

COURSE OUTCOMES FOR CSE DEPARTMENT

FIRST YEAR : 1ST SEMESTER		
Course Name (Code)	Course Outcomes (COs)	
ALGEBRA & CALCULUS (19A54101)	CO1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
	CO2	Utilize mean value theorems to real life problems (L3)
	CO3	Familiarize with functions of several variables which is useful in optimization (L3)
	CO4	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional coordinate systems (L5)
	CO5	Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions
CHEMISTRY (19A51102T)	CO1	Compare the materials of construction for battery and electrochemical sensors (L2)
	CO2	Explainthe preparation, properties, and applications of thermoplastics &thermosettings, elastomers & conducting polymers. (L2)
	CO3	Explain the principles of spectrometry, GC and HPLC in separation of gaseous and liquid mixtures (L2)
	CO4	Apply the principle of supramolecular chemistry in application of molecular machines and switches (L3)
PROBLEM SOLVING & PROGRAMMING (19A05101T)	CO1	Construct his own computer using parts (L6)
	CO2	Recognize the importance of programming language independent constructs (L2)
	CO3	Solve computational problems (L3)
	CO4	Select the features of C language appropriate for solving a problem (L4)
	CO5	Design computer programs for real world problems (L6) and Organize the data which is more appropriated for solving a problem (L6)
ENGINEERING GRAPHICS LAB (19A03102)	CO1	Draw various curves applied in engineering. (L2)
	CO2	show projections of solids and sections graphically. (L2)
	CO3	draw the development of surfaces of solids. (L3)
	CO4	Use computers as a drafting tool. (L2)
	CO5	Draw isometric and orthographic drawings using CAD packages. (L3)
ENGINEERING WORKSHOP (19A03101)	CO1	Apply wood working skills in real world applications. (I3)
	CO2	Build different parts with metal sheets in real world applications. (I3)
	CO3	Apply fitting operations in various applications. (I3)
	CO4	Apply different types of basic electric circuit connections. (I3)
	CO5	Demonstrate soldering and brazing. (I2)
CHEMISTRY LAB	CO1	determine the cell constant and conductance of solutions

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(19A51102P)		(L3)
	CO2	prepare advanced polymer materials (L2)
	CO3	measure the strength of an acid present in secondary batteries (L3)
	CO4	Analyse the IR and NMR of some organic compounds (L3)
FIRST YEAR : II SEMESTER		
Course Name (Code)	Course Outcomes (COs)	
BASIC ELECTRICAL & ELECTRONICS ENGINEERING (19A02201T) (PART-A) Basic Electrical Engineering	CO1	Apply concepts of KVL/KCL in solving DC circuits (L3)
	CO2	Choose correct rating of a transformer for a specific application (L5)
	CO3	Illustrate working principles of induction motor - DC Motor (L3)
	CO4	Identify type of electrical machine based on their operation.(L1)
	CO5	Describe working principles of protection devices used in electrical circuits. (L2)
(PART-B) Basic Electronics Engineering	CO1	Understand operation of basic op-amp circuits (L2)
	CO2	Describe operation and characteristics of diodes and transistors (L2)
	CO3	Make use of diodes and transistors in simple, typical circuit applications (L3)
	CO4	Explain need for modulation and different modulation techniques (L2)
	CO5	Understand functioning of various communication systems (L2)
PROBABILITY AND STATISTICS (19A54202)	CO1	make use of the concepts of probability and their applications (L3)
	CO2	apply discrete and continuous probability distributions (L3)
	CO3	classify the concepts of data science and its importance (L4)
	CO4	interpret the association of characteristics and through correlation and regression tools (L4)
	CO5	design the components of a classical hypothesis test (L6)
	CO6	infer the statistical inferential methods based on small and large sampling tests (L6)
APPLIED PHYSICS (19A56101T)	CO1	identify the wave properties of light and the interaction of energy with the matter (L3)
	CO2	apply electromagnetic wave propagation in different guided media (L2)
	CO3	asses the electromagnetic wave propagation and its power in different media (L5)
	CO4	calculate conductivity of semiconductors (L3)
	CO5	interpret the difference between normal conductor and superconductor (L2)

