Engineering Sciences And Allied Engineering Sem-I

A.Y. 2018-19, Sem-I		
Sr.No.	**Course code** **Course name**	**Course outcome**
Engineering Sciences And Allied Engineering Sem-I		
1	Subject code 107001 subject name : Engineering Mathematics I	1. To Find the rank of Matrix, Linear Independence, Transformation. Solve the system of Linear Equations of any Engineering system using rank of matrix.
		2. To Find amplitude and argument of any complex number. Find nth power or root of a complex number using De-Moivre's theorem. Separate real and imaginary parts of circular and hyperbolic functions.
		3. To Apply test for convergence/divergence of series.Find nth derivative and can apply Lebnitz theorem.
		4. To Evaluate limit having indeterminate form.Apply Taylors series to evaluate any functional value
		5. To Compute partial derivatives of functions of several variables Apply Eular's theorem on Homogeneous Functions
		6. To find Jacobian of functions and implicit functions find maxima and minima of two variable and using Lagranges Method
2	Subject code 107002 subject name : Engineering Physics	1. Students should be able to calculate radius of curvature of plano-convex lens by Newton's ring experiment, wavelength of light by plane diffraction grating, verify law of Malu's
		2. Students should be able to calculate velocity of ultrasonic waves in different media, absorption coefficient of various surfaces by using decibel meter.
		3. Students should be able to demonstrate how LASER can be used for determination of diameter a wire.
		4. Students should be able to explain working of PN junction diode & NPN transistor on the basis of Energy band Diagrams.
		5. Students should be able to draw wave functions & their Probability densities for particle in rigid box & non rigid box, calculate Eigen energy values for particle inside a rigid box.
		6. Students should be able to differentiate between Type I & Type II superconductor, explain Meissner effect, explain synthesis of nanoparticles by physical & chemical method, explain properties of nanoparticles & their applications.
2	Subject code 107009 subject name : Engineering Chemistry	1.Demonstrate various techniques of water softining and refer green chemistry principles
		2.Use sophiscated electro analytical instuments

		3.Illustrate engineering application of various polymers with reference to their chemical structure and properties
		4.Demonstrate knowledge of fuel with reference to properties, application and future scope
		5.Use carbon nonmaterials for various engineering application and hydrogen as future fuel
		6.Demonstrate chemical reaction of corrosion and its prevention
3	Subject code 110003 subject name :Fundamental Programming Languages -I	1. Understand fundamentals of computer system
		2. Ability to develop basic C programs based on simple mathematical calculations.
		3. Ability to develop C programs based on decision control structure
		4.Ability to develop C programs based on strings and functions.
4	Subject code:103004 Basic Electrical Engineering OR	1. Solve numericals based on work, power & energy by studying basic concepts of electrical engineering such as emf, pd, current and resistance.
		2. Compare electrical & magnetic circuit stating similarities & dissimilarities
		3. Derive expression for RMS value & average value in terms of peak value to find form factor and peak factor for sinusoidal current & voltage.
		4. Estimate efficiency & regulation of single phase transformer by performing direct load test on it.
		5. 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.
		6. Differentiate electrical networks & apply various network theorems to solve the circuit.
4	Subject code:104012 subject name: Basic Electronic Engineering	1. Explain the various electronic components.
		2. Understand and describe specifications, features of electronic ideal diode and ideal diode circuits.
		3. Learn basic characteristics of BJT and MOSFET.
		4. Learn the concept of amplifier, input resistance, output resistance.
		5. Understand working of some IC based circuits.
		6. Explain logic gates and their usage in digital circuits.
		7. Learn the working of some power electronic devices, transducers and application of transducers.
		8. Knowledge of the basic aspect of electronic communication systems.
	Subject code 101005	1. Able to communicate effectively to function on multidisciplinary teams
		2. Identify the different materials and types of constructions used on field.

5	subject name : Basic Civil and Environmental Engineering	3. Identify the stages of planning process and surveys in planning and carry out preliminary surveying in the field of civil engineering applications
		4. Analyze importance of ecological cycles and realize the impact of human behavior on environment and need of conserving natural resources
		5. Apply the knowledge of surveying to draw layout of any plot /field and apply the principles of planning and bylaws used for building planning.
		6. To identify the sources of different pollutions and can suggest the remedial actions against it.also identify the need of harnessing energies.
6	Subject code: 102006 subject name : Engineering Graphics - I	1. To know and understand the conventions and the methods of engineering drawing.
		2. Interpret engineering drawings by using fundamental technical mathematics.
		3. Construct basic and intermediate geometries.
		4. Construct conics and special Engineering curves and development of solids.
		5. Comprehend the theory of projection and demonstrate an ability to prepare pictorial and orthographic drawings.
		6. Analyse and solve 3-dimensional problems by graphical means. To improve their technical skill in the form of communicative drawings.To get familiar with advance technology used in form of software.
7	Subject code : 111007 subject name : Workshop	1. Get a idea about safety precautions to take while working in workshop
		2. Understand the working of machine tools like lathe, grinding and drilling machine
		3. Achieve practical knowledge of machine tool by making small jobs on it
		4. Understand assembly/disassembly of small products
		A.Y. 2018-19, Sem-II
Sr.No.	**Course code Course name**	**Course outcome**
Engineering Sciences And Allied Engineering Sem-II		
1	Subject code : 107008 subject name : Engineering Mathematics -II	1. Solve first order, first degree differential equation
		2. Formulate or modeling in Heat flow, L-R, C-R circuits, Newton's Law of cooling as a first order, first degree differential equation
		3. Find Fourier series, sine and cosine series Formulate and evaluate special function Beta and Gamma function
		4. Apply DUIS rule to evaluate definite Integral. Trace Cartesian, explicit, polar and parametric curves. measure length of arc

		5. Understand three dimensional Geometry
		6. Find and Evaluate multiple Integral Apply Multiple integration to Area, Volume, Moment of Inertia ,Centre of Gravity etc
2	Subject code 107009 subject name : Engineering Chemistry	1.Demonstrate various techniques of water softining and refer green chemistry principles
		2.Use sophiscated electro analytical instuments
		3.Illustrate engineering application of various polymers with reference to their chemical structure and properties
		4.Demonstrate knowledge of fuel with reference to properties, application and future scope
		5.Use carbon nonmaterials for various engineering application and hydrogen as future fuel
		6.Demonstrate chemical reaction of corrosion and its prevention
2	Subject code 107002 subject name : Engineering Physics	1. Students should be able to calculate radius of curvature of plano-convex lens by Newton's ring experiment, wavelength of light by plane diffraction grating, verify law of Malu's
		2. Students should be able to calculate velocity of ultrasonic waves in different media, absorption coefficient of various surfaces by using decibel meter.
		3. Students should be able to demonstrate how LASER can be used for determination of diameter a wire.
		4. Students should be able to explain working of PN junction diode & NPN transistor on the basis of Energy band Diagrams.
		5. Students should be able to draw wave functions & their Probability densities for particle in rigid box & non rigid box, calculate Eigen energy values for particle inside a rigid box.
		6. Students should be able to differentiate between Type I & Type II superconductor, explain Meissner effect, explain synthesis of nanoparticles by physical & chemical method, explain properties of nanoparticles & their applications.
3	Subject code :110010 subject name : Fundamental Programming Languages II	1. Understand concept of object oriented Programming to develop programs.
		2. Understand concept of object oriented Programming to develop programs.
		3. Design and develop web pages using HTML.
		4. Design and develop simple application and mobile application using Embedded Programming and Android SDK.

4	Subject code 101011 subject name : Engineering Mechanics	1. Able to apply scalar and vector analytical techniques for analyzing forces in statically determinate structures and to reduce a system of forces acting on rigid body to a single equivalent force and compute its point of application as well as able to compute Centroid of plane lamina and wire bend.
		2. Apply fundamental concepts of Kinematics and kinetics of particles to the analysis of simple, practical problems in Rectilinear motion and will able to apply the basic Knowledge of Engineering Mechanics to solve real life problem for rectilinear motion.
		3. Apply fundamental concepts of Kinematics and Kinetics of particles to the analysis of simple, practical problems in Curvilinear motion ,will able to solve real life problem for Curvilinear motion and Analyze the motion of vehicles on Curved road.
		4. Able to solve dynamics problems Appraise given information and determine which concepts can be appropriately applied to solve real life problems.
		5. Apply the concept of free body diagram and equilibrium to find out the resultant of the force system in 2-D and 3-D , reactions developed in structures like beam.
		6. Able to solve for internal forces acting on any member of a pined jointed truss structure and frame. Able to compute frictional force or coefficient for sliding motions and for belt and pulleys.
5	Subject code :104012 subject name : Basic Electronic Engineering OR	1. Explain the various electronic components.
		2. Understand and describe specifications, features of electronic ideal diode and ideal diode circuits.
		3. Learn basic characteristics of BJT and MOSFET.
		4. Learn the concept of amplifier, input resistance, output resistance.
		5. Understand working of some IC based circuits.
		6. Explain logic gates and their usage in digital circuits.
		7. Learn the working of some power electronic devices, transducers and application of transducers.
		8. Knowledge of the basic aspect of electronic communication systems.
5	Subject code :103004 Basic Electrical Engineering	1. Solve numericals based on work, power & energy by studying basic concepts of electrical engineering such as emf, pd, current and resistance.
		2. Compare electrical & magnetic circuit stating similarities & dissimilarities
		3. Derive expression for RMS value & average value in terms of peak value to find form factor and peak factor for sinusoidal current & voltage.
		4. Estimate efficiency & regulation of single phase transformer by performing direct load test on it.

		5. 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.
		6. Differentiate electrical networks & apply various network theorems to solve the circuit.
6	Subject code :102013 subject name : Basic Mechanical Engineering	1. understand power transmission through mechanical elements and understand the mechanisms of power transmission in a machine.
		2. Understand the fundamentals of theory of kinematics, motion of machines, Mechanism and their components. Learn and identify steps in machine design process, various materials, their properties and their applications in human life as well as industrial practices. Also understand the process of selection of engineering materials
		3. Understand various manufacturing process and its mechanical application. The manufacturing process are casting, metal forming, Fabrication process.
		4. Understand concepts of various machining processes and will be able to work in workshop on machining tools like lathe, drilling, grinding etc.
		5.Impart knowledge of basic concepts in thermodynamics and heat transfer, different laws and processes involved in it to understand energy conversions.
		6. Learn industrial applications of thermodynamics like power plants, refrigerators, automobile engines, pumps and similar energy conversion devices and its applications.
7	Subject code : 102014 subject name : Engineering Graphics II	1. UnderstandUsefulness of Engg. Graphics subject and Autocad Software.
		2. Know about different types of lines, lettering standards & dimensioning
		3. Understand the meaning of first and third angle method of projection
		4. Use basic commands like how to set limiy to screen, drawing in metric unit, commands like draw, modify for 2D, use of layer manager, isometric views setting.
		5. Draw solutions on topics like projection of solid, engineering curves, development of solid & orthographic projection by using Autocad software
		6. Draw orthographic projections and sections of 3D componants
		7. Draw 3d componants by using isometric setting of software
		8. Implement different dimensioning methods on 2Ds

Computer Department

A.Y. 2018-19, Sem-I		
Sr.No.	**Course code** **Course name**	**Course outcome**
SE Computer Sem-I (2015 COURSE)		

1	210241 Discrete Mathematics	1. To Analyse and synthesis real world problems
		2. To construct mathematical constructs by using relations and functions
		3. To solve problems based on probability
		4. To solve travelling salesman Problem and network problem
		5. To find easily shortest path by using different algorithms
		6. Analyze and synthesize the real world problems using discrete mathematics.
2	210242 Digital Electronics and Logic Design	1. Realize & simplify Boolean algebraic assignments for designing digital circuits using K-map.
		2. Design & implement sequential digital circuits as per specification.
		3. Design simple system using VHDL..
		4. Design programmable logic devices such as PLA,PAL,PLDs
		5. Explain logic families in detail
		6. Draw the architecture & write a instruction set.
3	210243 Data Structures and Algorithms	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. Apply dynamic memory management using linked list in problem. Also state its advantages and disadvantages.
		4. Translate the expression from one form to another form using stack.
		5. Explain dferent types of queues with their application.
		6. Sort the given data using any type of sorting technique and state time complexity of that sorting technique.
4	210244 Computer Organization and Architecture	1. solve basic binary math operations and define system architecture and various components of system
		2. Demonstrate the use of cache memory and Internal and External memories.
		3. State and explain the I/O module and its working along with DMA.
		4. Differentiate between different types of Instructions and write a program using and understanding different instructions.
		5. Recall and define the Processor organization and superscalar processor
		6. Analyses and define Basic Processing Unit functions and write the micro-instructions for the task.
	210245	1. Define & explain basic concepts of object oriented programming & apply features of object oriented programming language.
		2. Explain concept of virtual &friend function with example & types of pointers

5	Object Oriented Programming	3. Describe templates & types of templates, to analyze and design a computer program using template
		4. Explain & analyze the strengths of exception handling mechanism in program with keyword.
		5. Describe different file handling classes & stream manipulators.
		6. To design & apply Standard Template Library for effective programming, describe components of STL & types of containers.
6	210246 Digital Electronics Lab	1. Study of logic gates and realization of OR,AND,NOT AND XOR Functions using universal gates
		2. Design and implement combinational circuits like half adder/full adder, half subtractor/full subtractor, code converters, comparators, MUX/DEMUX
		3. Design and implement sequential circuits like flip-flops, counters and shift registers
		4. Design & Implement the VHDL programs using software
		5. Study of TTL characteristics & microprocessor 8051
7	210247 Data Structures Lab	1. Analyze problem and select suitable data structure for given problem
		2. Implement data structurein different programming environment
		3. Identify the data structure and compare all of them
8	210248 Object Oriented Programming Lab	1. The Students must be able to understand problem statement
		2. Ability to understand class, object, method concepts in object oriented environment.
		3. Ability to develop logic of division of the complete problem statement into multiple modules.
		4. Better understanding of technological aspects, utility and recent trends related to the topic
		5. Understanding of coding standards such as appropriate use of proper Indentation and comments.
		6. Practicing programming on open source software.
9	210249 Soft Skills	1. Effectively communicate through verbal/oral communication and improve her listening skill.
		2. Write precise briefs or reports and technical documents.
		3. Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
		4. Follow Ethics as an engineering professional and adopt good standards & norms of engineering practice.
		5. Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.
		6. Function effectively in multi-disciplinary teams through the knowledge of team work

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	1. Understand the role of information system in modern organization
		2. Analyze different managerial issues relating to information system

	Information Systems & Engineering Economics	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 Database Management System 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 Computer Network 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	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
		1. Analysis of non-AI and AI technique to implement Tic-Tac-Toe game using minmax algorithm

6	410246 Laboratory Practice I	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 Laboratory Practice II	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.
		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		1. Solve real life problems by applying knowledge.
	410248 Project Work Stage I	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.

A.Y. 2018-19, Sem-II		
Sr.No.	**Course code** / **Course name**	**Course outcome**
SE Computer Sem-II (2015 COURSE)		
1	207003 Engineering Mathematics III	1. To Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits
		2. To Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing
		3. To Obtain Interpolating polynomials, numerically differentiate and integrate functions
		4. To Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence.
		5. To Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals.
		6. To Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.
		1. Basic concepts, input and output devices

2	210251 Computer Graphics	2. Identify the installed graphics drivers and graphics modes. DDA and Bresenham's algorithms for line and circle.
		3. Solve 2D and 3D transformations problems on polygon..
		4. Analyze and identify different algorithms for back-face removal surfaces, color models.
		5. Define terms in Multimedia Animation and gaming programs.
		6. Define the concept of Curves and Fractals..
3	210252 Advanced Data Structures	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.
4	210253 Microprocessor	1. Write a program by using instructions & explain the memory organization.
		2. Describe the architecture and classify segmentation & paging. Calculate physical address.
		3. Understand the system level features & protection levels, Illustrate multitasking.
		4. Explain IDT, IDT descriptors, error code format, identifying interrupts etc, I/O addressing & instructions
		5. Understand reset state, switching from mode, difference between the modes
		6. Understand the co-processor instructions & applying it in program
5	210254 Principles of Programming Languages	1. To analyze the strengths and weaknesses of programming languages for effective and efficient program development.
		2. To inculcate the principles underlying the programming languages enabling to learn new programming languages.
		3. To grasp different programming paradigms
		4. To use the programming paradigms effectively in application development.
		5. To use concept of Inheritance, Polymorphism and Encapsulation to develop complex Applications
		6. To use Exception handling in Java
6	210255 Computer Graphics Lab	1. Understand the basic concepts of computer graphics.
		2. Apply clipping and filling techniques for modifying an object
		3. Understand the concepts of different type of geometric transformation of objects in 2D and 3D.

