		4.Apply appropriate mathematical concepts and skills to solve problems in both familier and unfamilier situations including those in real life context
		5.Model and solve computing problem using tree and graph and solve problems using appropriate algorithms
		6.Analyze the propertie of binary operations,apply abstract algebra in coding theory and evaluate the algebraic structure
2	210242 Fundamentals of Data Structures	1. Define the terms such as data structure, time complexity and to calculate time complexity of given program segment.
		2. Solve problem of sparse matrix using array data structure.
		3. Sort the given data using any type of sorting technique and state time complexity of that sorting technique.
		4. Apply dynamic memory management using linked list in problem. Also state its advantages and disadvantages.
		5. Translate the expression from one form to another form using stack.
		6. Explain deferent types of queues with their application.
3	210243 Object Oriented Programming	1. Describe the procedural and object oriented paradigm with concepts of streams,classes, functions, data and objects etc
		2. Understand dynamic memory management techniques using pointers, constructors, destructors, etc
		3. Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
		4. Demonstrate the use of various OOPs concepts with the help of programs
		5. Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming
		6. Develop applications using object orinted programming language.
		1. Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics.

4	210244 Computer Graphics	2. Apply mathematics to develop Computer programs for elementary graphic operations.
		3. Illustrate the concepts of windowing and clipping and apply various algorithms to fill and clip polygons.
		4. Understand and apply the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection
		5. Understand the concepts of color models, lighting, shading models and hidden surface elimination.
		6. Create effective programs using concepts of curves, fractals, animation and gaming. Course Contents
5	210245 Digital Electronics & Logic Design	1. Realize & simplify boolean algebric assignments for designing digital circuits using k-map.
		2. Design & implement combinational circuits.
		3.Design & implement sequential digital circuits as per specification.
		4.Draw a ASM chart and Develop programmable logic devices for real world applications.
		5. Choose appropriate logic families according to their speciications.
		6. Explain architecture and units of computer system.
6	210246 Data structures Laboratory	1. Analyze problem and select suitable data structure for given problem
		2. Implement data structure in different programming environment.
		3. Identify the data structure and compare all of them.
7	210247 OOP & Computer Graphics Laboratory	1.Understand and apply the concept like inheritance,polymorphism,exception handling and generic structure for implementing reusable programming codes.
		2.Analyze the concept of file and apply it while storing and retriving the data from secondary storage.
		3.Analyze and apply computer graphics algorithms for line-circle drawing scan conversion and filling with the help of object oriented programming concepts.
		4.Understand the concept of windowing and clipping and apply various algorithm to fill and clip polygon.
		5.Apply Logic to implement,curves,fractals,animations and gaming programs.
8	210248 Digital Electronics Labpratory	1.Identify the various digital ICs and understand their operation.
		2. Apply Boolean laws , k-map to simplify the digital circuits.
		3. Capable to design simple logic diagram as per specification
		4. Apply knowledge to appropriate IC as per design specification.
		5. Design and implement combinational circuits such as Mux, Demux, Adder etc ans sequential circuits such as FF, Counter etc as per specifiction
		6. Learn about shift register
9	210249 Business Communication Skills	1. Express effectively through communication skills and improve listing and reading skills.
		2. Write well formatted reports and technical documents.
		3. Prepare for public speaking, group discussion, interviews and presentations.

		4. Explore target setting, self-motivation and practicing creative thinking.
		5. Prepare for writing telephone and e-mail etiquettes
		6. Write SWOT analysis and shot team and long term goals
10	210250 Humanity and Social Science	1. Aware of the various issues concerning humans and society
		2. Aware about their responsibilities towards society.
		3. Sensitized about broder issues regarding social cultural ,economic aspects of the society.
		4. Ability to understand the nature of the individual and relationship between self and community
		5. Ability to understand major ideas, values, beliefs and experiences.
TE Computer Sem-I (2015 COURSE)		
1	310241 Theory of Computation	1. Define the basic properties of formal languages, Design NFA and DFA, Conversion of NFA to DFA, Conversion of NFA with ε to NFA without ε and inter-conversion of Malay and Moore machine
		2. Inter-conversion between DFA to RE, Prove language is not regular using pumping lemma, find RE for given language and explain closure properties and applications of RE.
		3. Write CFG for given language, simplify given CFG, convert given CFG to CNF and inter-conversion of right linear and left linear grammar.
		4. Define PDA and write its applications, design PDA, inter-conversion of CFG and PDA.
		5. Explain types of Turing machine, Design TM, Differentiate between PDA and TM.
		6. Differentiate and derive the class P, NP hard and NP complete problems.
2	310242 Database Management Systems (DBMS)	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. Apply database design approaches for covering conceptual design, logical design and normalize database
		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 modern database techniques such as NOSQL
3	310243 Software Engineering & Project Management	1. Compare and chose a process model for a software project development
		2. Analyze and model software requirements of a software system
		3. Apply Fundamental knowledge in mathematics, computer science, programming and computer systems, which support the software engineering discipline
		4. Design and Modeling of a software system with tool
		5. Designing test cases of a software system
		6. Prepare the SRS, Design document, Project plan of a given software system

		7. To work as an effective member or leader in software engineering teams. and also should be able to communicate and coordinate competently for technical and general purpose
4	310244 Information Systems & Engineering Economics	1. Understand the role of information system in modern organization
		2. Analyze different managerial issues relating to information system
		3. Understand the role of engineering in organizational decision making process
		4. Identify various options in information system in the organization
		5. Analyze cost revenue data in engineering decisions and select the best possible alternative
		6. Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives
5	310245 Computer Networks	1. To understand network reference models and technologies
		2. Demonstrate design issues, flow control and error control using different protocol
		3. To understand different IEEE standards and frame formats
		4. To identify network protocols and demonstrate different routing algorithms.
		5.To understand transport layer protocol and to demonstrate client server communication using socket programming.
		6. To understand various application layer protocols.
6	310246 Skills Development Lab	1. Evaluate problems and analyze data using current technologies
		2. Incorporate best practices for building applications
		3. Install android studio & develop android app
		4. Construct software solutions by evaluating alternate architectural patterns.
		5. Develop a mini project in the form of android app
		6. Implement program using advanced data structure in Java
7	310247 DBMS Lab	1. Use fundamental database techniques such as Create, Modify and Delete
		2. Use advance database techniques such as Trigger ,Cursor and PL/SQL
		3. Use of CRUD operations on unstructured database such as MongoDB.
		4. Develop the ability to handle databases of varying complexities
8	310248 CN Lab	1. Setup of LAN of four computer using layer-2 switch in wired network.
		2. To identify network protocols and layers
		3. To understand and configure a DHCP server
		4. To apply concept of Socket programming in TCP and UDP.
		5. To analyze network tools and network programming.
		6. To understand and configure a RIP, OSPF and BGP using packet tracer.
BE Computer Sem-I (2015 COURSE)		
1	410241 High Performance Computing	1. Understand opportunities of HPC systems, describe different parallel architectures.
		2. Understand the fundamental concepts, principles of parallel algorithm design
		3. List basic communication operations
		4. To analyze & measure performance of modern parallel computing system