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	CO6	demonstrate the application of nanomaterials (L2)
DATA STRUCTURES (19A05201T)	CO1	Select Appropriate Data Structure for solving a real world problem (L4)
	CO2	Select appropriate file organization technique depending on the processing to be done (L4)
	CO3	Construct Indexes for Databases (L6)
	CO4	Analyse the Algorithms (L4)
	CO5	Develop Algorithm for Sorting large files of data (L3)
COMMUNICATIVE ENGLISH I (19A52101T)	CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
	CO2	Apply grammatical structures to formulate sentences and correct word forms
	CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions
	CO4	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts
	CO5	Create a coherent paragraph interpreting a figure/graph/chart/table
COMPUTER SCIENCE AND ENGINEERING WORKSHOP (19A05202)	CO1	Construct a computer from its parts and prepare it for use (L3)
	CO2	Develop Documents using Word processors (L3)
	CO3	Develop presentations using the presentation tool (L3)
	CO4	Perform computations using spreadsheet tool (L3)
	CO5	Connect computer using wired and wireless connections (L4)
	CO6	Design Graphics, Videos and Web pages (L6)
	CO7	Connect things to computers (L3)
COMMUNICATIVE ENGLISH I LAB (19A52101P)	CO1	To remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
	CO2	To apply communication skills through various language learning activities
	CO3	To analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO4	To evaluate and exhibit acceptable etiquette essential in social and professional settings
	CO5	To create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English
BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB (PART-A) Basic Electrical Engineering	CO1	Verify Kirchoff's Laws & Superposition theorem.
	CO2	Perform testing on AC and DC Machines.
	CO3	Study I – V Characteristics of PV Cell
BASIC ELECTRICAL & ELECTRONICS	CO1	Describe construction, working and characteristics of diodes, transistors and operational amplifiers (L2)

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ENGINEERING LAB (PART-B) Basic Electronics Engineering	CO2	Demonstrate how electronic devices are used for applications such as rectification, switching and amplification (L2)
	CO3	Build different building blocks in digital electronics using logic gates (L3)
	CO4	Explain functionality of flip-flops, shift registers and counters for data processing applications (L2)
	CO5	Explain functioning of various communication systems (L2)
APPLIED PHYSICS LAB (19A56101P)	CO1	operate optical instruments like microscope and spectrometer (L2)
	CO2	determine thickness of a hair/paper with the concept of interference (L2)
	CO3	estimate the wavelength of different colors using diffraction grating and resolving power (L2)
	CO4	plot the intensity of the magnetic field of circular coil carrying current with distance (L3)
	CO5	evaluate the acceptance angle of an optical fiber and numerical aperture (L3)
	CO6	determine magnetic susceptibility of the material and its losses by B-H curve (L3)
	CO7	determine the resistivity of the given semiconductor using four probe method (L3)
	CO8	identify the type of semiconductor i.e., n-type or p-type using hall effect (L3)
	CO9	calculate the band gap of a given semiconductor (L3)
DATA STRUCTURES LAB (19A05201P)	CO1	Select the data structure appropriate for solving the problem (L5)
	CO2	Implement searching and sorting algorithms (L3)
	CO3	Design new data types (L6) 4
	CO4	Illustrate the working of stack and queue (L4)
	CO5	Organize the data in the form of files (L6)
SECOND YEAR :I SEMESTER		
COURSE NAME	COURSE OUTCOMES	
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (19A54303)	CO1	Evaluate elementary mathematical arguments and identify fallacious reasoning (L5).
	CO2	Understand the properties of Compatibility, Equivalence and Partial Ordering relations, Lattices and Has see Diagrams (L1).
	CO3	Understand the general properties of Algebraic Systems, Semi Groups, Monoids and Groups (L1).
	CO4	Design solutions for problems using breadth first and depth first search techniques (L6)
	CO5	Solve the homogeneous and non-homogeneous recurrence relations (L3).
	CO6	Apply the concepts of functions to identify the Isomorphic Graphs (L2)