		4. Understand the practical implementation of modeling, rendering, viewing of objects in 2D.
7	210256 Advanced Data Structures Lab	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 multiway trees.
		5. Use different file organization for maintenance of data.
		6. Apply appropriate data structure for given problem.
8	210257 Microprocessor Lab	1. Write a programs by using instruction set
		2. Write a programs using coprocessor instruction set
		3. Execute a program using different assemblers
		4. Understand the interrupt vector table & use of interrupts in program
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. define problem statement for seminars
		2. perform literature survey and generate proof of concept.
		3. 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	1. Design & implement language translator
		2. Implement two pass macroprocessor
		3. Write program using tools like LEX and YACC

	System Programming &Operating System Lab	4. Implement CPU scheduling algorithms
		5. Write a program for system calls
		6. Implement different page replacement algorithms
9	310258 Embedded Systems & Internet of Things 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 Cloud Computing	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
		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

Electronics and Telecommunication Department

A.Y. 2018-19, Sem-I

Sr.No.	Course code Course name	Course outcome
SE Electronics and Telecommunication-Sem-I (2015 COURSE)		
1	204181 Signals and Systems	1. Understand mathematical description and representation of continuous and discrete time signals and systems.
		2. Develop input output relationship for linear shift invariant system and able to use convolution operator for continuous and discrete time system.
		3. Analyze linear shift invariant system using transform domain technique.

		4. Resolve the signals in frequency domain using Fourier series and Fourier transforms.
		5. Develop the ability to analyze the system in s domain using Laplace Transform.
		6. Evaluate probability, CDF,PDF,autocorrelation and crosscorrelation
2	204182 Electronic Devices and 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 motors.
		5. To compare performance of generator and motor.
		6.Explain proper electrical motor for given application.
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 .
		1. Perform operations on the measuring instruments.

6	204186 Electronic Measuring Instruments and Tools	2. Identify analog and digital instruments and evaluate some properties like Mean, Deviation, Probable error etc.
		3. Solve problems using different power supply.
		4. Analyze the performance of Observing type instruments
		5. Apply the concept of digital to analyze and store the waveform.
		6. Define terms in statistical analysis, error etc. Calculate statistical parameters such as mean, standard deviation and variance.
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
		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
		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.
		1. Describe fundamental principles of computer networking
		2. Compare and recognize errors in existing protocols.

2	404182 COMPUTER NETWORK & SECURITY	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
5	404185 PRODUCT	1. Explain and apply the various stages of hardware design in product design and development.
		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
		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. 2018-19		
Sr.No.	Course code Course name	Course outcome
ME First Year E&TC(VLSI & ES)-Sem-I		
1	504201	1. Understand different MOSFET models and their characteristics.

	Digital CMOS Design	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
4	504104 Research	1. Define research problem & its scope, objectives, and errors.
		2. State basic instrumentation schemes & data collection methods.
		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. 2018-19, Sem-II		
Sr.No.	Course code Course name	Course outcome
SE Electronics and Telecommunication-Sem-II (2015 COURSE)		
1	2070005 Engineering Mathematics III	1. To Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
		2. To Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing.
		3. To 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. To Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.
		5. To Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing
2	204187 Integrated Circuits	1. Unerstand the charactristics of Op Amp,it's internal structure and its parameters.
		2. Identify various performance based paramters and their significance for Op Amp.
		3. Analyze and identify various Linear and Nonlinear applications of Op Amp.
		4. Design,build and test some circuits for various applications.
		5. Apply the functionalities of PLL to understand different applictions as frequency synthesizer,multiplier,AM and FM demodulators.
		6. Analyze and design Active filters.
		1. Learn and utilize models of physical systems in different forms suitable for use in the analysis of control systems.

3	204188 Control Systems	2. Perform time domain and frequency domain analysis of control systems required for stability analysis.
		3. Apply Routh-Hurwitz criterion to determine the domain of stability of linear time-invariant systems in the parameter space.
		4. Perform time domain and frequency domain correlation analysis.
		5. Apply root-locus, Bode plot techniques to analyze control systems
		6. Express and solve system equations in state variable form
		7. Explain the concepts of PID and PLC controllers and digital control system.
4	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.
5	204190 Object Oriented Programming	1. State the features of object oriented programming.
		2. Explain the concepts of data encapsulation, inheritance in C++.
		3. Understand basic program constructs in Java
		4. Describe how the class mechanism supports encapsulation and information hiding.
		5. Apply the concepts of classes, methods and inheritance to write programs Java.
		6. Design and implement simple programs in an object-oriented programming language
6	204191 Employability Skill Development	1. Able to solve aptitude test.
		2. Analyze presentation skill, listening skill and be ready for facing job interviews
		3. Able to write story, paragraph and letter.
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 Information Theory and Coding Techniques	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.
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.
4	304189 Advanced Processors	1. Compare features of different ARM Series processor
		2. Describe the architecture of ARM 7 microprocessor
		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.
	304190	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.

5	System Programming and Operating System	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. 2018-19		
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. 2018-19, 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.
	Problem Solving and Object Oriented	2. Design an algorithmic solution to a problem using problem decomposition and step-wise refinement.
		3. Explain features of object oriented programming.
		4. Program using C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, etc

	Programming	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
		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	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
	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.
		6. 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.

7	314447	1. Understand the basics of Linux commands and program the shell of Linux.
	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
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.

	Modeling	6. Learn the architectural design guidelines in various type of application development.
4	414456	1. Justify the need to study human-computer-interaction or human-factors while designing software.
	Elective - I (Usability Engineering)	2. Discuss the process of designing user-friendly software based on usability engineering guidelines.
		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.
	Project Phase-I	2. Develop plans with help of team members to achieve the project's goals.
		3. Break work down into tasks and determine appropriate procedures.
		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.
A.Y. 2018-19, Sem-II		
Sr.No.	Course code	Course outcome
	Course name	
SE (Information Technology) 2015 pattern Sem-II		
	207003	1. To Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits
		2. To Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing

1	Engineering Mathematics - III	3. To Obtain Interpolating polynomials, numerically differentiate and integrate functions
		4. To Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence.
		5. To Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals.
		6. To 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 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
		4. Perform vector differentiation and integration to analyze the vector fields
		5.Explain techniques to create realistic views using shading and animation
		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.

	Laboratory	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		
1	314450	1. Know Responsibilities, services offered and protocol used at each layer of network.
	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.
	314453	1. Understand the need of Cloud based solutions.
		2. Understand Security Mechanisms and issues in various Cloud Applications

4	Cloud Computing	3. Explore effective techniques to program Cloud Systems.
		4. Understand security issues in cloud computing.
		5. Understand current challenges and trade-offs in Cloud Computing.
		6. Understand emerging trends in cloud computing.
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.
	Software Laboratory-IV	2. Understand and use various networking and simulations tools.
		3. Configure various client/server environments to use application layer protocols
		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. Demonstrate and 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. 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
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.
	414467	1. Describe Android development environment. Installing and setting up the environment. Hello world application.
		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.

6	COMPUTER LABORATORY-X	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.
7	414468	1. Extend further the investigative study
	Project Work	2. Product development cycle using industrial experience, use of state of art technologies.
		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.
		6. Analyze professional issues, including ethical, legal and security issues, related to computing projects.

Engineering Sciences And Allied Engineering Sem-I

A.Y. 2019-20, Sem-I		
Sr.No.	**Course code** **Course name**	**Course outcome**
Engineering Sciences And Allied Engineering Sem-I		
1	Subject code : 107001 subject name : Engineering Mathematics I	1. To learn Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
		2. To learn 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
		5. To the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and
		6. To the essential tool of matrices and linear algebra in a comprehensive manner for analysis of 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.
3	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.

4	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
		6.Explain various types of mechanism and its application.
5	Subject code :104010 subject name : Basic Electronic Engineering OR	1. To learn and understand the principle of electronics and working principle of PN junction diode and special purpose diodes.
		2. To learn and understand the functioning of transistors like BJT, MOSFETs and OPAMP.
		3. To learn and understand basics of various logic gates, digital circuits and their applications.
		4. To learn and understand working and functions of various electronic instruments.
		5. To learn and understand the operating principles and applications of various active and passive sensors.
		6. To learn and understand basic principles of communication systems.
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.
	Subject code 101011	1. Determine the resultant of various force system.
		2. Determine Centroid, moment of Inertia and solve problems related to friction

7	subject name : Engineering Mechanics	3. Determine reactions of beam,and apply principle of equilibrium to forces in space.
		4. 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.
8	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 modules, packages.
		4.Enlist strings methods & operations
		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
9	Subject code : 111006 subject name : Workshop	1. Familiar with safety norms to prevent any mishap in 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.
10	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. 2019-20, Sem-II
Sr.No.	**Course code Course name**	**Course outcome**
Engineering Sciences And Allied Engineering Sem-II		

1	Subject code : 107008 subject name : Engineering	1. To know the effective mathematical tools for solutions of first order differential equations.
		2. To model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
		3. To know advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and
		4. To trace the curve for a given equation and measure arc length of various curves.
		5. To konw the concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.
		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.
3	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.
4	Subject code :104010 subject name : Basic Electronic Engineering OR	1. To learn and understand the principle of electronics and working principle of PN junction diode and special purpose diodes.
		2. To learn and understand the functioning of transistors like BJT, MOSFETs and OPAMP.
		3. To learn and understand basics of various logic gates, digital circuits and their applications.

		4. To learn and understand working and functions of various electronic instruments.
		5. To learn and understand the operating principles and applications of various active and passive sensors.
		6. To learn and understand basic principles of communication systems.
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 :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 modules, packages.
		4.Enlist strings methods & operations
		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
7	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.
8	Subject code : 102012 subject name : Engineering Graphics II	1. Draw the fundamental engineering objects using basic rules and able to construct the simple geometries
		2. Construct the various engineering curves using the drawing instruments
		3. 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
		4. Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.
		5. Draw the development of lateral surfaces for cut section of geometrical solids
		6. Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.
9	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 rettention of material and relpicable skill, as well as improve teacher,s and students attitudes towards learning.
10	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. 2019-20, Sem-I		
Sr.No.	**Course code** / **Course name**	**Course outcome**
SE Computer Sem-I (2015 COURSE)		
1	210241 Discrete Mathematics	1. To Analyse and synthesis real world problems
		2. To construct mathematical constructs by using relations and functions
		3. To solve problems based on probability

		4. To solve travelling salesman Problem and network problem
		5. To find easily shortest path by using different algorithms
		6. Analyze and synthesize the real world problems using discrete mathematics.
2	210242 Digital Electronics and Logic Design	1. Realize & simplify Boolean algebraic assignments for designing digital circuits using K-map.
		2. Design & implement sequential digital circuits as per specification.
		3. Design simple system using VHDL..
		4. Design programmable logic devices such as PLA,PAL,PLDs
		5. Explain logic families in detail
		6. Draw the architecture & write a instruction set.
3	210243 Data Structures and Algorithms	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. Apply dynamic memory management using linked list in problem. Also state its advantages and disadvantages.
		4. Translate the expression from one form to another form using stack.
		5. Explain dferent types of queues with their application.
		6. Sort the given data using any type of sorting technique and state time complexity of that sorting technique.
4	210244 Computer Organization and Architecture	1. solve basic binary math operations and define system architecture and various components of system
		2. Demonstrate the use of cache memory and Internal and External memories.
		3. State and explain the I/O module and its working along with DMA.
		4. Differentiate between different types of Instructions and write a program using and understanding different instructions.
		5. Recall and define the Processor organization and superscalar processor
		6. Analyses and define Basic Processing Unit functions and write the micro-instructions for the task.
5	210245 Object Oriented Programming	1. Define & explain basic concepts of object oriented programming & apply features of object oriented programming language.
		2. Explain concept of virtual &friend function with example & types of pointers
		3. Describe templates & types of templates, to analyze and design a computer program using template
		4. Explain & analyze the strengths of exception handling mechanism in program with keyword.
		5. Describe different file handling classes & stream manipulators.
		6. To design & apply Standard Template Library for effective programming, describe components of STL & types of containers.

6	210246 Digital Electronics Lab	1. Study of logic gates and realization of OR,AND,NOT AND XOR Functions using universal gates
		2. Design and implement combinational circuits like half adder/full adder, half subtractor/full subtractor, code converters, comparators, MUX/DEMUX
		3. Design and implement sequential circuits like flip-flops, counters and shift registers
		4. Design & Implement the VHDL programs using software
		5. Study of TTL characteristics & microprocessor 8051
7	210247 Data Structures Lab	1. Analyze problem and select suitable data structure for given problem
		2. Implement data structurein different programming environment
		3. Identify the data structure and compare all of them
8	210248 Object Oriented Programming Lab	1. The Students must be able to understand problem statement
		2. Ability to understand class, object, method concepts in object oriented environment.
		3. Ability to develop logic of division of the complete problem statement into multiple modules.
		4. Better understanding of technological aspects, utility and recent trends related to the topic
		5. Understanding of coding standards such as appropriate use of proper Indentation and comments.
		6. Practicing programming on open source software.
9	210249 Soft Skills	1. Effectively communicate through verbal/oral communication and improve her listening skill.
		2. Write precise briefs or reports and technical documents.
		3. Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
		4. Follow Ethics as an engineering professional and adopt good standards & norms of engineering practice.
		5. Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.
		6. Function effectively in multi-disciplinary teams through the knowledge of team work
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	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

	Computer Networks	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 Database Management System 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 Computer Networks 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.
		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

2	410242 Artificial Intelligence and	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 Laboratory Practice II	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.
		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. 2019-20, Sem-II		
Sr.No.	**Course code** **Course name**	**Course outcome**
SE Computer Sem-II (2015 COURSE)		
1	207003 Engineering Mathematics III	1. To Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits
		2. To Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing
		3. To Obtain Interpolating polynomials, numerically differentiate and integrate functions
		4. To Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence.
		5. To Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals.
		6. To Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.
2	210251 Computer Graphics	1. Basic concepts, input and output devices
		2. Identify the installed graphics drivers and graphics modes. DDA and Bresenham's algorithms for line and circle.
		3. Solve 2D and 3D transformations problems on polygon..
		4. Analyze and identify different algorithms for back-face removal surfaces, color models.
		5. Define terms in Multimedia Animation and gaming programs.
		6. Define the concept of Curves and Fractals..
3	210252 Advanced Data Structures	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.
4	210253 Microprocessor	1. Write a program by using instructions & explain the memory organization.
		2. Describe the architecture and classify segmentation & paging. Calculate physical address.
		3. Understand the system level features & protection levels, Illustrate multitasking.
		4. Explain IDT, IDT descriptors, error code format, identifying interrupts etc, I/O addressing & instructions
		5. Understand reset state, switching from mode, difference between the modes
		6. Understand the co-processor instructions & applying it in program
5	210254 Principles of Programming Languages	1. To analyze the strengths and weaknesses of programming languages for effective and efficient program development.
		2. To inculcate the principles underlying the programming languages enabling to learn new programming languages.
		3. To grasp different programming paradigms
		4. To use the programming paradigms effectively in application development.
		5. To use concept of Inheritance, Polymorphism and Encapsulation to develop complex Applications
		6. To use Exception handling in Java
6	210255 Computer Graphics Lab	1. Understand the basic concepts of computer graphics.
		2. Apply clipping and filling techniques for modifying an object
		3. Understand the concepts of different type of geometric transformation of objects in 2D and 3D.
		4. Understand the practical implementation of modeling, rendering, viewing of objects in 2D.
7	210256 Advanced Data Structures Lab	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 multiway trees.
		5. Use different file organization for maintenance of data.
		6. Apply appropriate data structure for given problem.
8	210257 Microprocessor Lab	1. Write a programs by using instruction set
		2. Write a programs using coprocessor instruction set
		3. Execute a program using different assemblers
		4. Understand the interrupt vector table & use of interrupts in program
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 &	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
3	310252 Embedded Systems & Internet of Things	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. 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. Define problem statement for seminars
		2. Perform literature survey and generate proof of concept.
		3. 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 System Programming &Operating System 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 Embedded Systems & Internet of Things 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	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.