		5. To develop an efficient parallel algorithm to solve a given problem.
		6. Make use of CUDA programming & explain working of CUDA.
2	410242 Artificial Intelligence and Robotics	1. Identify and apply suitable Intelligent agents for various AI applications.
		2. Design smart systems using different informed search / uninformed search or heuristic search approaches
		3. Identify knowledge associated and represent it
		4. Analyze and identify given problem by ontological engineering to plan a strategy.
		5. Apply the suitable algorithms to solve AI problems.
		6. Define the concept of Robotics.
3	410243 Data Analytics	1. Capacity building of problem solving approach with respect to multiple use case.
		2. Ability to understand statistics and apply to given problem.
		3. Preparedness to apply suitable algorithmic strategies.
		4. Expertise in developing time efficient algorithms.
		5. Expertise in developing space efficient algorithms
		6. Ability to develop scalability in algorithms.
4	410244 Elective I (Data Mining and Warehousing)	1. Apply basic, intermediate and advanced techniques to mine the data
		2. To define the concepts of data warehousing
		3. To solve many pattern recognition problems such as clustering and classification
		4. Explore the hidden patterns in the data
		5. Optimize the mining process by choosing best data mining technique
		6. To solve the problems in machine learning
5	410245 Elective II Distributed Systems	1. Explain Distributed System concept Web Challenges and Architecture models.
		2. Explain Interprocesses communication methods in DS.
		3. Describe the working of clocks used in synchronous working of DS.
		4. Explain various File System and File server architectures in DS.
		5. Explain various types of consistency models and design in DS.
		6. Describe and implement the security in DS applications serving over Web
6	410246 Laboratory Practice I	1. Analysis of non-AI and AI technique to implement Tic-Tac-Toe game using minmax algorithm
		2. Study Heuristic search technique to implement Hill-Climbing algorithm
		3. Implement Best First search and A* algorithm.
		4. Implement 8-Queens problem using Backtracking algorithm
		5. Mini project using PROLOG: Medical Diagnosis System.
		6. Mini project using PROLOG: Monkey Banana Problem
7	410247	1. To develop and analyze ETL model and Visualize the effectiveness of K-means Algorithm
		2. Create association rules which can be used for product recommendations depending on the confidences of the rules
		3. To see a word list containing all the different words in your document and their occurrence count next to it in the "Total Occurrences" column.

	Laboratory Practice II	4. Explain Distributed System concept Web Challenges and Architecture models.
		5. Explain Interprocesses communication methods in DS.
		6. Describe the working of clocks used in synchronous working of DS.
8	410248 Project Work Stage I	1. Solve real life problems by applying knowledge.
		2. Write precise reports and technical documents in a nutshell.
		3. Analyze alternative approaches, apply and use most appropriate one for feasible solution
		4. Participate effectively in teams exhibiting team work, Inter-personal relationships, conflict management and leadership quality.

Computer Department

A.Y. 2020-21, Sem-II		
Sr.No.	**Course code** **Course name**	**Course outcome**
SE Computer Sem-II (2019 COURSE)		
1	207003 Engineering Mathematics-III	1. Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
		2. Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
		3. 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.
		4. Perform vector differentiation & integration, analyze the vector fields and apply to electro-magnetic fields & wave theory.
		5. Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.
2	210252 Data Structures & Algorithms	1. Define terms such as complete binary tree, full binary tree, skewed tree and identify traversals on binary tree.
		2. Define terms such as weighted graphs, subgraph, complete graph etc. and apply algorithm for finding minimum distance.
		3. Describe hashing functions and to apply proper hashing technique for given problem.
		4. Apply technique of optimal binary search tree to reduce searching time.
		5. Explain indexing techniques and to prepare B tree or B+ tree for given data.
		6. Explain different types of file organization and its operations.
3	210253 Software Engineering	1. Compare software process models used for software development.
		2. Identify and analyze the software requirements required for software development.
		3. Explain the software project estimation techniques.
		4. Formulate the design solution using software engineering.
		5. Explain and justify the importance of Software Configuration Management.
		6. Describe and compare the various testing techniques.
		1. Describe the general architecture of a microprocessor, write an assembly language program by using instruction set.

4	210254 Microprocessor	2. Differentiate read and write bus cycles, Explain debug, control, test and system registers.
		3. Calculate the physical address using segmentation and paging, Explain GDT,IDT,LDT etc.
		4. Illustrate the privilege levels and page & segment protection
		5. Compare different processor modes, describe TSS, Task gate descriptor, TR etc
		6. Classify the microprocessor and microcontroller. Explain handling of interrupts and exceptions .
5	210255 Principals of Programming Languages	1. Make use of Basic principals of Programming Languages
		2. Develop a program with data representation and computition
		3. Develop a program using Object Oriented Programming Language : Java
		4. Develop application using Encapsulation Inheritance and Polymorphism
		5. Explain the concept of Multithreading in Java
		6. Develop a simple program using functional and logical programming paradigm
6	210256 Data Structures and algorithms laboratory	1. Use tree data structure for solving real life applications and perform conversions of tree.
		2. Apply various algorithms to find out minimum distance for traversing in real life application.
		3. Apply proper hashing technique to improve search results.
		4. Solve problem with use of proper multi way trees.
		5. Use different file organization for maintenance of data.
		6. Apply appropriate data structure for given problem.
7	210257 Microprocessor Laboratory	1.Apply knowledge and demonstrate programming proficiency using the various addressing modes and instructions of microprocessor.
		2. Write a programs using co processor instruction set.
		3. Execute & debug a programs using 64 bit assembler.
		4. Create an interrupt & use it in a program.
		5. Apply the programming knowledge and create a simple arithmetic, logical, string and real time applications.
		6. Demonstrate the use of procedures, macros with suitable example programs.
8	210258 Project Based Learning II	1. Identify the real-life problem from societal need point of view.
		2. Identify the tools and techniques to solve the problem.
		3.Select feasible approach for solving the problem.
		4. Design the reliable and scalable solution for the selected problem.