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	CO7	Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).
DIGITAL LOGIC DESIGN (19A05301)	CO1	Analyze the number systems and codes.
	CO2	Decide the Boolean expressions using Minimization methods.
	CO3	Design the sequential and combinational circuits.
	CO4	Apply state reduction methods to solve sequential circuits.
	CO5	Describe various types of memories.
DESIGN THINKING (19A99304)	CO1	Generate and develop different design ideas.
	CO2	Appreciate the innovation and benefits of design thinking
	CO3	Experience the design thinking process in IT and agile software development.
	CO4	Understand design techniques related to variety of software services
DATABASE MANAGEMENT SYSTEMS (19A05302T)	CO1	Design a database for a real world information system
	CO2	Define transactions which preserve the integrity of the database
	CO3	Generate tables for a database
	CO4	Organize the data to prevent redundancy
	CO5	Pose queries to retrieve the information from database.
OBJECT ORIENTED PROGRAMMING THROUGH JAVA (19A05303T)	CO1	To solve real world problems using OOP techniques.
	CO2	To apply code reusability through inheritance, packages and interfaces
	CO3	To solve problems using java collection framework and I/O classes.
	CO4	To develop applications by using parallel streams for better performance.
	CO5	To develop applets for web applications.
	CO6	To build GUIs and handle events generated by user interactions
	CO7	To use the JDBC API to access database
PYTHON PROGRAMMING (19A05304T)	CO1	Apply the features of Python language in various real applications.
	CO2	Select appropriate data structure of Python for solving a problem.
	CO3	Design object oriented programs using Python for solving real-world problems
	CO4	Apply modularity to program
UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY (19A52301)	CO1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature).
	CO2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
	CO3	They would have better critical ability
	CO4	They would also become sensitive to their commitment

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		towards what they have understood (human values, human relationship and human society).
	CO5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.
DATABASE MANAGEMENT SYSTEMS LABORATORY (19A05302P)	CO1	Design database for any real world problem
	CO2	Implement PL/SQL programs
	CO3	Define SQL queries
	CO4	Decide the constraints
	CO5	Investigate for data inconsistency
OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB (Common to CSE & IT) (19A05303P)	CO1	Recognize the Java programming environment.
	CO2	Develop efficient programs using multithreading.
	CO3	Design reliable programs using Java exception handling features.
	CO4	Extend the programming functionality supported by Java
	CO5	Select appropriate programming construct to solve a problem
PYTHON PROGRAMMING LABORATORY (19A05304P)	CO1	Design solutions to mathematical problems.
	CO2	Organize the data for solving the problem
	CO3	Develop Python programs for numerical and text based problems
	CO4	Select appropriate programming construct for solving the problem.
	CO5	Illustrate object oriented concepts
ENVIRONMENTAL SCIENCE (19A99301)	CO1	Grasp multidisciplinary nature of environmental studies and various renewable and nonrenewable resources.
	CO2	Understand flow and bio-geo- chemical cycles and ecological pyramids.
	CO3	Understand various causes of pollution and solid waste management and related preventive measures
	CO4	About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation
	CO5	Casus of population explosion, value education and welfare programmes
SECOND YEAR :II SEMESTER		
COURSE NAME	CORSE OUTCOMES	
NUMBER THEORY AND APPLICATIONS (19A54401)	CO1	Understand number theory and its properties
	CO2	Understand principles on congruences
	CO3	Develop the knowledge to apply various applications
	CO4	Develop various encryption methods and its applications.
COMPUTER ORGANIZATION (19A05401)	CO1	Understand computer architecture concepts related to design of modern processors, memories and I/Os
	CO2	Identify the hardware requirements for cache memory and virtual memory