	Information and Cyber 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 Cloud Computing	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
		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. 2019-20, Sem-I		
Sr.No.	Course code Course name	Course outcome
SE Electronics and Telecommunication-Sem-I (2015 COURSE)		
1	204181 Signals and Systems	1. Understand mathematical description and representation of continuous and discrete time signals and systems.
		2. Develop input output relationship for linear shift invariant system and able to use convolution operator for continuous and discrete time system.
		3. Analyze linear shift invariant system using transform domain technique.
		4. Resolve the signals in frequency domain using Fourier series and Fourier transforms.
		5. Develop the ability to analyze the system in s domain using Laplace Transform.
		6. Evaluate probability, CDF,PDF,autocorrelation and crosscorrelation
2	204182 Electronic Devices and 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.
		6.Explain proper electrical motor for given application.
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 .
6	204186 Electronic Measuring Instruments and Tools	1. Perform operations on the measuring instruments.
		2. Identify analog and digital instruments and evaluate some properties like Mean, Deviation, Probable error etc.
		3. Solve problems using different power supply.
		4. Analyze the performance of Observing type instruments
		5. Apply the concept of digital to analyze and store the waveform.
		6. Define terms in statistical analysis, error etc. Calculate statistical parameters such as mean, standard deviation and variance.
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 .
		1.Study & derive electrostatic laws & theorem (Coulombs Law, Gauss's Law, Divergence Theorem).

3	304183 Electomagnetics	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. hall 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. 2019-20, Sem-I		
Sr.No.	Course code Course name	Course outcome
ME First Year E&TC(VLSI & ES)-Sem-I		
1	504201 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
3	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
4	504104 Research	1. Define research problem & its scope, objectives, and errors.
		2. State basic instrumentation schemes & data collection methods.
		3. Perform analysis with various statistical techniques.
		4. Perform modeling and predict the performance of experimental system
		5. Develop the research proposals.
		1. Gain knowledge of Architecture of WSN network.

5	504205 Wireless Sensor 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. 2019-20, Sem-II
Sr.No.	Course code Course name	Course outcome
		SE Electronics and Telecommunication-Sem-II (2015 COURSE)
1	207005 Engineering Mathematic	1. To Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
		2. To Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing.
		3. To 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. To Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.

		5. To Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing
2	204187 Integrated Circuits	1. Unerstand the charactristics of Op Amp,it's internal structure and its parameters.
		2. Identify various performance based paramters and their significance for Op Amp.
		3. Analyze and identify various Linear and Nonlinear applications of Op Amp.
		4. Design,build and test some circuits for various applications.
		5. Apply the functionalities of PLL to understand different applictions as frequency synthesizer,multiplier,AM and FM demodulators.
		6. Analyze and design Active filters.
3	204188 Control Systems	1. Learn and utilize models of physical systems in different forms suitable for use in the analysis of control systems.
		2. Perform time domain and frequency domain analysis of control systems required for stability analysis.
		3. Apply Routh-Hurwitz criterion to determine the domain of stability of linear time-invariant systems in the parameter space.
		4. Perform time domain and frequency domain correlation analysis.
		5. Apply root-locus, Bode plot techniques to analyze control systems
		6. Express and solve system equations in state variable form
		7. Explain the concepts of PID and PLC controllers and digital control system.
4	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. State the features of object oriented programming.
		2. Explain the concepts of data encapsulation, inheritance in C++.
		3. Understand basic program constructs in Java
		4. Describe how the class mechanism supports encapsulation and information hiding.
		5. Apply the concepts of classes, methods and inheritance to write programs Java.
		6. Design and implement simple programs in an object-oriented programming language
5	204191	1. Able to solve aptitude test.

	Employability Skill Development	2. Analyze presentation skill, listening skill and be ready for facing job interviews
		3. Able to write story, paragraph and letter.
TE Electronics and Telecommunication-Sem-II (2015 COURSE)		
1	304186 Power Electronics	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.
		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 Information Theory and Coding Techniques	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.
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.
4	304189 Advanced Processors	1. Compare features of different ARM Series processor
		2. Describe the architecture of ARM 7 microprocessor
		3. Interface the peripherals to ARM based microcontroller

4		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. 2019-20		
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.
	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.

5	Problem Solving and Object Oriented Programming	3. Explain features of 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		
	314441	1.Explain finite state machines to solve problems on it.
		2.Construct Regular Expression by solving related problems.

1	Theory of Computation	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.
7	314447	1. Understand the basics of Linux commands and program the shell of Linux.
	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.
4	414456	1. Justify the need to study human-computer-interaction or human-factors while designing software.
	Elective - I (Usability Engineering)	2. Discuss the process of designing user-friendly software based on usability engineering guidelines.
		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.
	Project Phase-I	2. Develop plans with help of team members to achieve the project's goals.
		3. Break work down into tasks and determine appropriate procedures.
		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.

A.Y. 2019-20, Sem-II		
Sr.No.	Course code Course name	Course outcome
SE (Information Technology) 2015 pattern Sem-II		
1	207003	1. To Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits
	Engineering Mathematics - III	2. To Solve problems related to Fourier transform, Z-transform and
		3. To Obtain Interpolating polynomials, numerically differentiate and integrate functions
		4. To Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence.
		5. To Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals.
		6. To 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
		2. Explain the basic terminologies and types of trees.
		3. Illustrate the use of various graphs algorithms.

4	Data Structures and Files	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		
1	314450	1. Know Responsibilities, services offered and protocol used at each layer of network.
	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.
	314451	1. Explain independently modern software development tools and creates novel solutions for language processing applications.

2	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 the need of Cloud based solutions.
	Cloud Computing	2. Understand Security Mechanisms and issues in various Cloud Applications
		3. Explore effective techniques to program Cloud Systems.
		4. Understand security issues in cloud computing.
		5. Understand current challenges and trade-offs in Cloud Computing.
		6. Understand emerging trends in cloud computing.
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.
	Software Laboratory-IV	2. Understand and use various networking and simulations tools.
		3. Configure various client/server environments to use application layer protocols
		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. Demonstrate and 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. 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
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.
	414465	1. Understand the basics of Social Media Analytics.
		2. Explain the significance of Data mining in Social media.

4	Elective IV: Social Media Analytics	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.
7	414468	1. Extend further the investigative study
	Project Work	2. Product development cycle using industrial experience, use of state of art technologies.
		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.
		6. Analyze professional issues, including ethical, legal and security issues, related to computing projects.

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	1. To learn Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering
		2. To learn 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
		5. To the essential tool of matrices and linear algebra in a
		6. To the essential tool of matrices and linear algebra in a comprehensive manner for analysis of Eigen values and Eigen vectors applicable to engineering problems.
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.
		1.Apply various skills in problem solving and also explain basic features and future of python programming to solve the problem.

3	Subject code :110005 subject name : Programming and Problem Solving	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
7	Subject code : 111006 subject name : Workshop	1.Familiar with safety norms to prevent any mishap in 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. To know the effective mathematical tools for solutions of first order differential equations.
		2. To model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
		3. To know 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.
		4. To trace the curve for a given equation and measure arc length of various curves.
		5. To konw the concepts of solid geometry using equations of sphere,
		6. To 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 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.
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)		
	210241	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

1	Discrete Mathematics	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.
4	210244 Computer Graphics	1. Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of 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	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

	Software Engineering & Project Management	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 Database Management System 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 Computer Networks 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 Laboratory Practice II	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.
		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)		
	207003	1. To Solve Linear differential equations, essential in modelling and design of computer-based systems.
		2. To Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.

1	Engineering Mathematics-III	3. To Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
		4. To Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
		5. To Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
2	210252 Data Structures & Algorithms	1. Describe the benefits of good hashing and identify hashing scheme for solving real world problem.
		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.
4	210254 Microprocessor	1. Describe the general architecture of a microprocessor, write an assembly language program by using instruction set.
		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. Discuss role of algorithm design of algorithm with related issue and confirmining correlation of algorithm

1	310250 Design & Analysis of Algorithms	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
3	310252 Embedded Systems & Internet of Things	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. 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	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

	Web Technology	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 System Programming &Operating System 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 Embedded Systems & Internet of Things 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
		1. Define the different attacks on Information. Find problems with existing ciphers.

2	410251 Information and Cyber Security	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 Cloud Computing	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
		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

Electronics and Telecommunication Department

A.Y. 2020-21, Sem-I

Sr.No.	Course code Course name	Course outcome
SE Electronics and Telecommunication-Sem-I (2019 COURSE)		
1	207005 gineering Mathematics	1. To Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
		2. to Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
		3. To 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. To Perform vector differentiation & integration, analyze the vector fields and apply to electro- magnetic fields & wave theory.
		5. To 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	204182 Digital Circuits	1. Identify and prevent various hazards and timing problems in a digital design.
		2. Use the basic logic gates and various reduction techniques of digital logic circuit.
		3. Analyze, design and implement combinational logic circuits.
		4. Analyze, design and implement sequential circuits.
		5. Differentiate between Mealy and Moore machines.
		6. Analyze digital system design using PLD.
	204183	1. Analyze the simple DC and AC circuit with circuit simplification techniques.

4	Electrical Circuits	2. Formulate and analyze driven and source free RL and RC circuits.
		3. Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function
		4. Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors
		5. Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles
		6.Analyze and select a suitable motor for different applications.
5	204184 ta structures & Algorit	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.
6	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 ITAL COMMUNICAT	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 AL SIGNAL PROCES	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 IICROCONTROLLER	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 & TEC	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 on and Microwave Tec	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.
	404184	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	tal Image Video Proces	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
5	404185 ELECTRONICS PRODUCT DESIGN	1. Explain and apply the various stages of hardware design in product design and development.
		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 mbedded System Desig	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 Computi	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
4	504104 Research	1. Define research problem & its scope, objectives, and errors.
		2. State basic instrumentation schemes & data collection methods.
		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 Networ	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 managemen	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 Communicatio	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 Programm	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 Develop	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)		
1	304186 Power Electronics	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.
		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 on Theory and Coding T	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 SINESS MANAGEME	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.
4	304189 Advanced Processors	1. Compare features of different ARM Series processor
		2. Describe the architecture of ARM 7 microprocessor
		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 Communicatio	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.
		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.

2	404190 Broadband Communication System	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 Networ	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 Process	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 Radi	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. 2020-21, Sem-I		
Sr.No.	Course code Course name	Course outcome
SE (Information Technology) 2019 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.
	Problem Solving and Object Oriented Programming	2. Design an algorithmic solution to a problem using problem decomposition and step-wise refinement.
		3. Explain features of 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.
	214448	1. Breakdown problem into smaller components, propose and evaluate different solutions for solving problems.
		2. Develop and implement algorithms for solving simple problems using modular programming concept.

8	Object Oriented Programming Lab.	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.

		6. 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.
7	314447	1. Understand the basics of Linux commands and program the shell of Linux.
	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.

	Laboratory -III	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.
4	414456	1. Justify the need to study human-computer-interaction or human-factors while designing software.
	Elective - I (Usability Engineering)	2. Discuss the process of designing user-friendly software based on usability engineering guidelines.
		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	2. Understand Testing Approaches.
		3. Explore Software Test Automation, Quality Management Metrics.
		4. Understand Software quality assurance.

	and 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.

A.Y. 2020-21, Sem-II		
Sr.No.	Course code	Course outcome
	Course name	
SE (Information Technology) 2019 pattern Sem-II		
1	207003	1. To Solve Linear differential equations, essential in modelling and design of computer-based systems.
	Engineering Mathematics - III	2. to Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
		3. To Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
		4. To Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
		5. To Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
2	214450	1.Explain terms related to computer graphics and apply mathematics and logic to develop computer programs for elementary graphic operations.
		2.Solve problems for performing graphical transformations.
		3.Apply mathematics and graphical techniques to achieve realism using 3D transformations and projections.

	Computer Graphics	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.
	214456	1. Apply and implement line drawing and circle drawing algorithms to draw specific shape given in the problem

8	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		
1	314450	1. Know Responsibilities, services offered and protocol used at each layer of network.
	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 the need of Cloud based solutions.
	Cloud Computing	2. Understand Security Mechanisms and issues in various Cloud Applications
		3. Explore effective techniques to program Cloud Systems.
		4. Understand security issues in cloud computing.
		5. Understand current challenges and trade-offs in Cloud Computing.
		6. Understand emerging trends in cloud computing.
	314454	1. Understand Big Data primitives.
		2. Learn and apply different mathematical models for Big Data.
		3. Demonstrate their Big Data learning skills by developing industry or research applications.

5	Data Sciece and Big Data Analytics	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.
	Software Laboratory-IV	2. Understand and use various networking and simulations tools.
		3. Configure various client/server environments to use application layer protocols
		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.

	Computing Systems	5.Understand the distributed Web based system.
		6.Discuss the various security issues and security management in a distributed system.
2	414463	1. Demonstrate and 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. 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
3	414464	1. Describe the concept of the Internet of Things, IoT definitions and
	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
		5. Describe a Smart Light System (Light that automatically switched on in evening and gets off in morning) using open source Hardware

		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.
7	414468	1. Extend further the investigative study
	Project Work	2. Product development cycle using industrial experience, use of state of art technologies.
		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.
		6. Analyze professional issues, including ethical, legal and security issues, related to computing projects.

Engineering Sciences And Allied Engineering Sem-I

A.Y. 2021-22, 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	leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
		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
		5. To the essential tool of matrices and linear algebra in a
		6. To the essential tool of matrices and linear algebra in a comprehensive manner for analysis of Eigen values and Eigen vectors applicable to engineering problems.
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. 2021-22, 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	1. To know the effective mathematical tools for solutions of first order differential equations.
		2. To model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
		Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions
		4. To trace the curve for a given equation and measure arc length of various curves.
		5. To konw the concepts of solid geometry using equations
		6. To 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	1. Apply different water softening methods and techniques as commodity.
		2. Select suitable electro-analytic technique and system for material investigation.

	subject name : Engineering Chemistry	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	1. Determine the resultant of various force system.
		2. Determine Centroid, moment of Inertia and solve problems related to friction

	subject name : Engineering Mechanics	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. 2021-22, Sem-I		
Sr.No.	**Course code**	**Course outcome**

	Course name	
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. Define & explain basic concepts of object oriented programming & apply features of object oriented programming language.
		2. Explain concept of virtual &friend function with example & types of pointers
		3. Describe templates & types of templates, to analyze and design a computer program using template
		4. Explain & analyze the strengths of exception handling mechanism in program with keyword.

		5. Describe different file handling classes & stream manipulators.
		6. To design & apply Standard Template Library for effective programming, describe components of STL & types of containers.
4	210244 Computer Graphics	1. Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of 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.
		1.Design and implement complex number program using fundamental concept of oop
		2.Devlop application by using inheritance and polymorphism

7	210247 OOP & Computer Graphics Laboratory	3.Design and inmplement exception handling and template by using C++
		4. Analyze and apply computer graphics algorithms for line-circle drawing scan conversion and filling with the help of object oriented programming concepts.
		5. Understand the concept of windowing and clipping and apply various algorithm to fill and clip polygon.
		6. 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 Communicati on 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 broader issues regarding the social, cultural, economic and human aspects, involved in social changes.
		4. Able to understand the nature of the individual and the relationship between self and the community.
		5. Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.