		5. Specify the Hardware software requirements of the project.
		6. Prepare the brief report of their project
9	210259 Code of Conduct	1. To promote ethics, honesty and professionalism.
		2. To set standards that are expected to follow and to be aware that if one acts unethically what are the consequences.
		3. To provide basic knowledge about engineering Ethics, Veriety of moral issues and Moral dilemmas, Professional ideals and virtues.
		4. To provide basic familarity about Engineers as responsible Experimenters, Research Ethics, Codes of Etics, Industrial standards.
		5. To provide awareness about Risks and Exposure to safety and Risk, Risk Benifit Analysis.
		6. To have an idea about the collegiality and Loyalty.
TE Computer Sem-II (2015 COURSE)		
1	310250 Design & Analysis of Algorithms	1. Discuss role of algorithm design of algorithm with related issue and confirmining correlation of algorithm
		2. Explain and compare with different models and derive proof rules, decide and write algorithmic strategies to solve given problem
		3. Discuss and apply algorithmic strategies like divide and conquer, greedy approach, dynamic programming and compare algorithmic strategies
		4. Explain and analyzing asymptotic growth ,deterministic and non-deterministic growth and compare NP problem algorithm
		5. Discuss amortized analysis with its methods and write approximate embedded, randomized algorithms, Dijkstra's shortest path algorithm
		6. To analyze and evaluate problem using multithreaded and distributed string matching algorithm
2	310251 Systems Programming & Operating System	1. Define various system software & their role
		2. Analyze and synthesize system software
		3. Write program using tools like LEX and YACC
		4. Implement operating systems functions
		5. Analyze and compare memory management algorithm
		6. Analyze different file & I/O management concepts
		1. Explain Embedded System and basics of IoT like protocols and communication models and levels.
		2. Identify and state various steps involved in design methodology of IoT platform.

3	310252 Embedded Systems & Internet of Things	3. Describe the working of various IoT pillars and Hardware of IoT
		4. Explain various protocols and security in IoT.
		5. Understand application of Cloud Computing in IoT.
		6. Describe various Cloud models in IoT with various case studies.
4	310253 Software Modeling and Design	1. To apply basic concept of UML for designing use case diagram of object oriented based application
		2. Design a model using static modeling using appropriate modern tool.
		3. Design a model using dynamic modeling using appropriate modern tool.
		4. Design a model using dynamic modeling using appropriate modern tool.
		5. Apply design patterns to understand reusability in object oriented design
		6. Apply appropriate test tool for testing application.
5	310254 Web Technology	1. Analyze given assignment to select sustainable web development design methodology.
		2. Develop Client Side Web Application using Java Script
		3. Describe difference between Servlet and JSP Server Side Technologies
		4. Use PHP technology for application development
		5. Explain different client and server framework
		6. Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
6	310255 Seminar & Technical Communication	1. Student will be able to define problem statement for seminars
		2. Student will be able to perform literature survey and generate proof of concept.
		3. Student will be able to present technical contents
7	310256 Web Technology Lab	1. develop web based application using suitable client and Server side scripting such as JSP
		2. develop web based application using suitable client and Server side scripting such as PHP
		3. develop web based application using Server side Framework
		4. develop web based application using Client side Framework
8	310257 SP & OS Lab	1. Design & implement language translator
		2. Implement two pass macroprocessor
		3. Write program using tools like LEX and YACC
		4. Implement CPU scheduling algorithms
		5. Write a program for system calls

		6. Implement different page replacement algorithms
9	310258 ES & IoT Lab	1. Install and configure Raspberry Pi and Aurdino microcontrollers.
		2. Connect various sensors to Raspberry Pi and Aurdino.
		3. Write a program to control various sensors and devices
		4. Write a program to control multiple sensors and devices in coordination
		5. Write a program to create a web interface using IOT.
		6. Develop a real time application in IOT.
BE Computer Sem-II (2015 COURSE)		
1	410250 Machine Learning	1. Understanding human learning aspects and relate it with machine learning concepts.
		2. Applying statistical techniques to solve problem statements.
		3. Learning different machine learning algorithms.
		4. Understanding nature of the problem and applying machine learning algorithm.
		5. Finding optimized solution for given problem
		6. Learning input, output mapping
2	410251 Information and Cyber Security	1. Define the different attacks on Information. Find problems with existing ciphers.
		2. Identify the problems with private cryptography method.
		3. Apply public cryptography on information for security.
		4. Apply authentication methods on user end.
		5. Apply intrusion detection system to existing system
		6. Apply Security services. Analyze email security.
3	410252 Elective III Embedded and Real Time Operating System	1. To understand basics of embedded system and its components.
		2. To learn selection process of memory and processor for real time applications
		3. To learn devices, communication buses and various communication protocols of embedded system.
		4. To learn real time operating system and various approaches of real time scheduling.
		5. To understand inter process communication and resource and resource access control in RTOS
		6. To learn real time communication and software development process for embedded system.
4	410253 Elective IV	1. To understand the need of cloud based solution
		2. To understand Storage and Security mechanisms in various cloud systems
		3. To explore effective techniques to program cloud systems
		4. To explore amazon web service in detail

	Cloud Computing	5. To understand trends, current challenges and trade-off in cloud computing
		6. To understand the emerging future trends in cloud computing
5	410254 Laboratory Practice III	1. The Students must be able achieve practical hands on skills.
		2. Enhancement of employability of learner.
		3. Enhancement of technical competency of learner
		4. Understanding and analyzing problem statement clearly
		5. Learning practical machine learning algorithms
		6. Applying practical machine learning algorithms
6	410255 Laboratory Practice IV	1. To study and explore various platforms for cloud computing.
		2. Setup cloud environment in laboratory
		3. Develop the mini-project for parallel processing and execution
		4. Develop the basic parallel programs using open MP
		5. Develop the parallel programs using CUDA.
		6. Develop the mini-project for parallel processing and execution
7	410256 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
		5. Appreciate practical implications and constraints of the specialist subject

A.Y. 2020-21, Sem-I		
Sr.No.	Course code Course name	Course outcome
SE Electronics and Telecommunication-Sem-I (2019 COURSE)		
1	207005 Engineering Mathematics III	1. Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
		2. Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
		3. 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.
		4. Perform vector differentiation & integration, analyze the vector fields and apply to electro-magnetic fields & wave theory.
		5. Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.
2	204181 Electronic Circuits	1. Understand and apply semiconductor principles to the device to observe its performance.
		2. Design and analyze the concept of feedback to improve stability of circuits.
		3. Simulate amplifier, switch and oscillator circuits using computer simulation software to obtain desired results.
		4. Implement amplifier, switch and oscillator hardwired circuits to test performance and application.
		5. Explain behavior of FET at low and high frequency.
		6. Design an adjustable voltage regulator circuits.
3	204183 Electrical Circuits and Machines	1. Revise and solve basic AC &DC circuit by using KVL,KCL & network theorem.
		2. Examine performance of single phase and three phase transformer.
		3. Explain working and principle of different electrical machines.
		4. Identify application of DC machines and transformer.
		5. To compare performance of generator and motor.
4	204184 Data structures & Algorithms	1. Define and illustrate computational efficiency of the algorithms such as sorting & searching.
		2. Identify and implement different data structures such as Array,Structure,linked list, stack, queue, tree, graph by using C as the programming language.
		3. Implement stacks & queues for various applications.
		4. Explain various terminologies and traversals of trees.

		5. Explain various terminologies and traversals of graph.
		6. Design and implement C programs for various data structure.
5	204185 Digital Electronics	1. Implement the combinational circuit according to the specification
		2. Identify and build Synchronous and Asynchronous Sequential circuits.
		3. To design the ASM & FSM Machine according to the specification .
		4. Explain the basics of Digital Electronics with different logic families.
		5. To design the state mealy and moore machine according to the specifications .
		6. To explain the basics of microcontroller and their instruction set .
TE Electronics and Telecommunication-Sem-I (2015 COURSE)		
1	304181 DIGITAL COMMUNICATION	1. Select the blocks in a design of digital communication system.
		2. Analyze the performance of various line codes .
		3. Perform the time and frequency domain analysis of the signals in a digital communication system.
		4. Define various random processes. Calculate mean autocorrelation and variance.
		5. Comparison of all modulation techniques.
		6. Analyze the performance and applications of a baseband and pass band digital modulation systems in terms of error rate and spectral efficiency.
2	304182 DIGITAL SIGNAL PROCESSING	1. Perform different operations on signals.
		2. Computer Linear & Circular convolution, DFT, IDFT, DCT,I DCT of discrete time sequence and properties of DFT.
		3. Evaluate Z transform of sequence, identify its region of Convergence and compute inverse Z transform and properties of Z transform
		4. Design & analyze IIR filters
		5. Design & analyze FIR filters.Solve the problems on multistage sampling rate converter .
		6. Study different applications of DSP .
3	304183 Electomagnetics	1.Study & derive electrostatic laws & theorem (Coulombs Law, Gauss's Law, Divergence Theorem).
		2.Analyze the electric fields and apply boundary conditions in different media.
		3.Study & derive Magnetostaticlaws & theorem (Biot- Savart Law, Ampere Circuital law, Stokes theorem).

		4.Write &analyse Maxwell's equation for static and time varying field in point and integral form.
		5.Study transmission line and analyze its parameters (VSWR, Return loss, Reflection Coefficient). Solve numerical using Smith Chart.
		6.To understand thephsasor form of Maxwell equation and solve it for Uniform planewave.
4	304184 MICROCONTROLLERS	1.Description of MCS 8051 in detail with its architecture and its features like memory organization, timer and its instruction set overview.
		2.Designing and interface the Microcontroller 8051 with real world input output devices like LCD, Keypad, and ADC. With its codes in assembly language. Explanation of different hardware and software developing tools.
		3. Designing the system like Digital Acquisition system and Frequency counter with microcontroller 8051.
		4. Description of PIC18F in detail with its architecture and its features like memory organization, oscillator option and its instruction set overview.
		5.Designing and interface the PIC Microcontroller with real world input output devices like LCD, Keypad etc and timers with interrupt. With its codes in Embedded C.
		6. Classified different Serial Communication Protocol like RS232, RS 485, I2C, SPI.
5	304185 Mechatronics	1. Describe the key elements of Mechatronics system with daily life examples and explain design approach of Mechatronics system.
		2. Explain working principles of different sensors with its advantages, disadvantages and applications.
		3. Draw and explain typical Hydraulic system.
		4. Differentiate between Hydraulic and Pneumatic system and also explain physical components of Pneumatic system.
		5. Explain different electrical actuators and electromechanical actuator.
		6. Explain various case studies with its construction, working, applications and suitable sketch.
6	304193 Electronics System Design	1. Shall be able to understand the specifications
		2. Shall be able to select appropriate design topologies.
		3. Shall be able to interpret datasheets & select components & devices as per requirement
		4. Shall be able to use simulation tools like MULTISIM etc for validating the results

		6. Demonstrate and Interpret various OS functions used in Linux/ Ubuntu.
BE Electronics and Telecommunication-Sem-I (2015 COURSE)		
1	404181 VLSI DESIGN & TECHNOLOGY	1. Design digital circuits with HDL
		2. Analyze different CMOS circuit issues.
		3. Model digital circuits with HDL and implement prototype on different PLDs
		4. Design CMOS circuits for specific applications.
		5. Analyze various ASIC design issues
		6. Explain need of design for testability with different fault models and different testing techniques.
2	404182 COMPUTER NETWORK & SECURITY	1. Describe fundamental principles of computer networking
		2. Compare and recognize errors in existing protocols.
		3. Identify requirements for a given organizational structure and select suitable networking architecture.
		4. Apply the knowledge of cryptography and network security.
		5. Analyze the hardware, software, components of a network
		6. Design a Routing table for finding shortest path for data communication
3	404183 Radiation and Microwave Techniques	1. Define and 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 application.
		6. Measure various performance parameters of microwave components. Understand radiations effects and hazards.
4	404184 Digital Image Video Processing	1. Define the image mathematically and Perform basic operations on the given image.
		2. Perform basic image enhancement and restoration operations on the given image.
		3. Perform different compression techniques on given image
		4. Perform basic image segmentation and morphological operations on the given image Analyze the result.
		5. Apply the concept to represent and describe image.
		6. Define basic concept of video processing
		1. Explain and apply the various stages of hardware design in product design and development.

5	404185 ELECTRONICS PRODUCT DESIGN	2. Analyze different design considerations for analog, digital and mixed circuits design process.
		3. Describe and apply the various stages of software design in product design and development.
		4. Describe the various techniques for PCB design.
		5. Apply and describe the steps of debugging and techniques for troubleshooting
		6. Explain and apply the methods of documentation
A.Y. 2020-21, Sem-I		
Sr.No.	Course code Course name	Course outcome
ME First Year E&TC(VLSI & ES)-Sem-I		
1	Digital CMOS Design	1. Understand different MOSFET models and their characteristics.
		2. Understand different performance parameters
		3. Design CMOS logic circuits
		4. Design and Develop different FSM systems
		5. Understand advance trends in CMOS technology
2	504103 Embedded System Design	1. Define the basic concepts of Embedded Systems and Architecture of Embedded System
		2. Identify Design Methodology, and understand design challenges and Design Metrics and problem solving.
		3. Use Life-Cycle Models. Understand design process and System specifications versus system requirements
		4. Understand ARM Processor based Embedded System design and exhibit the knowledge of ARM.
		5. Understand Embedded Linux. And Linux kernel construction.
		6. Understand and apply the concept of android operating system
3	504203 Reconfigurable Computing	1. Describe Reconfigurable Device Characteristics, Configurable, Programmable, and Fixed Function Devices
		2. Designing reconfigurable circuits using PLD.
		3. Explain Metrics, Partitioning and Placement, Routing, ALU and CLB.
		4. Describe architectures of PDSPs, RALU, VLIW, Vector Processors, Memories, CPLDs, FPGA
	504104	1. Define research problem & its scope, objectives, and errors.
		2. State basic instrumentation schemes & data collection methods.