		6. Able to understand need of society and provide solution to them.
TE Computer Sem-I (2019 COURSE)		
1	310241 Database Management Systems (DBMS)	1. Design E-R Model for given requirements and convert the same into database tables.
		2. Develop solutions with 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. Develop solution with modern database techniques such as NOSQL
2	310242 Theory of Computation	1. Analyse inputs and design system which gives absolute output
		2. Able to subdivide problem space based on input subdivision using constraints
		3. Able to design deterministic Turing machine for all inputs and all outputs
		4. Able to subdivide problem space based on input subdivision using constraints
		5. Identify suitable grammer to apply relative system
		6. Able to apply linguistic theory
3	310243 System Programming & operating system	1. Analyze and synthesize basic system software and its functionality
		2. Identify suitable data structures and design and implement various system software
		3. Compare and analyze different loading schemes
		4. Implement and analyze the performance of process scheduling algorithms
		5. Identify the mechanism to deal with the deadlock and concurrency issues
		6. Demonstrate memory organization and memory management policies
4	310244	1. Understand network reference models and technologies.
		2. Differentiate design issues, flow control, error control and multiple access protocol using different protocol

	Computer Networks & security	3. Distinguish network protocols and demonstrate different routing algorithms.
		4. Understand transport layer protocol and implement client server communication using socket programming.
		5. Select any application layer protocols to implement web or desktop application.Select any application layer protocols to implement web or desktop application.
		6. Comprehend the basic of network security.
5	310245 Elective-1 (Internet of Things & embedded systems)	1. Understand the fundamentals and need of Embedded Systems for the Internet of Things
		2. Apply IoT enabling technologies for developing IoT systems
		3. Apply design methodology for designing and implementing IoT in real time applications
		4. Analyze IoT protocols for making IoT devices communication
		5. Learn and understand Design cloud based IoT systems
		6. Design and Develop secured IoT applications
5	310245 Elective-1 Human Computer Interface	1. Explain importance of good user interface design.
		2. Define and apply the design guidelies for designing the user interface.
		3. Differentiate between graphical and web user interface.
		4. Explain the user interface design process
		5. justify the pattern recognition in HCI.
		6. Design GUI in python
6	310246 Database Management Systems Lab	1. Design E-R Model for given requirements and convert the same into database tables
		2. Design schema in appropriate normal form considering actual requirements
		3. Implement SQL queries for given requirements, using different SQL concepts
		4. Implement PL/SQL Code block for given requirements
		5. Implement NoSQL queries using MongoDB
		6. Design and develop application considering actual requirements and using database concepts
		1. Setup of LAN of four computer using layer-2 switch in wired network.

7	310247 Computer Networks & security Lab	2. Demonstrate LAN and WAN protocol behavior using Modern Tools.
		3. Understand error detection and correction concept and implement program based on it.
		4. Develop Client-Server architectures and prototypes by the means of correct standards and technology.
		5. Analyze data flow between peer to peer in an IP network using Application, Transport and Network Layer Protocols.
		6. Design and configure a RIP, OSPF and BGP using packet tracer.
8	310248 Lab Practice-I	1. Implement language trnslators
		2. Implement internals and functionalities of operating system
		3. Implement and analyze the performance of memory management policies
		4. Sketch the User Interface designs.
		5. Design the user interfaces by appying user interface design guidelines.
		6. Design GUI by using python.
		4. To understand the Python pakages used in IOT for sensor programming
		5. To undaerstand and implement the hardware with its connections.
		6. Design and Develop IoT applications
9	310249 Seminar & technical communicatio n	1. Analyze a latest topic of professional interest
		2. Enhance technical writing skill
		3. Identify an engineering problem, analyze it and propose a work plan to solve it
		4. communicate with professional technocal presentation skill
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. Develop applications 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. Compare different learning techniques such as supervised, semi supervised and unsupervised learning techniques.
		5. Apply the suitable algorithms to solve AI problems
		6. Describe the working mechanism of robots and explain various robotic applications
3	410243 Data Analytics	1.The student will be able to understand the Data Analytics life cycle.
		2.The student will be able to understand and implement differenrt Data Analytics Methods
		3. The student will be able to understand and implement differenrt Data Analytics Algorithm.
		4. The student will be able to understand and implement differenrt Data Analytics classification Algorithm.
		5. The student will be able to understand and implement differenrt Data visualization Algorithm.
		6. The student should be able to implement Advanced Analytics-Technology and tools.
4	410244 Elective I Data Mining and Warehousing	1. Apply various data pre processing techniques on input dataset.
		2. Understanding input problem statement.
		3. Apply basic, intermediate and advanced techniques to mine the data
		4. Analyze the output generated by the process of data mining
		5. Explore the hidden patterns in the data
		6. Optimize the mining process by choosing best data mining technique
		1. Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance.

5	410245 Elective II Software testing and 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 Selenium Automation Tool for testing web based applications.
		5. Apply different approaches of quality management, assurance, and quality standard to software system
		6. Apply and analyze effectiveness Software Quality Tools
6	410246 Laboratory Practice I	1. To understand the Use Case, provided input and expected output.
		2. To find inference from input dataset by applying exploratory data analysis techniques
		3. To apply various algorithms for given use case.
		4. To observe appropriate output performance measurement parameter.
		5. To take decision about most optimised algorithm for given usecase.
		6. To enhance practical technical competency of students.
		4. Develop the basic parallel programs using open MP.
		5. Develop the basic parallel programs using CUDA.
		6. Investigate the performance of parallel code.
7	410247 Laboratory Practice II	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.
		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. 2021-22, Sem-II		
Sr.No.	**Course code** **Course name**	**Course outcome**
SE Computer Sem-II (2019 COURSE)		
1	207003 Engineering Mathematics-III	1. To Solve Linear differential equations, essential in modelling and design of computer-based systems.
		2. To Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
		3. To Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
		4. To Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
		5. To Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
2	210252 Data Structures & Algorithms	1. Describe the benefits of good hashing and identify hashing scheme for solving real world problem.
		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.
4	210254 Microprocessor	1. Describe the general architecture of a microprocessor, write an assembly language program by using instruction set.
		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 (2019 COURSE)		
1	310251 Data Science & Big data analytics	1. Understand and Analyze needs and challenges for Data Science Big Data Analytics
		2. Compare the intuitions behind various algorithm. 3. Apply statistics for Big Data Analytics
		4. Understand the pattern in given Big Data Analytics Use Case dataset.

		5. Apply the lifecycle of Big Data analytics to real world problems
		6. Implement data visualization using visualization tools in Python programming
2	310252 Web technologies	1. Analyze given assignment to select sustainable web development design methodology.
		2. Develop Client Side Web Application using Java Script
		3. Develop and differentiate between Servlet and JSP Server Side Technologies
		4. Development of application with help of PHP technology
		5. Explain different client and server framework
		6. Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
3	310253 Artificial Intelligence	1. Identify and apply suitable intelligent agentsfor various AI applications
		2. solve problems using different informed search and uninformed search & heuristic approaches
		3. Identify knowledge associated and represent it to solve a given problem
		4. Apply suitable algorithms to solve AI problems
		5. Implement ideas underlying modern logical inference system
		6. Represent complex problems with expressive yet carefully constrained language representation
4	310254 Elective-II Software Modelling & Architecture	1. 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. Understand and design different architecture of system.
		5. Apply appropriate design modern tool for designing and modeling.
		6. Apply design patterns to understand reusability in object oriented design
		1. To demonstrate professional competence through industry internship
		2. To apply knowledge gained through internships to complete academic activities in a professional manner

5	310255 Internship	3. To choose appropriate technology and tools to solve given problem
		4. To demonstrate abilities of a responsible professional and use ethical practices in day to day life
		5. creating network and social circle and developing relationships with industry people
		6. To analyze various career opportunities and career goals
6	310256 Data Science & Big data analytics Lab	1. Understand the pattern in given Big Data Analytics Use Case dataset.
		2. Implement data visualization using visualization tools in Python programming
		3. Analyze inference from given problem statement.
7	310257 Web Technology Lab	1. Understand the importance of website planning and website design issues
		2. Develop web based application using suitable client and Server side scripting such as JSP and servlet
		3. Develop web based application using suitable client and Server side scripting such as PHP
		4. Analyze the web technology languages, frameworks and services
		5. Create three tier web based applications
8	310258 Lab Practice-II	1. Design a system using informed and uninformed search approaches
		2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation & learning
		3. Design and develop interactive AI applications
		4. use tools & techniques in the area software modelling & architecture
		5. use the knowledge of software modelling & architecture for problem solving
		6. Design & develop applications using UML as fundamental tool
BE Computer Sem-II (2015 COURSE)		
1	410250 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
		6. Learn clusterinfg and different deep learning techniquues.
2	410251 Information and Cyber Security	1. Define the different attacks on Information. Find problems with existing ciphers.
		2. Apply appropriate cryptographic principle, algorithm and techniques to write analysis report
		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 Compilers	1.Design and implement a lexical analyzer using LEX tools
		2. Design and implement a syntax analyzer using YACC tools
		3.Implement syntax-directed translation and and apply on run-time environment
		4 Design and implement intermediate codes for high-level statements.
		5.Design and implement code optimization algorithm to produce computer code.
		6.Analyze and transform programs to improve their time and memory efficiency
4	410253 Elective IV Cloud Computing	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
		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. Implement different learning models to find solution for given usecase
		2. Implement and analyze clustering techniquues.
		3. Design and implement supervised and unsupervised machine learning algorithm.
		4. Apply authentication methods on user end for better access control
		5. Design intrusion detection system for given Problem statement
		6. Apply Security services. Analyze email security.

6	410255 Laboratory Practice IV	1.To understand the fundamental concepts of Lexical Analyzer
		2.To understand concept of Parser
		3.Apply basic principles of elective subjects to problem solving and modeling.
		4. Use tools and techniques in the area of software development to build mini projects
		5. Design and develop applications on subjects of their choice.
		6. Generate and manage deployment, administration & security.
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

Electronics and Telecommunication Department

A.Y. 2021-22, Sem-I

Sr.No.	Course code Course name	Course outcome
SE Electronics and Telecommunication-Sem-I (2019 COURSE)		
1	207005 Engineering Mathematics III	1. To Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
		2. to Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
		3. To 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. To Perform vector differentiation & integration, analyze the vector fields and apply to electro- magnetic fields & wave theory.
		5. To Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.
		1.Assimilate the physics, characteristics and parameters of MOSFET towards its application as amplifier.

2	204181 Electronic Circuits	2. Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications.
		3. Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
		4. Explain internal schematic of Op-Amp and define its performance parameters.
		5. Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
		6. Understand and compare the principles of various data conversion techniques and PLL with their applications.
3	204182 Digital Circuits	1. Identify and prevent various hazards and timing problems in a digital design.
		2. Use the basic logic gates and various reduction techniques of digital logic circuit.
		3. Analyze, design and implement combinational logic circuits.
		4. Analyze, design and implement sequential circuits.
		5. Differentiate between Mealy and Moore machines.
		6. Analyze digital system design using PLD.
4	204183 Elecrical Circuits	1. Analyze the simple DC and AC circuit with circuit simplification techniques.
		2. Formulate and analyze driven and source free RL and RC circuits.
		3. Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
		4. Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
		5. Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
		6. Analyze and select a suitable motor for different applications.
5	204184 Data Structures	1. Solve mathematical problems using C programming language.
		2. Implement sorting and searching algorithms and calculate their complexity.
		3. Develop applications of stack and queue using array.
		4. Demonstrate applicability of Linked List.
		5. Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity.
		6. Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.
TE Electronics and Telecommunication-Sem-I (2019 COURSE)		

1	304181 Digital Communication	1. Apply the statistical theory for describing various signals in a communication system.
		2. Understand and explain various digital modulation techniques used in digital communication systems and analyze their performance in presence of AWGN noise.
		3. Describe and analyze the digital communication system with spread spectrum modulation.
		4. Analyze a communication system using information theoretic approach.
		5. Use error control coding techniques to improve performance of a digital communication system
2	304182 Electromagnetic Field Theory	1. Apply the basic electromagnetic principles and determine the fields (E & H) due to the given source.
		2. Apply boundary conditions to the boundaries between various media to interpret behavior of the fields on either sides.
		3. State, Identify and Apply Maxwell's equations (integral and differential forms) in both the forms (Stat ic, time-varying or Time-harmonic field) for various sources, Calculate the time average power density using Poynting Theorem, Retarded magnetic vector potential. 4. Formulate, Interpret and solve simple uniform plane wave (Helmholtz Equations) equations, and analyze the incident/reflected/transmitted waves at normal incidence.
		5.Interpret and Apply the transmission line equation to transmission line problems with load impedance to determine input and output voltage/current at any point on the Transmission line, Find input/load impedance, input/load admittance, reflection coefficient, SWR, Vmax/Vmin, length of transmission l ine using Smith Chart.
		6. Carry out a detailed study, interpret the relevance and applications of Electromagnetics.
3	304183 Database Management	1.Ability to implement the underlying concepts of a database system. 2.Design and implement a database schema for a given problem-domain using data mode 3.Formulate, using SQL/DML/DDL commands, solutions to a wide range of query and update problems. 4. Implement transactions, concurrency control, and be able to do Database recovery. 5.Able to understand various Parallel Database Architectures and its applications 6.Able to understand various Distributed Databases and its applications.

4	304184 Microcontrollers	1. Understand architecture and features of 8051 and PIC18FXX Microcontroller.
		2. Learn interfacing of real-world peripheral devices with microcontroller.
		3. Explore different features of PIC 18F Microcontroller with Architecture.
		4.Use concepts of timers and interrupts of PIC 18 in programming.
		5. Design and develop microcontroller based embedded application.
		6. Demonstrate real life applications using PIC 18.
5	304185 Elective - I Digital Signal Processing	1. Interpret and process discrete/ digital signals and represent DSP system.
		2.Analyze the digital systems using the Z-transform techniques.
		3.Implement efficient transform and its application to analyze DT signals.
		4.Design and implement IIR filters.
		5.Design and implement FIR filters.
		6.Apply DSP techniques for speech/ biomedical/ image signal processing.
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
5	404185 ELECTRONICS PRODUCT DESIGN	1. Explain and apply the various stages of hardware design in product design and development.
		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. 2021-22, Sem-I		
Sr.No.	Course code Course name	Course outcome
ME First Year E&TC(VLSI & ES)-Sem-I		
		1. Understand different MOSFET models and their

1	504201 Digital CMOS Design	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
3	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
4	504104 Research Methodology	1. Define research problem & its scope, objectives, and errors.
		2. State basic instrumentation schemes & data collection methods.
		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
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. 2021-22, 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	204193 Principals of Communication Systems	1: To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
		2: Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
		3: Explain generation and detection of FM systems and compare with AM systems.
		4: Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
		5: Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
		6: Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission.
	204194	1: Describe the principles of object oriented programming.
		2: Apply the concepts of data encapsulation, inheritance in C++.

4	Object Oriented Programming	3: Understand Operator overloading and friend functions in C++.
		4: Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
		5: Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
		6: Describe and use of File handling in C++.
5	204199 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 (2019 COURSE)		
1	304192 Cellular Networks	1. Understand fundamentals of wireless communications.
		2. Discuss and study OFDM and MIMO concepts.
		3. Elaborate fundamentals mobile communication.
		4. Describes aspects of wireless system planning
		5. Understand of modern and futuristic wireless networks architecture.
		6. Summarize different issues in performance analysis.
2	304193 Project Management	1. Learn the fundamental knowledge of project management and apply effectively handling the projects.
		2. Select the appropriate project based on feasibility study and undertake its effective planning.
		3. Understand organizational structure of project to handle project management related issues.
		4. Identify and apply the project scheduling techniques for a Project Schedule Plan to meet the resources to meet the project deadline.
		5. Assimilate the project risks and manage finances in line with Project Financial Management Process.

		6. Develop new skillsets to products assessing their commercial viability for becoming successful entrepreneurs.
3	304194 Power Devices & Circuits	1. To introduce different power devices viz. SCR, GTO, MOSFET and IGBT with construction,characteristics, repetitive and non repetitive ratings and typical triggering/driver circuits.
		2. To understand working, design and performance analysis and applications of various power converter circuits such as ac to dc converters, inverter and chopper.
		3. To know various protection circuit requirements of power electronic devices.
4	304195 Elective-II Digital Image Processing	1. To become familiar with digital image fundamentals
		2. To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
		3. To study the image segmentation and representation techniques.
		4. To become familiar with image compression methods.
		5. To learn concepts of degradation function and restoration techniques
		6. To understand the Object Recognition.
5	304195 Elective-II Sensors in Automation	1. Concept of Sensors/Transducers and their Static and Dynamic Characteristics.
		2. Sensors used in Industry for Temperature and Humidity Measurement.
		3. Sensors used for Sensors used for Force, Pressure, Stress and Flow measurements.
		4. Sensors used for Displacement and Level Measurement
		5. Applications of Image and Biosensors
		6. Role of Sensors/Transducers in IoT applications.
BE Electronics and Telecommunication-Sem-II (2015 COURSE)		
1	404189 Mobile Communicatio n	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	404212 Wireless Sensor Networks	1. Explain various concepts and terminologies used in WSN.
		2.Explain various wireless standards and protocols associated with WSN.
		3. Recognise importance of localization and routing techniques used in WSN
		4. Examine the issues involved in design and deployment of WSN.
		5. Understand techniques of data aggregation and importance of security in WSN
		6. Describe importance and use of radio communication and link management in WSN
A.Y. 2021-22		
Sr.No.	Course code Course name	Course outcome
		ME First Year E&TC(VLSI & ES)-Sem-II
1	504207	1. Understand and design basic COMS sub-circuits.

	Analog CMOS Design	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. 2021-22, Semester-I

	Course code	**Course Outcome**

Sr. No.	Course name	
SE (Information Technology) 2019 pattern Sem-I		
1	214441	1. Formulate and apply formal proof techniques and solve the problems with logical reasoning.
	Discrete Mathematics	2. Analyze and evaluate the combinatorial problems by using probability theory.
		3. Apply the concepts of graph theory to devise mathematical models.
		4. Analyze types of relations and functions to provide solution to computational problems.
		5. Identify techniques of number theory and its application.
		6. Identify fundamental algebraic structures.
2	214442	1. Perform basic binary arithmetic & simplify logic expressions.
	Logic Design and Computer Organization	2. Grasp the operations of logic ICs and Implement combinational logic functions using ICs.
		3. Understand the operations of basic memory cell types and Implement sequential logic functions using ICs.
		4. Explain the functions & organization of various blocks of CPU.
		5. Understand CPU instruction characteristics, enhancement features of CPU.
		6. Describe an assortment of memory types (with their characteristics) used in computer systems and basic principle of interfacing input, output devices.
3	214443	1. Perform basic analysis of algorithms with respect to time and space complexity
	Data Structure & Algorithms	2. Select appropriate searching and/or sorting techniques in the application development.
		3. Implement abstract data type (ADT) and data structures for given application.
		4. Design algorithms based on techniques like brute -force, divide and conquer, greedy, etc.
		5. Apply implement learned algorithm design techniques and data structures to solve problems.
		6. Design different hashing functions and use files organizations.
	214444	1. Differentiate various programming paradigms.
		2. Identify classes, objects, methods, and handle object
		3. Identify relationship among objects using inheritance and
		4. Handle different types of exceptions and perform generic programming.

4	Object-Oriented Programming	5. Use of files for persistent data storage for real world application.
		6. Apply appropriate design patterns to provide object-oriented solutions.
5	214445	1. Understand and explain the conceps of communication theory and compare functions of OSI and TCP/IP model
	Basics of Computer Network	2. Analyze data link layer services ,error detection and correction,linear block codes.
		3. Compare different access techniques,chanelization and Ethernet Standards.
		4. Apply the skills of subnetting,supernetting and routing mechanisms.
		5. Differentiate IPv4 and IPv6
		6. Illustrate services and protocols used at transport layer
6	214446	1. Simplify Logic function using K-map and design Combinational logic circuits using SSI & MSI chips.
	Logic Design and Computer Organization Lab	2. Analyze Sequential circuits like Flip-Flops (Truth Table, Excitation table)
		3. Design the applications like Asynchronous and Synchronous Counters.
		4. Design Sequential Logic circuits like MOD counters using synchronous counters.
		5. Understand the basics of simulator tool
		6. To simulate basic blocks such as ALU & memory.
7	214447	1.Analyze algorithms and to determine algorithm correctness and time efficiency class.
	Data Structure & Algorithms Lab	2. Implement abstract data type (ADT) and data structures for given application.
		3.Design algorithms based on techniques like brute -force, divide and conquer, greedy, etc.).
		4.Solve problems using algorithmic design techniques and data structures.
		5. Analyze of algorithms with respect to time and space complexity.
	214448	1. Differentiate various programming paradigms.
	Object Oriented	2. Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems.
		3. Identify relationship among objects using inheritance and polymorphism.
		4. Handle different types of exceptions and perform generic programming.
		5. Use file handling for real world application.

8	Programming Lab	6. Apply appropriate design patterns to provide object-oriented solutions.
9	214449	1. Provides an ability to understand, analyze and interpret the essentiality of grammar and its proper usage.
	Soft Skill Lab	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) 2019 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. Understanding the role of Modern Operating Systems
	Operating System	2. Apply the concepts of process and thread scheduling
		3. Apply the concept of process synchronization, mutual exclusion and the deadlock
		4. Understand and apply the concepts of various memory management techniques
		5. Make use of concept of I/O management and File system
		6. Understand Important of System software
3	314443	1.Explain basic concepts of machine learning and different types of learning .
	Machine Learning	2.Compare different types of classification models and studies their performance evaluation metrics.
		3.Differentiate various regression techniques and evaluate their performance.
		4.Illustrate the tree-based and probabilistic machine learning algorithms.
		5.Identify different types of unsupervised algorithm .
		6.Apply fundamental concepts of ANN.
	314444	1.Explain importance of HCI study and principles of user-centered design (UCD) approach.
		2.Develop understanding of human factors in HCI design, paradigms and context of interactions.

		3.Develop understanding of models, Apply cognitive models for predicting human-computer-interactions.
		4.Design effective user-interfaces and usability of a user-interface design
	Human Computer	5.Evaluate different methods for human-computer-interactions.
4	Interaction	6.Apply HCI to real life applications.
	314445	1. Understand relational and object-oriented databases
		2. Learn and understand of parallel & distributed database architectures..
		3. Learn the concepts of NoSQL Databases.
	Elective-I (Advanced Database	4. : Understand data warehouse and OLAP technologies.
		5. Apply data mining algorithms and to learn various software tools.
5	Management System)	6. Learn emerging and enhanced data models for advanced applications.
	314446	1. Apply the basics of Linux commands
		2. Build shell scripts for various applications
		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, CPU Scheduling, Memory Management and Disk Scheduling in Linux
	Operating System	5. Develop system programs for Inter Process
6	Laboratory	Communication in Linux.
	314447	1. Differentiate between good design and bad design.
		2. Analyze creative design in the surrounding.
		3. Assess design based on feedback and constraint.
	Human Computer	4. Design paper-based prototypes and use wire frame.
		5. Implement user-interface design using web technology.
	Interaction	6. Evaluate user-interface design using HCI evaluation
7	Laboratory-II	techniques
	314448 (A)	1.Implement different supervised and unsupervised learning algorithms.
	Laboratory Practice - I (Machine Learning)	2.Evaluate performance of machine learning algorithms for real-world applications.
8	314448 (B)	1. Understand Advanced Database Programming Languages.
		2. Master the basic concepts of NoSQL Databases.
		3. Install and configure database systems.
	Laboratory Practice - I (	4. Populate and query a database using MongoDB commands.

	Advanced Database Management System)	5. Design data warehouse schema of any one real-time: CASE STUDY.
		6. Develop small application with NoSQL Database for back-end.
	314449	1. Understand, interpret and summarize technical literature.
		2. Demonstrate the techniques used in the paper.
		3. Distinguish the various techniques required to accomplish the task.
		4. Identify intended future work based on the technical review.
		5. Prepare and present the content through various presentation tools and techniques in effective manner.
9	Seminar	6. Keep audience engaged through improved interpersonal skills.
BE (Information Technology) 2015 pattern Sem-I		
	414453	1. Understand basics of security services
		2. Use basic cryptographic techniques in application development
		3. Apply methods for authentication, access control, intrusion detection and prevention.
	Information and Cyber	4. Understand risks and vulnerability terms
		5. Classify different cybercrimes
1	Security	6. Develop computer forensics awareness.
	414454	1. Build the learning model.
		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
	Machine	5. Using different method evaluate the performance of learning models
	Learning and	6. Apply machine learning algorithms to solve problems of
2	Application	moderate complexity
	414455	1. Understand the fundamental aspects of different object oriented methodologies
		2. Explore and analyze use case modeling, domain/ class modeling.
		3. Understand Interaction and behaviour modeling
		4. Analyse design process in software development
	Software	5. Understand software design principles and patterns.
	Design &	6. Learn the architectural design guidelines in various type
3	Modeling	of application development.

4	414456	1. Justify the need to study human-computer-interaction or human-factors while designing software.
	Elective - I (Usability Engineering)	2. Discuss the process of designing user-friendly software based on usability engineering guidelines.
		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.
	Project Phase-I	2. Develop plans with help of team members to achieve the project's goals.
		3. Break work down into tasks and determine appropriate procedures.
		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.

A.Y. 2021-22, Semester-II

Sr.No.	Course code / Course name	Course outcome
SE (Information Technology) 2019 pattern Sem-II		
1	207003	1. To Solve Linear differential equations, essential in modelling and design of computer-based systems.
	Engineering Mathematics - III	2. to Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
		3. To Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
		4. To Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
		5. To Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
2	214451	1. Understand architecture and memory organization of PIC 18 microcontroller.
	Processor Architecture	2. Implement embedded C programming for PIC 18.
		3. Use concepts of timers and interrupts of PIC 18.
		4. Understand interfacing with PIC 18.
		5. Demonstrate real life applications using PIC 18.
		6. Analyze architectural details of ARM processor.
3	214452	1. Explain basic concepts of DBMS and RDBMS.
	Database Management System	2. Design ER-models for any database application.
		3. Formulate SQL queries on data for relational databases
		4. Improve the database design by normalization & to incorporate query processing
		5. Explain basic issues of transaction processing and concurrency control
		6. Analyze various database architectures and technologies.
4	214453	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.
		realism using 3D transformations and projections.
		4.Explain segment, color models concepts and apply shading algorithms to solve problems related to them.

		5.Explain concepts of animation, curves and fractals using computer graphics tools.
		6.Explain the concepts of virtual reality.
5	214454	1. Classify various software application domains.
	Software Engineering	2. Analyze software requirements by using various modeling techniques.
		3. Translate the requirement models into design models.
		4. Apply planning and estimation to any project.
		5. Use quality attributes and testing principles in software development life cycle.
		6. Discuss recent trends in Software engineering by using CASE and agile tools.
6	214455	1. Apply concepts related to embedded C programming.
	Programming Skill Development Lab	2. Develop and Execute embedded C program to perform array addition
		3. Develop and Execute embedded C program to perform block transfer
		4. Develop and Execute embedded C program to perform sorting operations
		5. Perform interfacing of real-world input and output devices to PIC18FXXX
		6. Use source prototype platform like Raspberry-Pi/Beagle board/Arduino.
7	214456	1. Install and configure database systems.
	Database Management System Lab	2. Analyze database models & entity relationship models.
		3. Design and implement a database schema for a given problem-domain
		4. Implement relational database systems.
		5. Populate and query a database using SQL DDL / DML / DCL commands.
		6. Design a backend database of any one organization: CASE STUDY
	214457	1. Apply and implement line drawing and circle drawing algorithms to draw specific shape given in the problem
	Computer Graphics Lab	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.

8		6. Apply and implement animation concepts for generating simple animation without using any animation tool
9	214458	1. Design solution to real life problems
	Project Based Learning	2. Analyze real life problem solution concerns through shared cognition.
		3. Apply learning by doing approach in PBL to promote lifelong learning.
		4. Tackle technical challenges for solving real world problems with team efforts.
		5. Collaborate and engage in multi-disciplinary learning environments.
		6. To design solution of engineering problems within the social, environmental and economic context.
TE (Information Technology 2019 pattern) Sem-II		
1	314451	1. Know Responsibilities, services offered and protocol used at application layer of network
	Computer Network and Security	2. Understand wireless network and different wireless standards
		3. Recognize the Adhoc Network's MAC layer, routing protocol and Sensor networkarchitecture
		4. Define the principal concepts of network security and Understand network security threats,security services, and countermeasures
		5. Apply basic cryptographic techniques in application development.
		6. Gain a good comprehension of the landscape of cyber security Vulnerabilities & describe typical threats to modern digital systems
2	314452	1.Understand Big Data primitives.
	Data Sciece and Big Data Analytics	2.Learn and apply different mathematical models for Big Data.
		3.Explain differnet Big Data ecosystem and technologies
		4.Analyze each learning model comes from a different algorithmic approach and it will perform differently under different datasets.
		5.Understand, apply and analyze needs, challenges and techniques for big data visualization
		6. Learn different programming platforms for big data analytics.
	314453	1.Explain technologies like HTML, CSS, Bootstrap.
		2.Demonstrate the use of web scripting languages.

3	Web Application and Developement	3.Understand web application with Front End Technologies.
		4.Understand web application with Back End Technologies.
		5.Understand Mobile web development using JQuery Mobile.
		6.Understand web application on cloud using AWS.
4	314454(A)	1.Apply the fundamental concepts of Artificial Intelligence
	Elective-II(Artificial Intelligence)	2.Choose appropriate search strategies for any AI problem
		3. Illustrate knowledge reasoning and knowledge representation methods (for solving real world problems)
		4. Analyze the suitable techniques of NLP to develop AI applications
		5. Correlate the appropriate methods of Game Theory to design AI applications
		6.Understand the concept of deep learning and AI applications
5	314455	1.Develop professional competence through industry internship
	Internship	2. Apply academic knowledge in a personal and professional environment
		3. Build the professional network and expose students to future employees.
		4. Apply professional and societal ethics in their day-to-day life.
		5. Become a responsible professional having social, economic and administrative considerations
		6. Make own career goals and personal aspirations.
6	314456	1. Design and configure small size network and associated networking commands
	Computer Network Security Lab	2. Understand various client/server environments to use application layer protocols
		3. Use basic cryptographic techniques in software and system design.
		4. Apply methods for authentication, access control, intrusion detection
	314457	1.Apply Big data primitives and fundamentals for application development.
	DS & BDA Lab	2.Explore different Big data processing techniques with use cases.
		3.Apply the Analytical concept of Big data using Python.
		4.Visualize the Big Data using Tableau.
		5.Design algorithms and techniques for Big data analytics.

7		6.Design and develop Big data analytic application for emerging trends.
8	314458 Lab Practice - II (Artifical Intelligence)	1.Develop realworld problem solving ability 2.Enable the student to apply AI techniquesin applications which involve perception, reasoning and planning 3.Work in team to build industry compliant AI applications
	314458 Laboratory Practice-II (Web Application	1.Develop Static and Dynamic responsive website using technologies HTML, CSS, Bootstrap and AJAX 2.Create Version Control Environment. 3.Develop an application using front end and backend technologies. 4.Develop mobile website using JQuery Mobile. 5.Deploy web application on cloud using AWS.
BE (Information Technology) 2015 pattern Sem-II		
1	414462 Distributed Computing Systems	1.Understand the fundamentals of distributed 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 Ubiquitous Computing	1. Demonstrate and explain the knowledge of design of UbiComp and its applications. 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. 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
3	414464 Ele-III: Internet of Things	1. Describe the concept of the Internet of Things, IoT 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.
	414465	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.

4	Elective IV: Social Media Analytics	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 Computer Laboratory - IX	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.
6	414467 COMPUTER LABORATORY-X	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 a machine learning algorithm.
		7. Explain the Evolution of cellular networks all the way up to 7G.
7	414468 Project Work	1. Extend further the investigative study
		2. Product development cycle using industrial experience, use of state of art technologies.
		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.
		6. Analyze professional issues, including ethical, legal and security issues, related to computing projects.