4	Research Methodology	3. Perform analysis with various statistical techniques.
		4. Perform modeling and predict the performance of experimental system
		5. Develop the research proposals.
5	504205 Wireless Sensor Network	1. Gain knowledge of Architecture of WSN network.
		2. Understand Physical, Data link and Network layer aspects with their protocols.
		3. Learn different techniques of power management and security.
		4. Exhibit the knowledge of operating systems in WSN systems.
		ME Second Year E&TC(VLSI & ES)-Sem-I
1	604201 Fault Tolerant Systems	1. The student will learn functional modeling.
		2. The student will use theory of logical fault models for testing single stuck fault.
		3. The student will show skills for fault simulation for statistical fault analysis.
		4. The student will exhibit the knowledge of self-checking for design of self-checking combinational circuits.
		5. The student will exhibit the self-testing for memory, processor and PLA according to the specifications .
2	604202 ASIC Design	1. Explain design steps of ASIC design.
		2. Explain steps of Analog and Digital (Mixed signal) ASIC design
		3. Describe different steps in ASIC construction
		4. Understand different ASIC testing methods
3	604103 A- Disaster management	1. Define disasters. Define Various terms involved in it. Explain Vulnerability profile of India.
		2. Enlist the types of disasters. Compare the disasters on the basis of major and minor. Study various disasters in details.
		3. To explain the impact of disasters on environment, social, economical, ecological etc.
		4. Define disaster risk and disaster risk reduction methods.
		5. Enlist various government and non government organizations for disaster management. Draw and explain disaster management cycle.
4	604103 B-Fuzzy mathematics	1. Explain the fuzzy logic and its properties. Compare fuzzy with crisp.
		2. Explain the fuzzy inference models Mamdani,Sugeno and Tsukamoto.

A.Y. 2020-21, Sem-II		
Sr.No.	Course code Course name	Course outcome
SE Electronics and Telecommunication-Sem-II (2019 COURSE)		
1	204191 Singals and Systems	1. Identify, classify basic signals and perform operations on signals.
		2. 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.
		3. Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform.
		4. Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms.
		5. Define and Describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF.
		6. Compute the mean, mean square, variance and standard deviation for given random variables using PDF.
2	204192 Control Systems	1. Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
		2. Determine the (absolute) stability of a closed-loop controlsystem.
		3. Perform time domain analysis of control systems required for stability analysis.
		4. Perform frequency domain analysis of control systems required for stability analysis.
		5. Apply root-locus, Frequency Plots technique to analyze controlsystems.
		6. Express and solve system equations in state variable form.
		7. Differentiate between various digital controllers and understand the role of the controllers in Industrial automation.
3	204189 Analog Communication	1. Understand fundamental concepts of different analog communication schemes with mathematical analysis.
		2. Describe Analog receivers with their performance characteristics.
		3. Compare different Analog modulation systems
		4. Understand different types of noise with performance parameters .
		5. Compare the behavior of Analog communication systems in presence of noise
		6. Describe various pulse and digital modulation techniques.

4	204190 Object Oriented Programming	1. Describe the principles of object oriented programming.
		2. Apply the concepts of data encapsulation, inheritance in C++.
		3. Understand Operator overloading and friend functions in C++.
		5. 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++.
		6. Describe and use of File handling in C++.
5	204191 Employability Skill Development	1. Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.
		2. 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.
		3. Be a part of a multi-cultural professional environment and work effectively by enhancing inter-personal relationships, conflict management and leadership skills.
		4. Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout certified career.
		5. 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.
TE Electronics and Telecommunication-Sem-II (2015 COURSE)		
	304186	1. List different power electronics devices. Sketch and Explain the construction and characteristic of SCR, MOSFET & IGBT. Compare these devices. State and explain device specifications. Design a UJT triggering circuit for SCR. Explain gate drive circuit for MOSFET/IGBT.
		2. Differentiate between Ordinary rectifiers and Controlled Rectifiers. Explain 1. phase controlled rectifier with R and RL load. Compare HWCR and FWCR. Explain 3. phase controlled rectifier with R load. Determine output V/I and other performance parameters of 1. phase/3. phase circuits. Identify applications of 1. /3. phase CR.

1	Power Electronics	3. Explain 1. phase Inverter with R and RL load. Explain 3. phase Inverter with 120 and 180 degree conduction mode. Determine output V and other performance parameters of 1. phase circuit. Identify applications of Inverter. Explain Harmonic reduction techniques of Inverter.
		4. Explain step up and step down DC chopper. Derive an expression for output V and Determine output V, other parameters. TRC and Duty cycle voltage control techniques. Classify choppers. Identify applications of 1. /3. phase CR. Explain 1. phase AVC.
		5. Explain the need of Resonant converters. Explain the operation of ZVS/ZCS. Explain different causes of EMI and techniques to reduce it.
		6. Over voltage and current protection circuits for SCR. Identify and Explain applications of power electronics.
2	304187 rmation Theory and Coding Techni	1. Identify the need of source coding Define, Calculate Entropy, Mutual information for various types of sources and channels.
		2.Apply the various source coding algorithms to Generate codeword, Calculate average code word length, efficiency and redundancy.
		3. Formulate generator matrix for linear block code and compute all code words. Determine the error detection and correction capacity for linear block code.
		4. Determine the generator polynomials for cyclic codes and calculate systematic cyclic codes
		5. Design BCH codes for varying error correction capacity and compare the performance with RS codes.
		6. Sketch tree diagram trellis diagram and state diagram and compute free distance for convolution codes
		7. Apply the concept of Viterbi Decoding, calculate branch metric, path metric and sketch decoding path through trellis.
3	304188 BUSINESS MANAGEMENT	1. Define domains of Industrial Management
		2. Be familiar with Quality Management, Financial Management and Project Management
		3. Identify importance of Human Resource Management
		4. Apply the knowledge of entrepreneurship.
	304189	1. Compare features of different ARM Series processor
		2. Describe the architecture of ARM 7 microprocessor

4	Advanced Processors	3. Interface the peripherals to ARM based microcontroller
		4. Interface advanced peripherals with ARM based microcontroller and develop Embedded system
		5. Explain features of DSP processor over ARM processor.
		6. Explain Detail architecture of DSP processor.
5	304190 System Programming and Operating System	1. Explain the concepts of system programming and develop skills to design Assembler and Macro Processor.
		2. Explain the basics of Compiler, Linker and Loader and use it in demonstration.
		3. Define OS and list different types of OS and also implement various process scheduling techniques.
		4. Explain inter process communication and implement deadlock avoidance schemes in OS.
		5. Implement memory management concepts and replacement algorithm.
		6. Explain I/O management and file management with example.
BE Electronics and Telecommunication-Sem-II (2015 COURSE)		
1	404189 Mobile Communication	1. Explain and apply the concepts telecommunication switching for voice and data.
		2. Analyze the telecommunication traffic.
		3. Analyze radio channel and cellular capacity.
		4. Explore the architecture of GSM.
		5. Knowledge of GSM channels and services.
		6. Differentiate thoroughly the generations of mobile technologies.
2	404190 Broadband Communication System	1. To explain the function of each block in the optical communication system. Compare various types of optical fibers. Define and compare different optical sources.
		2. To draw point to point optical link and power loss model. To solve numerical based on optical power budget and rise time budget. To evaluate bandwidth length product.
		3. Understand and draw WDM optical link. Enlist WDM components. Explain need of Optical amplifiers.
		4. Describe orbital parameters of satellite, launching of satellite. Explain satellite launch vehicles.
		5. Describe function of various satellite subsystems and draw the block diagram of the same. Describe the need of satellite subsystems.