Engineering Sciences And Allied Engineering

Sem-I

A.Y. 2022-23, 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	generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
		harmonic analysis for design and analysis of
		3. To deal with derivative of functions of several variables that are essential in various branches of
		4.to apply the concept of Jacobian to find partial derivative of implicit function and functional
		5. To the essential tool of matrices and linear
		6. To the essential tool of matrices and linear algebra in a comprehensive manner for analysis of Eigen values and Eigen vectors applicable to engineering problems.
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

7	Subject code: 111006 subject name: Workshop	1.Familiar with safety norms to prevent any mishap in 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

A.Y. 2022-23, 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	1. To know the effective mathematical tools for solutions of first order differential equations.
		law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
		Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and
		4. To trace the curve for a given equation and measure arc length of various curves.
		5. To konw the concepts of solid geometry using
		6. To 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 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.
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. 2022-23, Semester-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, propositional logic and to construct proofs using mathematical induction.
		2. Apply equivalence relations; construct and use functions and apply these concepts to solve new problems.
		3. Calculate numbers of possible outcomes using permutations and combinations. and use in real life applications
		4. Solve computing problems using appropriate algorithms related with graph
		5. Solve real life problems using appropriate algorithms related with Tree
		6. Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.
2	210242 Fundamentals of Data Structures	1. Define the terms such as data structure, algorithmic strategies, time complexity to calculate time complexity of given program segment.
		2. Demonstrate and understand sequential data structure and its use in sparse matrix.
		3. Apply appropriate sorting algorithm to sort the given data and state time complexity of that sorting technique.
		4. Understand dynamic memory management concepts and process data using linked list. Also state its advantages and disadvantages.
		5. Analyze Stack as an ADT and Describe the translation of the expression from one form to another form using stack.
		6. Explain different types of queues with their application.
3	210243 Object Oriented Programming	1. Apply OOP Principles for effective programming
		2. Define Inheritance and develop programs with reusability
		3. Learn the concept of polymorphism,virtual and friend function with example

		4. Describe different file handling classes & stream manipulators
		5. Explain & analyze the strengths of exception handling mechanism in program
		6. Define STL,components of STL & types of containers for effective programming.
4	210244 Computer Graphics	1. Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of 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 Humanity and Social Science	1. Aware of the various issues concerning humans and society.
		2. Aware about their responsibilities towards society.
		3. Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.
		4. Able to understand the nature of the individual and the relationship between self and the community.

		5. Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.
		6. Able to understand need of society and provide solution to them.
7	210247 Data structures Laboratory	1. To learn how to implement data structure concepts in object oriented programming
		2. To understand memory requirement for various data structures
		3. To solve real life problem using appropriate data structure.
		4. To study dynamic memory management.
		5. To understand basic techniques and strategies of algorithm analysis.
8	210248 OOP & Computer Graphics Laboratory	1. Understand and apply the concepts like inheritance, polymorphism, exception handling and generic structures for implementing reusable programming codes
		2. Analyze the concept of file and apply it while storing and retrieving the data from secondary storages
		3. Understand the concept of Template and Apply in sorting of different data types
		4. Analyze and apply computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts.
		5. Understand the concept of windowing and clipping and apply various algorithms to fill and clip polygons.
		6. Apply logic to implement, curves, fractals, animation and gaming programs
9	210249 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

10	210250 Business Communication Skills	1. Express effectively through verbal/oral communication and improve listening skills
		2. Write precisely reports and technical documents
		3. Prepare for group discussion / meetings / interviews and presentations
		4. Explore goal/target setting, self-motivation and practicing creative thinking.
		5. Operate effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership qualities
		6. study effective communication through E-mail and telephonic conversation
	TE Computer Sem-I (2019 COURSE)	
1	310241 Database Management Systems (DBMS)	1. Analyze and design Database Management System using ER model
		2. Implement database queries using database languages
		3. Normalize the database design using normal forms
		4. Apply Transaction Management concepts in real-time situations
		5. Use NoSQL databases for processing unstructured data
		6. Differentiate between Complex Data Types and analyze the use of appropriate data types
2	310242 Theory of Computation	1. Understand formal language, translation logic, essentials of translation, alphabets, language representation and apply it to design Finite Automata differentiate its variants
		2. Construct regular expression to present regular language, state the applications of RE and apply pumping lemma for RE
		3. Design Context Free Grammars and learn to simplify the grammar
		4. Define and Construct Pushdown Automaton model for the Context Free Language
		5. Design Turing Machine for the different requirements outlined by theoretical computer science and comapre TM with PDA.

		6. Understand different classes of problems classify and analyze them and study concepts of NP completeness.
3	310243 System Programming & operating system	1. Explain system software concepts and Analyze and synthesize basic system software and its functionality
		2. Identify suitable data structures and design and implement various system softwares such as Macroprocessor, Compiler
		3. Explain the concept of loader and linker and compare different loading schemes
		4. Explain operating system concepts and Implement and analyze the performance of process scheduling algorithms
		5.Explain deadlock and concurrency concepts also Identify the mechanism to deal with the deadlock and concurrency issues
		6.Analyze and Demonstrate memory organization and memory management policies
4	310244 Computer Networks & security	1. Understand network reference models and technologies.
		2. Illustrate the working and functions of data link layer
		3. Distinguish network protocols and demonstrate different routing algorithms.
		4. Understand transport layer protocol and to demonstrate client server communication using socket programming.
		5. Select any application layer protocols to implement web or desktop application.
		6. Comprehend the basics of Network Security.
5	310245 Elective-1 Human Computer Interface	1. Explain importance of good user interface design.
		2. Define and apply the design guidelies for designing the user interface.
		3. Differentiate between graphical and web user interface.
		4. Explain the user interface design process
		5. justify the pattern recognition in HCI.
		6. Design GUI in python

6	310246 Database Management Systems Lab	1. Design E-R Model for given requirements and convert the same into database tables
		2. Design schema in appropriate normal form considering actual requirements
		3. Implement SQL queries for given requirements, using different SQL concepts
		4. Implement PL/SQL Code block for given requirements
		5. Implement NoSQL queries using MongoDB
		6. Design and develop application considering actual requirements and using database concepts
7	310247 Computer Networks & security Lab	1. Setup of LAN of four computer using layer-2 switch in wired network.
		2. Demonstrate LAN and WAN protocol behavior using Modern Tools.
		3. Understand error detection and correction concept and implement program based on it.
		4. Develop Client-Server architectures and prototypes by the means of correct standards and technology.
		5. Analyze data flow between peer to peer in an IP network using Application, Transport and Network Layer Protocols.
		6. Design and configure a RIP, OSPF and BGP using packet tracer.
8	310248 Lab Practice-I	1. Design & implement language translator such as Assembler, Macro processor
		2. Implement CPU scheduling algorithms
		3. Implement different page replacement algorithms
		4. Sketch the User Interface designs.
		5. Design the user interfaces by applying user interface design guidelines.
		6. Design GUI by using python.
9	310249 Seminar & technical communication	1. Analyze a latest topic of professional interest
		2. Enhance technical writing skill
		3. Identify an engineering problem, analyze it and propose a work plan to solve it
		4. communicate with professional technocal presentation skill
BE Computer Sem-I (2019 COURSE)		

1	410241 Design and Analysis of Algorithm	1. Discuss role of algorithm design of algorithm with related issue and confirming 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.
		6. To analyze and evaluate problems using multithreaded and distributed algorithms.
2	410242 Machine Learning	1. To understand the need for Machine learning
		2. To explore various data pre-processing methods.
		3. To study and understand classification methods
		4. To understand the need for multi-class classifiers
		5. To learn the working of clustering algorithms
		6. To learn fundamental neural network algorithms.
3	410243 Blockchain Technology	1. Interpret the fundamentals and basic concepts in Blockchain
		2. Compare the working of different blockchain platforms
		3. Use Crypto wallet for cryptocurrency based transactions
		4. Analyze the importance of blockchain in finding the solution to the real-world problems.
		5. llustrate the Ethereum public block chain platform
		6. Identify relative application where block chain technology can be effectively used and implemented.
4	410244	1. Define the different attacks on Information. Find problems with existing ciphers.
		2. Identify the problems with private cryptography method.

	Ele-III(Cyber Security & Digital forensic)	3. Apply public cryptography on information for security.
		4. Analyze, validate and process crime scenes.
		5. Analyze evidence about computer crimes and apply tools to get them.
		6. Apply tools for network forensic to get digital evidence.
5	410245 Ele-IV (Software Testing & Quality Assurance)	1. Describe fundamental concepts in software testing and software quality..
		2. Design and develop project test plan, design test cases, test data, and conduct test operations
		3. Apply different test case design techniques.
		4. Apply different approaches of quality management, assurance, and quality standard to software system
		5. Apply recent automation tool for various software testing for testing software
		6. Apply and analyze effectiveness Software Quality Tools
6	410246 Lab Practice-III	1. Learn effect of data preprocessing on the performance of machine learning algorithms
		2. Develop in depth understanding for implementation of the regression models.
		3. Implement and evaluate supervised and unsupervised machine learning algorithms.
		4. Analyze performance of an algorithm.
		5. Learn how to implement algorithms that follow algorithm design strategies namely divide and conquer, greedy, dynamic programming, backtracking, branch and bound.
		6. Understand and explore the working of Blockchain technology and its applications.
7	410247 Lab Practice-IV	1. Demonstrate basic principles of elective subjects to problem solving and modeling.
		2. Use tools and techniques to solve problem
		3. Design and develop applications on subjects of their choice as a mini project.
		4. Differentiate between different tools and techniques Select appropriate tool to solve problem
8	410248	1. Solve real life problems by applying knowledge.
		2. Analyze alternative approaches, apply and use most appropriate one for feasible solution.

	Project Work Stage I	3. Write precise reports and technical documents in a nutshell.
		4. Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work
		5. Inter-personal relationships, conflict management and leadership quality.
A.Y. 2022-23, Semester-II		
Sr.No.	**Course code** **Course name**	**Course outcome**
SE Computer Sem-II (2019 COURSE)		
1	207003 Engineering Mathematics-III	1. To Solve Linear differential equations, essential in modelling and design of computer-based systems.
		2. To Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
		3. To Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
		4. To Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
		5. To Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
2	210252 Data Structures & Algorithms	1. Describe the benefits of good hashing and identify hashing scheme for solving real world problem.
		2. Apply non-linear data structure like tree for solving problems of various domain.
		3. Apply non-linear data structure like graph for solving problems of various domain.
		4. Analyze the algorithmic solutions for resource requirements and optimization
		5. Use efficient indexing methods and multiway search techniques to store and maintain data.
		6. Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.
		1. Compare software process models used for software development.
		2. Identify and analyze the software requirements required for software development.

3	210253 Software Engineering	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.
4	210254 Microprocessor	1. Classify processor architecture and illustrate the instruction set of 80386 processor.
		2. Compare 80386 processor modes and explain advanced featues of 80386
		3. Explain the memory management of 80386.
		4. Describe the protection mechanism with various previlege levels.
		5. State and Explain the multitasking with relevent descriptors and registers
		6. Identify interrupts/exceptions and differentiate between microprocessor and microcontroller
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	Understand the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem
		Choose most appropriate data structures and apply algorithms for graphical solutions of the problems
		Apply and analyze non linear data structures to solve real world complex problems.
		Apply and analyze algorithm design techniques for indexing, sorting, multi-way searching, file organization and compression.
		Analyze the efficiency of most appropriate data structure for creating efficient solutions for engineering design situations

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. Understand basics of IT Project management.
		3. Analyze alternative approaches, apply and use most appropriate one for feasible solution.
		4. Design and present the reliable solution to meet challenges
		5. Apply the technical knowledge to solve the identified problem
		6. Prepare the brief report of their project.
9	210259 Deep Learning	1. Understand the basics of Deep Learning and apply the tools to implement deep learning applications
		2. Evaluate the performance of deep learning models (e.g., with respect to the bias-variance trade-off, overfitting and underfitting, estimation of test error).
		3. To apply the technique of Convolution (CNN) and Recurrent Neural Network (RNN) for implementing Deep Learning models
		4. To implement and apply deep generative models.
		5. Construct and apply on-policy reinforcement learning algorithms
		6. To Understand Reinforcement Learning Process
TE Computer Sem-II (2019 COURSE)		
1	310251	1. To understand the need of Data Science and Big Data
		2. To understand computational statistics in Data Science
		3. To study and understand the different technologies used for Big Data processing

	Data Science & Big data analytics	4. To understand and apply data modeling strategies
		5. To learn Data Analytics using Python programming
		6. To be conversant with advances in analytics
2	310252 Web technologies	1. Implement and analyze behavior of web pages using HTML and CSS
		2. Apply the client side technologies for web development
		3. Analyze the concepts of Servlet and JSP
		4. Analyze the Web services and frameworks
		5. Apply the server side technologies for web development
		6. Create the effective web applications for business functionalities using latest web development platforms
3	310253 Artificial Intelligence	1. Identify and apply suitable intelligent agentsfor various AI applications
		2. solve problems using different informed search and uninformed search & heuristic approaches
		3. Identify knowledge associated and represent it to solve a given problem
		4. Apply suitable algorithms to solve AI problems
		5. Implement ideas underlying modern logical inference system
		6. Represent complex problems with expressive yet carefully constrained language representation
4	310254 (D) Elective-II Software Modelling & Architecture	1. Analyze the problem statement (SRS) and choose proper design technique for designing web-based/ desktop application.
		2. Design and analyze an application using Static UML modeling as fundamental tool.
		3. Design and analyze an application using Dynamic UML modeling as fundamental tool.
		4. Evaluate software architectures.
		5. Use appropriate architectural styles and software design patterns.
		6. Apply appropriate modern tool for designing and modeling.
		1. Understand the different Cloud Computing environment

4	310254(C) Elective-II Cloud Computing	2. Understand appropriate data storage technique on Cloud, based on Cloud application
		3. Analyze virtualization technology and install virtualization software
		4. Develop and deploy applications on Cloud
		5. Apply security in cloud applications
		6. Use advance techniques in Cloud Computing
5	310255 Internship	1. To demonstrate professional competence through industry internship
		2. To apply knowledge gained through internships to complete academic activities in a professional manner
		3. To choose appropriate technology and tools to solve given problem
		4. To demonstrate abilities of a responsible professional and use ethical practices in day to day life
		5. Creating network and social circle and developing relationships with industry people
		6. To analyze various career opportunities and career goals
6	310256 Data Science & Big data analytics Lab	1. To understand principles of Data Science for the analysis of real time problems
		2. To develop in depth understanding and implementation of the key technologies in Data Science and Big Data Analytics
		3. To analyze and demonstrate knowledge of statistical data analysis techniques for decision-making
		4. To gain practical, hands-on experience with statistics programming languages and Big Data tools
7	310257 Web Technology Lab	1. Understand the importance of website planning and website design issues
		2. Apply the client side and server side technologies for web application development
		3. Analyze the web technology languages, frameworks and services
		4. Create three tier web based applications
8	310258 Lab Practice-II	1. Design system using different informed search / uninformed search or heuristic approaches
		2.Apply basic principles of AI in solutions that require problem solving, inference, Perception, knowledge
		3.Design and develop an expert system
		4. Use tools and techniques in the area of Cloud Computing.

		5. Use the knowledge of Cloud Computing for problem solving.
		6. Apply the concepts Cloud Computing to design and develop applications.
		7. Use UML tools and techniques in the area Software Modeling and Architectures
		8. Use the knowledge of Software Modeling and Architectures for problem solving
		9. Apply the concepts Software Modeling and Architectures to design and develop Applications
BE Computer Sem-II (2019COURSE)		
1	410250 High Performance Computing	1. Understand various Parallel Paradigm
		2. Design and Develop an efficient parallel algorithm to solve given problem
		3. Illustrate data communication operations on various parallel architecture
		4. Analyze and measure performance of modern parallel computing systems
		5. Apply CUDA architecture for parallel programming
		6. Analyze the performance of HPC applications
2	410251 Deep Learning	1. Understand the basics of Deep Learning and apply the tools to implement deep learning applications
		2. Evaluate the performance of deep learning models (e.g., with respect to the bias-variance trade-off, overfitting and underfitting, estimation of test error).
		3. To apply the technique of Convolution (CNN) and Recurrent Neural Network (RNN) for implementing Deep Learning models
		4. To implement and apply deep generative models.
		5. Construct and apply on-policy reinforcement learning algorithms
		6. To Understand Reinforcement Learning Process
3	410252 (B) Ele-V (Image Processing)	1. Apply Relevant Mathematics Required for Digital Image Processing.
		2. Apply Special and Frequency Domain Method for Image Enhancement.
		3. Apply algorithmic approaches for Image segmentation.
		4. Summarize the Concept of Image Compression and Object Recognition.
		5. Explore the Image Restoration Techniques.
		6. Explore the Medical and Satellite Image Processing Applications.