		6. Solve and evaluate simple satellite link design problem considering Uplink and downlink.
3	404191 Machine Learning	1. Define the basic concepts of machine Learning.
		2. Perform basic regression and classification task.
		3. Perform and analyze clustering technique
		4. Mathematically analyze various machine learning approaches.
		5. Apply the concept to classification problem.
		6. Define basic concept of deep learning and CNN
4	404192 Wireless Sensor Networks	1. Keep himself updated on latest wireless technologies and trends in the communication field
		2. Understand the transmission of voice and data through various networks.
A.Y. 2020-21		
Sr.No.	Course code Course name	Course outcome
		ME First Year E&TC(VLSI & ES)-Sem-II
1	504207 Analog CMOS Design	1. Understand and design basic COMS sub-circuits.
		2. Udestand and Design CMOS Op-amp
		3. Understand low and high bandwidth CMOS designs.
		4. Understand and design Low Noise Amplifiers .
2	504208 System On Chip	1. Learn Design flow graphs and flow modeling.
		2. Understand SoC modeling and interfacing.
		3. Gain knowledge of SoC memory system design, embedded software and energy,management techniques for SoC design, SoC prototyping, verification, testing and physical design.
		4. Design , implement and test SoC.
3	504209 Embedded Signal Processors	1. Define the basic concepts of Real-Time Embedded Signal Processing.
		2. Realize the FIR filter.
		3. Use the concept of Digital Systems, Moving-Average Filters, and problem solving on Structures and Equations
		4. Use properties of DFT, Algorithm and problem solving on DFT and FFT
		5. Design the IIR filter

		6. Understand digital signal processing and key components of DSP and code optimization
		7. Understand the Practical DSP Applications like Audio Coding and Audio Effects
4	504210 Software Defined Radio	1. Define Software and hardware defined radio. State properties of SDR. Draw and explain the structure of SCA.
		2. Explain the function of RF front end blocks. Enlist types of RF front end topologies. Draw their block diagram.
		3. Enlist various DDS systems. Compare them. Draw PN sequence generator and derive the output.
		4. Enlist various smart antenna configurations. Define various adaptive antenna array algorithms. Draw the block diagram for various beam forming antenna arrays. Compare DSPs, ASIC and FPGA.
		5. Understand JTRS, CORBA and MAE in SDR

Department of Information technology

A.Y. 2019-20, Sem-I		
Sr.No.	Course code Course name	Course outcome
SE (Information Technology) 2015 pattern Sem-I		
1	214441	1. Calculate probability of a particular event in a given situation.
	Discrete Structure	2. Translate English statements in mathematical propositions and quantifiers.
		3. Classify different relations and functions types and relate problems to particular type.
		4. Translate real life problems into graphs and solve using graph theory concepts.
		5. To use different types of trees for various applications
		6. Solve examples of groups and rings
2	214442	1.Explain processor structure, functions of different units in it and solve problems based on computer arithmetic and computer performance.
	Computer Organization and Architecture	2.Explaindetails of CPU and MIPs, RISC and CISC architectures.
		3.Explaintypes of control unit with details.
		4.Explain concepts related to memory and I/O organization.
		5.Acquire knowledge about instruction level parallelism.
		6.Acquire knowledge about parallel organization of multi-processors and multi core systems.
3	214443	1. Understand the Number system, codes and logic family.
	Digital Electronics & Logic design	2. Use logic function representation for simplification with K-Maps and analyze as well as design Combinational logic circuits using SSI & MSI chips.
		3. Analyze Sequential circuits like Flip-Flops (Truth Table, Excitation table), their conversion &design the applications like counters, etc.
		4. Design and implement different sequential logic designs.
		5. To understand concept of programmable logic devices and ASM chart and get acquainted with design of synchronous state machines.
		6. Use VHDL programming technique with different modeling styles for any digital circuits.
4	214444	1. Develop ‘C’ programs using appropriate constructs and coding standards.
	Fundamentals of Data Structure	2. Use pointers to define and access arrays, structures, files.
		3. Evaluate the efficiency of algorithms.
		4. Choose the appropriate searching / sorting algorithm for a given application.
		5. Represent linear data structures using sequential organization.
		6. Show the representation of linear data structures using linkedorganization.
5	214445	1. Breakdown problem into smaller components, propose and evaluate different solutions for solving problems.
		2. Design an algorithmic solution to a problem using problem decomposition and step-wise refinement.
		3. Explain features of object oriented programming.

5	Problem Solving and Object Oriented Programming	4. Program using C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, etc
		5. Explain advanced Features of C++ like virtual function, templates.
		6. Understand exception handling and File I/O in C++
6	214446	1. Simplify Logic function using K-map and design Combinational logic circuits using SSI & MSI chips.
	Digital Laboratory	2. Analyze Sequential circuits like Flip-Flops (Truth Table, Excitation table) & design the applications like Asynchronous and Synchronous Counters.
		3. Design and implement Sequential Logic circuits like synchronous /asynchronous counters, MOD counters and Sequence generator using registers/Counters.
		4. Understand the design Steps and implement the main programming technique with different modeling styles for any digital circuits with VHDL Programming.
7	214447	1.Apply proper constructs of C language and coding standards for program development.
	Programming Laboratory	2.Develop programs using dynamic memory allocation.
		3.Develop programs using linear data structures.
		4.Use searching and sorting algorithms.
		5.Employ primitive operations on sequential file.
		6.Create and manipulate single, double, circular and generalized linked list.
8	214448	1. Breakdown problem into smaller components, propose and evaluate different solutions for solving problems.
	Object Oriented Programming Lab.	2. Develop and implement algorithms for solving simple problems using modular programming concept.
		3. Abstract data and entities from the problem domain, build object models and design software solutions using object-oriented principles and strategies.
		4. Develop programs that appropriately utilize key object-oriented concepts
9	214449	1. Provides an ability to understand, analyze and interpret the essentiality of grammar and its proper usage.
	Communication Skills	2. Build the students' vocabulary by means of communication via web, direct Communication and indirect communication.
		3. Understanding the various rules and means of written communication.
		4. Effective communication with active listening, facing problems while communication and how to overcome it.
TE (Information Technology) 2015 pattern Sem-I		
1	314441	1.Explain finite state machines to solve problems on it.
	Theory of Computation	2.Construct Regular Expression by solving related problems.
		3.Explain Regular Grammar and language also different types of grammar and normal forms by solving related problems.
		4.Explain concept of Push Down Automata and Post Machine by solving related problems.
		5.Explain Turing Machine by simplifying related problems.