4	410252 (A) Ele-V (Natural Language Processing)	1. Describe the fundamental concepts of NLP, challenges and issues in NLP
		2. Analyze Natural languages morphologically, syntactical and semantically
		3. Describe various language modeling techniques
		4. Apply NLP techniques for the information retrieval task
		5. Demonstrate the use of NLP tools and techniques for text-based processing of natural languages
		6. Develop real world NLP applications
5	410253 (C) Business Intelligence	1. Differentiate the concepts of Decision Support System & Business Intelligence
		2. Apply Data Warehouse & Business Architecture to design a BI system
		3. Create and Build graphical reports
		4. Apply different data preprocessing techniques on dataset
		5. Apply machine learning algorithms as per business needs
		6. Apply BI in marketing, logistics, and finance and telecommunication sector
6	410254 Lab Practice-V	1. Analyze and measure performance of sequential and parallel algorithms.
		2. Design and Implement solutions for multicore/Distributed/parallel environment.
		3. Identify and apply the suitable algorithms to solve AI/ML problems.
		4. Apply the technique of Deep Neural network for implementing Linear regression and classification.
		5. Apply the technique of Convolution (CNN) for implementing Deep Learning models.
		6. Design and develop Recurrent Neural Network (RNN) for prediction.
6	410255 Lab Practice-VI	1. Demonstrate basic principles of elective subjects to problem solving and modeling.
		2. Use tools and techniques in the area of software development to build mini projects
		3. Design and develop applications on subjects of their choice.
		4. Design,Generate and manage deployment, administration & security.
		1. Show evidence of independent investigation

7	410256 Project Work Stage II	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

Electronics and Telecommunication

A.Y. 2022-23, Semester -I

Sr.No.	Course code Course name	Course outcome
SE Electronics and Telecommunication-Sem-I (2019 COURSE)		
1	207005 Engineering Mathematics III	1. To Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
		2. to Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
		3. To 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. To Perform vector differentiation & integration, analyze the vector fields and apply to electro-magnetic fields & wave theory.
		5. To Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.
2	204181 Electronic Circuits	1.Assimilate the physics, characteristics and parameters of MOSFET towards its application as amplifier.
		2. Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications.
		3. Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.

		4. Explain internal schematic of Op-Amp and define its performance parameters.
		5. Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
		6. Understand and compare the principles of various data conversion techniques and PLL with their applications.
3	204182 Digital Circuits	1. Identify and prevent various hazards and timing problems in a digital design.
		2. Use the basic logic gates and various reduction techniques of digital logic circuit.
		3. Analyze, design and implement combinational logic circuits.
		4. Analyze, design and implement sequential circuits.
		5. Differentiate between Mealy and Moore machines.
		6. Analyze digital system design using PLD.
4	204183 Elecrical Circuits	1. Analyze the simple DC and AC circuit with circuit simplification techniques.
		2. Formulate and analyze driven and source free RL and RC circuits.
		3. Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
		4. Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
		5. Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
		6. Analyze and select a suitable motor for different applications.
5	204184 Data Structures	1. Solve mathematical problems using C programming language.
		2. Implement sorting and searching algorithms and calculate their complexity.
		3. Develop applications of stack and queue using array.
		4. Demonstrate applicability of Linked List.
		5. Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity.
		6. Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.

TE Electronics and Telecommunication-Sem-I (2019 COURSE)		
1	304181 Digital Communication	1. Apply the statistical theory for describing various signals in a communication system.
		2. Understand and explain various digital modulation techniques used in digital communication systems and analyze their performance in presence of AWGN noise.
		3. Describe and analyze the digital communication system with spread spectrum modulation.
		4. Analyze a communication system using information theoretic approach.
		5. Use error control coding techniques to improve performance of a digital communication system
2	304182 Electromagnetic Field Theory	1. Apply the basic electromagnetic principles and determine the fields (E & H) due to the given source.
		2. Apply boundary conditions to the boundaries between various media to interpret behavior of the fields on either sides.
		3. State, Identify and Apply Maxwell's equations (integral and differential forms) in both the forms (Stat ic, time-varying or Time-harmonic field) for various sources, Calculate the time average power density using Poynting Theorem, Retarded magnetic vector potential.
		4. Formulate, Interpret and solve simple uniform plane wave (Helmholtz Equations) equations, and analyze the incident/reflected/transmitted waves at normal incidence.
		5.Interpret and Apply the transmission line equation to transmission line problems with load impedance to determine input and output voltage/current at any point on the Transmission line, Find input/load impedance, input/load admittance, reflection coefficient, SWR, Vmax/Vmin, length of transmission l ine using Smith Chart.
		6. Carry out a detailed study, interpret the relevance and applications of Electromagnetics.
3	304183 Database Management	1. To understand fundamental concepts of database from its design to its implementation.
		2. To analyze database requirements and determine the entities involved in the system and with one another.
		3. Manipulate database using SQL Query to create, update and manage Database.

		4. Be familiar with the basic issues of transaction processing and concurrency control.
		5. To learn and understand Parallel Databases and its Architectures.
		6. To learn and understand Distributed Databases and its applications.
4	304184 Microcontrollers	1. Understand architecture and features of 8051 and PIC18FXX Microcontroller.
		2. Learn interfacing of real-world peripheral devices with microcontroller.
		3. Explore different features of PIC 18F Microcontroller with Architecture.
		4.Use concepts of timers and interrupts of PIC 18 in programming.
		5. Design and develop microcontroller based embedded application.
		6. Demonstrate real life applications using PIC 18.
5	304185 Elective - I Digital Signal Processing	1. Interpret and process discrete/ digital signals and represent DSP system.
		2.Analyze the digital systems using the Z-transform techniques.
		3.Implement efficient transform and its application to analyze DT signals.
		4.Design and implement IIR filters.
		5.Design and implement FIR filters.
		6.Apply DSP techniques for speech/ biomedical/ image signal processing.
BE Electronics and Telecommunication-Sem-I (2019 COURSE)		
1	404181 Radiation & Microwave Theory	1. Apply the fundamentals of electromagnetic to derive free space propagation equation and distinguish various performance parameters of antenna.
		2. Identify various modes in the waveguide. Compare: coaxial line, rectangular waveguides & striplines and identify applications of the same.
		3.Identify various modes in the waveguide. Compare: coaxial line, rectangular waveguides & striplines and identify applications of the same.
		4. Explore construction and working of principles active microwave devices/components.
		5. Analyze the structure, characteristics, operation, equivalent circuits and applications of various microwave solid state active devices.

		6. Know the various microwave systems, device set ups of microwave measurement devices and Identify the effect of radiations on environmental sustainability.
2	404182 VLSI Design and Technology	1. Develop effective HDL codes 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 In Self Test (BIST) circuit.
3	404183 Cloud Computing	1. Apply knowledge of testability in design and Build In Self Test (BIST) circuit.
		2. Describe the underlying principles of different Cloud Service Models.
		3.Classify the types of Virtualization.
		4. Examine the Cloud Architecture and understand the importance of Cloud Security.
		5. Develop applications on Cloud Platforms.
		6. Evaluate distributed computing and the Internet of Things.
4	404184 Elective - 3 Modernized IoT	1. Comprehend and analyze concepts of sensors, actuators, IoT and IoE.
		2. Interpret IoT Architecture Design Aspects.
		3. Comprehend the operation of IoT protocols.
		4. Describe various IoT boards, interfacing, and programming for IoT.
		5. Illustrate the technologies, Catalysts, and precursors of IIoT using suitable use cases.
		6. Provide suitable solution for domain specific applications of IoT.
5	404185 Elective - 4 Deep Learning	1. Classify machine learning algorithms and its types.
		2. Discuss the concepts of deep learning and its Frameworks.
		3. Identify the deep learning architectures with respect to the applications.
		4. Demonstrate different architectures of Convolutional neural networks.
		5. Discuss natural language processing architectures.
		6. Make use of various case studies and deep learning applications.

A.Y. 2022-23, Sem-I		
Sr.No.	Course code Course name	Course outcome
ME First Year E&TC(VLSI & ES)-Sem-I		
1	504201 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
3	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
4	504104 Research Methodology	1. Define research problem & its scope, objectives, and errors.
		2. State basic instrumentation schemes & data collection methods.
		3. Perform analysis with various statistical techniques.
		4. Perform modeling and predict the performance of experimental system
		5. Develop the research proposals.
	504205	1. Gain knowledge of Architecture of WSN network.
		2. Understand Physical, Data link and Network layer aspects with their protocols.

5	Wireless Sensor Network	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. 2022-23, Semester-II
Sr.No.	Course code Course name	Course outcome
		SE Electronics and Telecommunication-Sem-II (2019 COURSE)
		1. Identify, classify basic signals and perform operations on signals.

1	204191 Singals and Systems	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	204193 Principals of Communicatio n Systems	1. To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
		2.Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
		3. Explain generation and detection of FM systems and compare with AM systems.
		4. Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).

		5. Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
		6. Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission.
4	204194 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++.
		4. Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
		5. Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
		6. Describe and use of File handling in C++.
5	204199 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 (2019 COURSE)		
1	304192 Cellular Networks	1. Understand fundamentals of wireless communications.
		2. Discuss and study OFDM and MIMO concepts.
		3. Elaborate fundamentals mobile communication.
		4. Describes aspects of wireless system planning

		5. Understand of modern and futuristic wireless networks architecture.
		6. Summarize different issues in performance analysis.
2	304193 Project Management	1. Learn the fundamental knowledge of project management and apply effectively handling the projects.
		2. Select the appropriate project based on feasibility study and undertake its effective planning.
		3. Understand organizational structure of project to handle project management related issues.
		4. Identify and apply the project scheduling techniques for a Project Schedule Plan to meet the resources to meet the project deadline.
		5. Assimilate the project risks and manage finances in line with Project Financial Management Process.
		6. Develop new skillsets to products assessing their commercial viability for becoming successful entrepreneurs.
3	304194 Power Devices & Circuits	1. To introduce different power devices viz. SCR, GTO, MOSFET and IGBT with construction,characteristics, repetitive and non repetitive ratings and typical triggering/driver circuits.
		2. To understand working, design and performance analysis and applications of various power converter circuits such as ac to dc converters, inverter and chopper.
		3. To know various protection circuit requirements of power electronic devices.
4	304195A Elective-II Digital Image Processing	1. To become familiar with digital image fundamentals
		2. To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
		3. To study the image segmentation and representation techniques.
		4. To become familiar with image compression methods.
		5. To learn concepts of degradation function and restoration techniques
		6. To understand the Object Recognition.
5	304195B Elective-II	1. Concept of Sensors/Transducers and their Static and Dynamic Characteristics.
		2. Sensors used in Industry for Temperature and Humidity Measurement.
		3. Sensors used for Sensors used for Force, Pressure, Stress and Flow measurements.

	Sensors in Automation	4. Sensors used for Displacement and Level Measurement
		5. Applications of Image and Biosensors
		6. Role of Sensors/Transducers in IoT applications.
BE Electronics and Telecommunication-Sem-II (2019 COURSE)		
1	404190 Fiber Optic Communication	1. Explain the working of components and measurement equipments in optical fiber networks.
		2. Calculate the important parameters associated with optical components used in fiber optic telecommunication systems.
		3. Compare and contrast the performance of major components in optical links.
		4. Evaluate the performance viability of optical links using the power and rise time budget analysis.
		5. Design digital optical link by proper selection of components and check its viability using simulation tools.
		6. Compile technical information related to state of art components, standards, simulation tools and current technological trends by accessing the online resources to update their domain knowledge.
2	404191 Elective - 5 Biomedical Signal Processing	1. Describe the origin of various biomedical signals and Interpret the meaning of various parameters associated with biomedical signals
		2. Analyze ECG Signals with extraction of meaningful information
		3. Explain Processing of EEG signals for Diseases of Central Nervous System
		4. Analyze EMG signals for understanding Neuromuscular Diseases
		5. Analyze various Biomedical Signals
		6. Process the biomedical signals to remove adaptive interference and noise
3	404192 Elective - 6 Digital Marketing	1. Design websites using free tools like Wordpress and explore it for digital marketing.
		2. Apply various keywords for a website & to perform SEO.
		3.Understand the various SEM Tools and implement the Digital Marketing Tools.
		4. Illustrate the use of Facebook, Instagram and Youtube for Digital Marketing in real life.
		5. Use Linked in platform for various campaigning.

		6. Understand the importance of recent trends in digital marketing.
4	404193 Innovation and Entrepreneurship	1. Understand Innovation, Entrepreneurship and characteristics of an entrepreneur.
		2. Develop a strong understanding of the Design Process and its application in variety of business settings.
		3. Generate sustainable ideas.
		4. Explore various processes required to be an entrepreneur.
		5. Understand patents and its process of filing.
		6. Choose and use appropriate social media for marketing.
5	404194 Digital Business Management	1. Identify drivers of digital business.
		2. Illustrate various approaches and techniques for E-business and management.
		3. Prepare E-business plan.
A.Y. 2022-23, Sem-II		
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. 2022-23, Semester-I

Sr. No.	Course code / Course name	Course Outcome
SE (Information Technology) 2019 pattern Sem-I		
1	214441	1. Formulate and apply formal proof techniques and solve the problems with logical reasoning.
	Discrete Mathematics	2. Analyze and evaluate the combinatorial problems by using probability theory.
		3. Apply the concepts of graph theory to devise mathematical models.
		4. Analyze types of relations and functions to provide solution to computational problems.
		5. Identify techniques of number theory and its application.
		6. Identify fundamental algebraic structures.
2	214442	1. Perform basic binary arithmetic & simplify logic expressions.
	Logic Design and Computer Organization	2. Grasp the operations of logic ICs and Implement combinational logic functions using ICs.
		3. Understand the operations of basic memory cell types and Implement sequential logic functions using ICs.
		4. Explain the functions & organization of various blocks of CPU.

	Organization	5. Understand CPU instruction characteristics, enhancement features of CPU.
		6. Describe an assortment of memory types (with their characteristics) used in computer systems and basic principle of interfacing input, output devices.
3	214443	1. Perform basic analysis of algorithms with respect to time and space complexity
	Data Structure & Algorithms	2. Select appropriate searching and/or sorting techniques in the application development.
		3. Implement abstract data type (ADT) and data structures for given application.
		4. Design algorithms based on techniques like brute - force, divide and conquer, greedy, etc.
		5. Apply implement learned algorithm design techniques and data structures to solve problems.
		6. Design different hashing functions and use files organizations.
4	214444	1. Differentiate various programming paradigms.
	Object-Oriented Programming	2. Identify classes, objects, methods, and handle object creation, initialization, and Destruction to model real-world problems.
		3. Identify relationship among objects using inheritance and polymorphism principles.
		4. Handle different types of exceptions and perform generic programming
		5. Use of files for persistent data storage for real world application.
		6. Apply appropriate design patterns to provide object-oriented solutions.
5	214445	1. Understand and explain the conceps of communication theory and compare functions of OSI and TCP/IP model
	Basics of Computer Network	2. Analyze data link layer services ,error detection and correction,linear block codes.
		3. Compare different access techniques,chanelization and Ethernet Standards.
		4. Apply the skills of subnetting,supernetting and routing mechanisms.
		5. Differentiate IPv4 and IPv6
		6. Illustrate services and protocols used at transport layer
	214446	1. Simplify Logic function using K-map and design Combinational logic circuits using SSI & MSI chips.