		6.Explain decidability and computational complexity.
2	314442	1. Explain basic concepts of DBMS & RDBMS. Analyze different database models.
	Database Management Systems	2. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.
		3. Query a database using different SQL commands as well as Design and implement a database schema for a given problem domain.
		4. Explain basic issues of transaction processing and concurrency control.
		5. Describe and compare various database architectures with its applications.
		6. Describe emerging database technologies.
		7. Explain basics of data warehousing and data mining.
3	314443	1. Identify unique features of various software application domains and classify software applications.
	Software Engineering & Project Management	2. Choose and apply appropriate lifecycle model of software development.
		3. Describe principles of agile development, discuss the SCRUM process and distinguish agile process model from other process models
		4. Analyze software requirements by applying various modeling techniques.
		5. Llist and classify CASE tools and discuss recent trends and research in software engineering.
		5. Understand IT project management through life cycle of the project and future trends in IT Project Management
4	314444	1. Explain working of operating system and shell
	Operating System	2. Understand process, thread and scheduling
		3. Apply the concept of process synchronization, mutual exclusion and the deadlock
		4. Understand main and virtual memory management
		5. Realize the concept of I/O management and File system.
		6. Understand Linux operating system with its function
5	314445	1. Explain importance of HCI study and principles of user-centred design (UCD) approach.
	Human-Computer Interaction	2. Develop understanding of human factors in HCI design.
		3. Develop understanding of models, paradigms and context of interactions.
		4. Design effective user-interfaces following a structured and organized UCD process.
		5. Evaluate usability of a user-interface design.
		6. Apply cognitive models for predicting human-computer-interactions.
6	314446	1. Install and configure database systems.
	Software Laboratory-I	2. Analyze database models & entity relationship models.
		3. Design and implement a database schema for a given problem-domain
		4. Understand the relational and document type database systems.
		5. Populate and query a database using SQL DML/DDL commands.
		6. Populate and query a database using MongoDB commands.
	314447	1. Understand the basics of Linux commands and program the shell of Linux.

7	Software Laboratory-II	2. Develop various system programs for the functioning of operating system.
		3. Implement basic building blocks like processes, threads under the Linux.
		4. Develop various system programs for the functioning of OS concepts in user space like concurrency control and file handling in Linux
		5. Design and implement Linux Kernel Source Code.
		6. Develop the system program for the functioning of OS concepts in kernel space like embedding the system calls in any calls
8	314448	1.Describe a HTML5 program using frame, and to create table, registration form add images, links.
	Software Laboratory -III	2. Create a page using CSS properties Border, margins, Padding, Navigation, dropdown list.
		3.Create form in HTML with all form elements apply form validations (e.g. Email, mobile, Pin code, Password).
		4. Validate URL, Email, Required using functions empty, preg_match, filter_var in PHP.
		5. Describe servlet life cycle, create login page and apply proper validations with appropriate messages using doGet()/ doPost() methods.
		6. Design a website using Content management tool (Word Press).
		7. Describe phpMyAdmin and its features.
BE (Information Technology) 2015 pattern Sem-I		
1	414453	1. Understand basics of security services
	Information and Cyber Security	2. Use basic cryptographic techniques in application development
		3. Apply methods for authentication, access control, intrusion detection and prevention.
		4. Understand risks and vulnerability terms
		5. Classify different cybercrimes
		6. Develop computer forensics awareness.
2	414454	1. Build the learning model.
	Machine Learning and Application	2. Developed an appreciation for what is involved in learning from data.
		3. Find out solution to real world problems
		4. Implement some basic machine learning algorithms
		5. Using different method evaluate the performance of learning models
		6. Apply machine learning algorithms to solve problems of moderate complexity
3	414455	1. Understand the fundamental aspects of different object oriented methodologies
	Software Design & Modeling	2. Explore and analyze use case modeling, domain/ class modeling.
		3. Understand Interaction and behaviour modeling
		4. Analyse design process in software development
		5. Understand software design principles and patterns.
		6. Learn the architectural design guidelines in various type of application development.
	414456	1. Justify the need to study human-computer-interaction or human-factors while designing software.
		2. Discuss the process of designing user-friendly software based on usability engineering guidelines.

4	Elective - I (Usability Engineering)	3. Apply interaction design and UI design process in enhancing user-experience of an application.
		4. Conduct usability evaluation of user-interfaces or software applications.
		5. Discuss industry standards for designing and evaluating user-interfaces.
		6. Discuss current trends in usability engineering
5	414457	1. Understand importance of testing and tester's role in a software development organization.
	ELECTIVE II: Software Testing and Quality Assurance	2. Understand Testing Approaches.
		3. Explore Software Test Automation, Quality Management Metrics.
		4. Understand Software quality assurance.
		5. Choose appropriate quality assurance models and develop quality.
		6. Understand Software Process, Internal Auditing and Assessments.
6	414458	1. Implement basic security meachanisms
	Computer Laboratory VII	2. Understand the machine learning principles and analytics of learning algorithms.
		3. Apply Machine Learning Principles for various applications
7	414459	1. Understand Unified Modeling Language (UML 2.0)
	Computer Laboratory VIII	2. Identify different software artifacts at analysis and design phase.
		3. Explore and analyze use case modeling.
		4. Understand Interaction and Behavior Modeling.
		5. Explore and analyze domain/ class modeling.
8	414460	1. Implement their ideas/real time industrial problem/ currentapplications from their engineering domain.
		2. Develop plans with help of team members to achieve the project's goals.
		3. Break work down into tasks and determine appropriate procedures.
	Project Phase-I	4. Allocate roles with clear lines of responsibility and accountability and learn team work ethics.
		5. Estimate and cost the human and physical resources required, and make plans to obtain the necessary resources.

Department of Information technology

A.Y. 2019-20, Sem-II		
Sr.No.	Course code Course name	Course outcome
SE (Information Technology) 2015 pattern Sem-II		
1	207003	1. Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
	Engineering Mathematics - III	2. Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing.
		3. Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence.
		4. Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals.
		5. Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.
2	214450	1.Explain terms related to computer graphics and apply mathematics and logic to develop computer programs for elementary graphic operations.
	Computer Graphics	2.Solve problems for performing graphical transformations.
		3.Apply mathematics and graphical techniques to achieve realism using 3D transformations and projections.
		4.Explain segment, windowing and clipping concepts and apply algorithms to solve problems related to them.
		5.Explain techniques to create realistic views using shading and animation sequences and learn gaming platforms.
		6.Explain methods to draw curves and random surfaces.
3	214451	1. Explain ALP tools and architecture details of 80386 microprocessor
	Processor Architecture & Interfacing	2. Explain the memory management of 80386 microprocessor
		3. Explain Paging, multitasking, Real and Protected mode Interrupt structure?
		4. Differentiate between microprocessor and microcontroller. Understand architecture and memory organization of 8051microcontroller.
		5. Explain ports, interrupts and timers/ counters of 8051.
		6. Explain the Features, Architecture, Operating modes 8255. Understand the interfacing and application of 8051.