6	Logic Design and Computer Organization Lab	2. Design Sequential Logic circuits like MOD counters using synchronous counters.
		3. Understand the basics of simulator tool and simulate basic blocks such as ALU & memory.
7	214447	1.Analyze algorithms and to determine algorithm correctness and time efficiency class.
	Data Structure & Algorithms Lab	2. Implement abstract data type (ADT) and data structures for given application.
		3.Design algorithms based on techniques like brute - force, divide and conquer, greedy, etc.).
		4.Solve problems using algorithmic design techniques and data structures.
		5. Analyze of algorithms with respect to time and space complexity.
8	214448	1. Differentiate various programming paradigms.
	Object Oriented Programming Lab	2. Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems.
		3. Identify relationship among objects using inheritance and polymorphism.
		4. Handle different types of exceptions and perform generic programming.
		5. Use file handling for real world application.
		6. Apply appropriate design patterns to provide object-oriented solutions.
9	214449	1. Provides an ability to understand, analyze and interpret the essentiality of grammar and its proper usage.
	Soft Skill Lab	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) 2019 pattern Sem-I		
1	314441	1.Explain finite state machines to solve problems on it.
	Theory of Computation	2. Write regular expressions for the regular languages and finite automata.
		3. Identify types of grammar, design and simplify Context Free Grammar.
		4. Construct Pushdown Automata machine for the Context Free Language..

		5. Design and analyze Turing machines for formal languages.
		6. Understand decidable and undecidable problems, analyze complexity classes.
2	314442	1. Understanding the role of Modern Operating Systems
	Operating System	2. Apply the concepts of process and thread scheduling
		3. Apply the concept of process synchronization, mutual exclusion and the deadlock
		4. Understand and apply the concepts of various memory management techniques
		5. Make use of concept of I/O management and File system
		6. Understand Important of System software
3	314443	1.Explain basic concepts of machine learning and different types of learning .
	Machine Learning	2.Compare different types of classification models and studies their performance evaluation metrics.
		3.Differentiate various regression techniques and evaluate their performance.
		4.Illustrate the tree-based and probabilistic machine learning algorithms.
		5.Identify different types of unsupervised algorithm .
		6.Apply fundamental concepts of ANN.
4	314444	1.Explain importance of HCI study and principles of user-centered design (UCD) approach.
	Human Computer Interaction	2.Develop understanding of human factors in HCI design, paradigms and context of interactions.
		3.Develop understanding of models, Apply cognitive models for predicting human-computer-interactions.
		4.Design effective user-interfaces and usability of a user-interface design.
		5.Understand Evaluation techniques for human-computer-interactions.
		6.Apply HCI to real life applications.
5	314445	1. Understand relational and object-oriented databases
	Elective-I (Advanced Database	2. Learn and understand of parallel & distributed database architectures..
		3. Learn the concepts of NoSQL Databases.
		4. Understand data warehouse and OLAP technologies.

	Management System)	5. Apply data mining algorithms and to learn various software tools.
		6. Learn emerging and enhanced data models for advanced applications.
6	314446	1. Apply the basics of Linux commands
	Operating System Laboratory	2. Build shell scripts for various applications
		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, CPU Scheduling, Memory Management and Disk Scheduling in Linux
		5. Develop system programs for Inter Process Communication in Linux.
7	314447	1. Differentiate between good design and bad design.
	Human Computer Interaction Laboratory-II	2. Analyze creative design in the surrounding.
		3. Assess design based on feedback and constraint.
		4. Design paper-based prototypes and use wire frame.
		5. Implement user-interface design using web technology.
		6. Evaluate user-interface design using HCI evaluation techniques
8	314448 (A)	1.Implement different supervised and unsupervised learning algorithms.
	Laboratory Practice - I (Machine Learning)	2.Evaluate performance of machine learning algorithms for real-world applications.
	314448 (B)	1. Understand Advanced Database Programming Languages.
	Laboratory Practice - I (Advanced Database Management System)	2. Master the basic concepts of NoSQL Databases.
		3. Install and configure database systems.
		4. Populate and query a database using MongoDB commands.
		5. Design data warehouse schema of any one real-time: CASE STUDY.
		6. Develop small application with NoSQL Database for back-end.
	314449	1. Understand, interpret and summarize technical literature.
		2. Demonstrate the techniques used in the paper.

9	Seminar	3. Distinguish the various techniques required to accomplish the task.
		4. Identify intended future work based on the technical review.
		5. Prepare and present the content through various presentation tools and techniques in effective manner.
		6. Keep audience engaged through improved interpersonal skills.
BE (Information Technology) 2019 pattern Sem-I		
1	414441	1.Understand the concept of Information retrieval and to apply clustering in information retrieval.
	Information and Storage Retrieval	2.Use an indexing approach for retrieval of text and multimedia data.
		3.Evaluate performance of information retrieval systems.
		4.Apply the concepts of multimedia and distributed information retrieval
		5.Use appropriate tools in analyzing the web information
		6.Simulate the working of a search engine and recommender system
2	414442	1.Apply the practices and methods for successful Software Project Management
	Software Project Management	2.Create Design and Evaluate Project
		3.Analyze Project Schedule and calculate Risk Management with help of tools.
		4.Demonstrate different tools used for Project Tracking, Monitoring & Control
		5.Identify Staff Selection Process and the issues related to Staff Management.
		6.Discuss and use modern tools for Software Project Management.
3	414443	1. Understand the theoretical foundations, algorithms, and methodologies of Deep Learning.
	Deep Learning	2. Apply the concepts of Convolution Neural Networks and use of popular CNN architectures.
		3. Compare Feed Forward Neural Network and Recurrent Neural Network and learn modeling the time dimension using RNN and LSTM.
		4. Elaborate unsupervised deep learning algorithms like Autoencoders.
		5. Explore Representation Learning and Transfer Learning techniques using variants of CNN architecture.

		6. Evaluate the performance of deep learning algorithms and to provide solution for various real-world applications.
4	414444	1.Understand the basic concepts of Mobile Computing, MAC and different multiplexing techniques.
	Elective - III (Mobile Computing)	2.Understand Protocols, Connection Establishment, Frequency Allocation, Routing of mobile telecommunication system like GSM, GPRS, UMTS.
		3.Understand the Generations of Mobile Communication Technologies.
		4.Understand Mobile IP, Adhoc – Network, Reactive Routing protocols, Multicast Routing.
		5.Explain transport layer protocol TCP, File System, and different application layer protocols.
		6.Explain different mobile platforms, operating Systems, Software Development Kit, Security Issues.
5	414445	1. Understand the fundamental concepts of DevOps
	ELECTIVE IV: (Introduction to Devops)	2. Link the background of DevOps with other technologies
		3. Comprehend the concept of continuous integration and continuous delivery
		4. Compare various stages of continuous deployment and test strategies
		5. Justify the importance of monitoring system and reliability engineering
		6. Use the latest tools in DevOps
6	414446	1.Understand the concept of Information retrieval and to apply clustering in information retrieval
	Lab Practice III	2.Use appropriate indexing approach for retrieval of text and multimedia data. Evaluate performance of information retrieval systems.
		3.Apply appropriate tools in analyzing the web information.
		4.Map the concepts of the subject on recent developments in the Information retrieval field.
7	414447	
	Lab Practice	1. Learn and Use various Deep Learning tools and packages.
		2. Build and train a deep Neural Network models for use in various applications.

	IV	3. Apply Deep Learning techniques like CNN, RNN Auto encoders to solve real word Problems.
		4. Evaluate the performance of the model build using Deep Learning.
8	414460	1.Apply knowledge of mathematics, science, and engineering to formulate the Problem statement.
	Project Stage-I	2.Design and conduct experiments, as well as to analyze and interpret data.
		3.Understand the professional and ethical responsibility.
		4.To communicate effectively.
		5.Get broad education which is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
		6. Recognition of the need for, and an ability to engage in life-long learning.
		7. Use the techniques, skills, and modern engineering tools necessary for engineering practices.
		8.Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
A.Y. 2022-23, Semester-II		
Sr.No.	**Course code / Course name**	**Course outcome**
SE (Information Technology) 2019 pattern Sem-II		
1	207003	1. To Solve Linear differential equations, essential in modelling and design of computer-based systems.
	Engineering Mathematics - III	2. To Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
		3. To Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
		4. To Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
		5. To Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.

2	214451	1. Understand architecture and memory organization of PIC 18 microcontroller.
	Processor Architecture	2. Implement embedded C programming for PIC 18.
		3. Use concepts of timers and interrupts of PIC 18.
		4. Understand interfacing with PIC 18.
		5. Demonstrate real life applications using PIC 18.
		6. Analyze architectural details of ARM processor.
3	214452	1. Explain basic concepts of DBMS and RDBMS.
	Database Management System	2. Design ER-models for any database application.
		3. Formulate SQL queries on data for relational databases
		4. Improve the database design by normalization & to incorporate query processing
		5. Explain basic issues of transaction processing and concurrency control
		6. Analyze various database architectures and technologies.
4	214453	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, color models concepts and apply shading algorithms to solve problems related to them.
		5.Explain concepts of animation, curves and fractals using computer graphics tools.
		6.Explain the concepts of virtual reality.
5	214454	1. Classify various software application domains.
	Software Engineering	2. Analyze software requirements by using various modeling techniques.
		3. Translate the requirement models into design models.
		4. Apply planning and estimation to any project.
		5. Use quality attributes and testing principles in software development life cycle.
		6. Discuss recent trends in Software engineering by using CASE and agile tools.
	214455	1. Apply concepts related to embedded C programming.

6	Programming Skill Development Lab	2. Develop and Execute embedded C program to perform array addition, block transfer, sorting operations.
		3. Perform interfacing of real-world input and output devices to PIC18FXXX microcontroller.
		4. Use source prototype platform like Raspberry-Pi/Beagle board/Arduino.
7	214456	1. Install and configure database systems.
	Database Management System Lab	2. Analyze database models & entity relationship models.
		3. Design and implement a database schema for a given problem-domain
		4. Implement relational database systems.
		5. Populate and query a database using SQL DDL / DML / DCL commands.
		6. Design a backend database of any one organization: CASE STUDY
8	214457	1. Apply and implement line drawing and circle drawing algorithms to draw specific shape given in the problem
	Computer Graphics Lab	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
9	214458	1. Design solution to real life problems and analyze its concerns through shared cognition.
	Project Based Learning	2. Apply learning by doing approach in PBL to promote lifelong learning.
		3. Tackle technical challenges for solving real world problems with team efforts.
		4. Collaborate and engage in multi-disciplinary learning environments.
TE (Information Technology 2019 pattern) Sem-II		
	314451	1. Know Responsibilities, services offered and protocol used at application layer of network
		2. Understand wireless network and different wireless standards

1	Computer Network and Security	3. Recognize the Adhoc Network's MAC layer, routing protocol and Sensor networkarchitecture
		4. Define the principal concepts of network security and Understand network security threats,security services, and countermeasures
		5. Apply basic cryptographic techniques in application development.
		6. Gain a good comprehension of the landscape of cyber security Vulnerabilities & describe typical threats to modern digital systems
2	314452	1.Understand Big Data primitives.
	Data Sciece and Big Data Analytics	2.Learn and apply different mathematical models for Big Data.
		3.Explain differnet Big Data ecosystem and technologies
		4.Analyze each learning model comes from a different algorithmic approach and it will perform differently under different datasets.
		5.Understand, apply and analyze needs, challenges and techniques for big data visualization
		6. Learn different programming platforms for big data analytics.
3	314453	1.Understand technologies like HTML, CSS, Bootstrap, W3C.
	Web Application and Developement	2.Demonstrate the use of web scripting languages.
		3.Understand and develop web application with Front End Technologies.
		4.Understand and develop web application with Back End Technologies.
		5.Understand and develop Mobile web development using JQuery Mobile.
		6.Understand web application deployment on cloud using AWS.
4	314454(A)	1.Apply the fundamental concepts of Artificial Intelligence
	Elective-II(Artificial Intelligence)	2.Choose appropriate search strategies for any AI problem
		3. Illustrate knowledge reasoning and knowledge representation methods (for solving real world problems)
		4. Analyze the suitable techniques of NLP to develop AI applications
		5. Correlate the appropriate methods of Game Theory to design AI applications

		6.Understand the concept of deep learning and AI applications
5	314455	1.Develop professional competence through industry internship
	Internship	2. Apply academic knowledge in a personal and professional environment
		3. Build the professional network and expose students to future employees.
		4. Apply professional and societal ethics in their day-to-day life.
		5. Become a responsible professional having social, economic and administrative considerations
		6. Make own career goals and personal aspirations.
6	314456	1. Design and configure small size network and associated networking commands
	Computer Network Security Lab	2. Understand various client/server environments to use application layer protocols
		3. Use basic cryptographic techniques in software and system design.
		4. Apply methods for authentication, access control, intrusion detection
7	314457	1.Apply Big data primitives and fundamentals for application development.
	DS & BDA Lab	2.Explore different Big data processing techniques with use cases.
		3.Apply the Analytical concept of Big data using Python.
		4.Visualize the Big Data using Tableau.
		5.Design algorithms and techniques for Big data analytics.
		6.Design and develop Big data analytic application for emerging trends.
8	314458	1.Develop realworld problem solving ability
	Lab Practice - II (Artifical Intelligence)	2.Enable the student to apply AI techniquesin applications which involve perception, reasoning and planning
		3.Work in team to build industry compliant AI applications
	314458	1.Develop Static and Dynamic responsive website using technologies HTML, CSS, Bootstrapand AJAX.
	Laboratory Practice-II (Web	2.Create Version Control Environment.
		3.Develop an application using front end and backend technologies.

	Application Development)	4.Develop mobile website using JQuery Mobile.
		5.Deploy web application on cloud using AWS.
BE (Information Technology) 2019 pattern Sem-II		
1	414450	1. Demonstrate the core concepts of distributed systems.
	Distributed Systems	2. Understand the concept of middleware of distributed systems.
		3. Understand Inter-process communication methods and analyze different coordination algorithms.
		4. Comprehend the importance of replication to achieve fault tolerance in distributed systems.
		5. Analyze the design and functioning of existing distributed file systems, distributed multimedia, and distributed web-based systems.
		6. Understand various Recent Trends in distributed systems.
2	414451	1.Understand basics of Social Media Analytics
	Elective V: (Social Computing)	2.Correlate Network Measures for Social Media Data
		3.Visualize mining in social media data
		4.Discuss the Social Similarities
		5.Interpret social media behavior
		6.Apply Social Media Computations for Google+
3	414452	1. Understand the concept of cryptography and decentralization.
	Elective-VI: (Blockchain Technology)	2. Acquire fundamental knowledge of blockchain with issues associated with it.
		3. Acquire knowledge of Ethereum blockchain platform.
		4. Understand hyper ledger fabric platform.
		5. Acquire the knowledge regarding working of tokenization.
		6. Describe the applications and risk involved
4	414453	1. Able to understand key concepts and framework of innovation and start-up ecosystem
	Startup and Entrepreneurs hip	2. gain knowledge of how to develop start up ecosystem, its key components and how to influence and manage dynamics between them and increase the productivity of ecosystem
		3. Understand the role of different stakeholders in ecosystem in building and supporting growth of start-ups
		4. Have insight into global trend in start-up ecosystem and product development

		5. Mapping different start-up ecosystems and developing performance indicators
5	414454	1. Demonstrate knowledge of the core concepts and techniques in distributed systems.
	Lab Practice V	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	414455	1.Implement small blockchain experimentations.
	Lab Practice VI	2.Identify Consensus mechanism for Blockchain Application.
7	414456	1. Apply engineering and mathematical knowledge to investigate / select proper technology / Algorithm suitable to solve the problem in hand.
	Project Stage II	2. Apply knowledge of statistics for analysis of results and express conclusion and justification for the same.
		3.Design and conduct experiments, as well as to analyze and interpret data or develop prototype model of the application.
		4. Communicate effectively.
		5.Get broad education which is necessary to understand the impact of engineering solutions in a global, economic, environmental, ethically and societal context.
		6.Recognition of the need for, and an ability to engage in life-long learning.