4	214452	1. Explain linear data structures i.e. stack and queue with their applications
	Data Structures and Files	2. Explain the basic terminologies and types of trees.
		3. Illustrate the use of various graphs algorithms.
		4. Explain symbol table applications and use the different hashing methods.
		5. Describe the use of advanced tree data structures.
		6. Explain different file organizations with their primitive operations.
5	214453	1.Understand data/signal transmission over communication media
	Foundations of Communication and Computer Network	2. Recognize usage of various modulation techniques in communication
		3. Analyze various spread spectrum and multiplexing techniques
		4. Use concepts of data communication to solve various related problems
		5. Understand error correction and detection techniques.
		6. Acquaint with transmission media and their standards
6	214454	1. Explain concepts related to assembly language programming
	Processor Interfacing Laboratory	2. Write and execute assembly language program to perform array addition, code conversion, block transfer and string operations
		3. Write program of 8051 microcontroller and implement the same using 8051 development board.
		4. Explain interfacing of real world input and output devices to 8051 microcontroller
7	214455	1. Apply proper constructs of C++ and coding standards for program development.
	Data Structures and Files Laboratory	2. Implement stack and queue.
		3.Implement non-linear data structures such as trees, graphs etc.
		4. Implement primitive operations on sequential file.
		5. Use various hashing techniques for implementing direct access file.
8	214456	1. Apply and implement line drawing and circle drawing algorithms to draw specific shape given in the problem
	Computer Graphics Laboratory	2. Apply and implement polygon filling algorithm for a given polygon.
		3. Apply and implement 2-D and 3-D transformation algorithms for given input shape
		4. Apply and implement polygon clipping algorithm for given input polygon
		5. Apply and implement fractal generation algorithm for a given input.
		6. Apply and implement animation concepts for generating simple animation without using any animation tool
TE (Information Technology 2015 pattern) Sem-II		
	314450	1. Know Responsibilities, services offered and protocol used at each layer of network.

1	Computer Network Technology	2. Understand different addressing techniques used in network.
		3. Know the difference between different types of network.
		4. Know the different wireless technologies and IEEE standards
		5. Use and apply the standards and protocols learned, for application development.
		6. Understand and explore recent trends in network domain.
2	314451	1. Explain independently modern software development tools and creates novel solutions for language processing applications.
	System Programming	2. esign and implement assemblers and macro processors.
		3. Use tool LEX for generation of Lexical Analyzer.
		4. Use YACC tool for generation of syntax analyzer.
		5. Generate output for all the phases of compiler.
		6. Apply code optimization in the compilation process.
3	314452	1. practice principle of Optimality to solve problems using Dynamic Programming
	Design and Analysis of Algorithms	2. Apply Divide & Conquer as well as Greedy approach to design algorithms.
		3. Classify different problems into appropriate design solutions.
		4. Illustrate different problems using Backtracking.
		5. Compare different methods of Branch and Bound strategy.
		6. Identify the nature of nondeterministic algorithms and classify deterministic algorithms into P classes.
4	314453	1. Understand Cloud Computing and its ecosystem.
	Cloud Computing	2. Learn basics of virtualization and its importance.
		3. Give technical overview of Cloud Programming and Services.
		4. Understand security issues in cloud computing.
		5. Evaluate in-depth analysis of Cloud Computing capabilities.
5	314454	1. Understand Big Data primitives.
	Data Sciece and Big Data Analytics	2. Learn and apply different mathematical models for Big Data.
		3. Demonstrate their Big Data learning skills by developing industry or research applications.
		4. Analyze each learning model come from a different algorithmic approach and it will perform differently under different datasets.
		5. Understand needs, challenges and techniques for big data visualization.
		6. Learn different programming platforms for big data analytics.
6	314455	1. Implement small size network and its use of various networking commands.
		2. Understand and use various networking and simulations tools.
		3. Configure various client/server environments to use application layer protocols

6	Software Laboratory-IV	4. Understand the protocol design at various layers.
		5. Explore use of protocols in various wired and wireless applications.
		6. Develop applications on emerging trends.
7	314456	1. To design and implement two pass assembler for hypothetical machine instructions.
	Software Laboratory-V	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.
8	314457	1. Understand Big data primitives and fundamentals.
	Software Laboratory-VI	2. Understand the different Big data processing techniques.
		3. Understand the application and impact of Big Data
		4. Understand and apply the Analytical concept of Big data using R/Python
		5. Understand emerging trends in Big data analytics
		6. Understand different data visualization techniques for Big Data.
9	314458	1. Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal
	Project Based Seminar	2. 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. Explore and enhance the use of various presentation tools and techniques.
		6. Understand scientific approach for literature survey and paper writing.
BE (Information Technology) 2015 pattern Sem-II		
1	414462	1.Understand the fundamentals of distributed systems.
	Distributed Computing Systems	2.Describe various ways of communication and coordination in a distributed system.
		3.Discuss the importance of replication and fault tolerance.
		4.Describe the various file systems used in distributed systems.
		5.Understand the distributed Web based system.
		6.Discuss the various security issues and security management in a distributed system.
2	414463	1. Explain the knowledge of design of UbiComp and its applications.
	Ubiquitous Computing	2. Explain smart devices and services used UbiComp.
		3. Explain 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. Describe UbiComp privacy and explain the challenges associated with UbiComp privacy.
3	414464	1. Describe the concept of the Internet of Things, IoT definitions and physical and logical design of IoT.
	Ele-III: Internet of Things	2. Explain architecture of IoT.
		3. Describe the objects connected in IoT.
		4. Understand addressing techniques for IoT.
		5. Understand the platforms in IoT.
		6. Understand cloud interface to IoT.
4	414465	1. Understand the basics of Social Media Analytics.
	Elective IV: 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.
5	414466	1.Demonstrate knowledge of the core concepts and techniques in distributed systems.
	Computer Laboratory - IX	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.
6	414467	1. Describe Android development environment. Installing and setting up the environment. Hello world application.
	COMPUTER LABORATORY-X	2.Design a User Interface(Android) using pre-built UI components such as structured layout objects, UI controls and special interfaces such as dialogs, notifications, and menus.
		3. Explain Android-database Connectivity and create a SQLite Database for an Android Application and perform CRUD (Create, Read, Update and Delete) database operations.
		4. Design a Smart Application that senses environment temperature using temperature sensor (DHT 11).
		5. Describe a Smart Light System (Light that automatically switched on in evening and gets off in morning) using open source Hardware platform like Arduino and some sensors (Light dependent resistor) and actuator (An LED).
		6. Explain Android Security and design a system which connect hardware to Android Smart Phone with unique identifier Security i.e Authentication token.
		7.Explain the Evolution of cellular networks all the way up to 7G.
	414468	1. Extend further the investigative study
		2. Product development cycle using industrial experience, use of state of art technologies.

7	Project Work	3. Participate in National/International paper presentation activities and funding agency for sponsored projects.
		4. Use learning and knowledge access techniques using Conferences, Journal papers and anticipation in research activities.
		5. Evaluate the various validation and verification methods.
		Analyze professional issues, including ethical, legal and security issues, related to computing projects.