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	CO3	Design algorithms to exploit pipelining and multiprocessors
	CO4	Understand the importance and tradeoffs of different types of memories.
	CO5	Identify pipeline hazards and possible solutions to those hazards
DESIGN AND ANALYSIS OF ALGORITHMS (19A05402T)	CO1	Determine the time complexity of an algorithm by solving the corresponding recurrence equation
	CO2	Apply the Divide and Conquer strategy to solve searching, sorting and matrix multiplication problems.
	CO3	Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems
	CO4	Apply Backtracking technique for solving constraint satisfaction problems.
	CO5	Analyze the LC and FIFO branch and bound solutions for optimization problems, and compare the time complexities with Dynamic Programming techniques.
	CO6	Define and Classify deterministic and Non-deterministic algorithms; P, NP, NP –hard and NP-complete classes of problems.
ENTREPRENEURSHIP (19A52401)	CO1	Design business model and business plan
	CO2	Demonstrate the Venture in front of investors
	CO3	Build the team for a start-up
	CO4	Develop strategies for market survey
	CO5	Illustrate successful cases of start-ups
OPERATING SYSTEMS (19A05403T)	CO1	Realize how applications interact with the operating system
	CO2	Analyze the functioning of a kernel in an Operating system.
	CO3	Summarize resource management in operating systems
	CO4	Analyze various scheduling algorithms
	CO5	Examine concurrency mechanism in Operating Systems
	CO6	Apply memory management techniques in design of operating systems
	CO7	Understand the functionality of file system
	CO8	Understand the deadlock prevention and avoidance.
	CO9	Compare and contrast memory management techniques.
	CO10	Perform administrative tasks on Linux based systems.
SOFTWARE ENGINEERING (19A05404T)	CO1	Obtain basic software life cycle activity skills.
	CO2	Design software requirements specification for given problems
	CO3	Implement structure, object oriented analysis and design for given problems
	CO4	Design test cases for given problems.
	CO5	Apply quality management concepts at the application

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		level.
OPERATING SYSTEMS LAB (19A05403P)	CO1	Trace different CPU Scheduling algorithm (L2).
	CO2	Implement Bankers Algorithms to Avoid and prevent the Dead Lock (L3).
	CO3	Evaluate Page replacement algorithms (L5).
	CO4	Illustrate the file organization techniques (L4).
	CO5	Illustrate shared memory process (L4).
	CO6	Design new scheduling algorithms (L6)
SOFTWARE ENGINEERING LAB (19A05404P)	CO1	Acquaint with historical and modern software methodologies
	CO2	Understand the phases of software projects and practice
	CO3	Practice clean coding
	CO4	Take part in project management
		Adopt skills such as distributed version control, unit testing, integration testing, build management the activities of each phase and deployment
BIOLOGY FOR ENGINEERS (19A99302)	CO1	Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
	CO2	Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry
	CO3	Briefly about human physiology.
	CO4	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
		Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals
THIRD YEAR : I SEMESTER		
COURSE NAME (Code)	COURSE OUTCOMES (COs)	
FORMAL LANGUAGES AND AUTOMATA THEORY (19A05501)	CO1	Explain formal machines, languages and computations (L2)
	CO2	Design finite state machines for acceptance of strings (L6)
	CO3	Develop context free grammars for formal languages (L3)
	CO4	Build pushdown automata for context free grammars (L3)
	CO5	Apply Turing machine for solving problems (L3)
	CO6	Validate decidability and undecidability (L6)
ARTIFICIAL INTELLIGENCE (19A05502T)	CO1	Apply searching techniques for solving a problem (L3)
	CO2	Design Intelligent Agents (L6)
	CO3	Develop Natural Language Interface for Machines (L6)
	CO4	Design mini robots (L6)
	CO5	Summarize past, present and future of Artificial Intelligence (L5)

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OBJECT-ORIENTED ANALYSIS DESIGN AND TESTING (19A05503T)	CO1	Analyze the problem from object oriented perspective (L4)
	CO2	Model complex systems using UML Diagrams (L3)
	CO3	Choose the suitable design patterns in software design (L5)
	CO4	Adapt Object-Oriented Design Principles (L6)
	CO5	Identify the challenges in testing object-oriented software. (L3)
COMPUTER NETWORKS (19A05504T)	CO1	Identify the software and hardware components of a Computer network (L3)
	CO2	Develop new routing, and congestion control algorithms (L3)
	CO3	Assess critically the existing routing protocols (L5)
	CO4	Explain the functionality of each layer of a computer network (L2)
	CO5	Choose the appropriate transport protocol based on the application requirements (L3)
MOBILE APPLICATION DEVELOPMENT (19A05505C)	CO1	Identify various concepts of mobile programming that make it unique from programming for other platforms (L3)
	CO2	Evaluate mobile applications on their design pros and cons. (L5)
	CO3	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces. (L3)
	CO4	Develop mobile applications for the Android operating system that use basic and advanced phone features. (L6)
	CO5	Demonstrate the deployment of applications to the Android marketplace for distribution. (L2)
TECHNICAL COMMUNICATION AND PRESENTATION SKILLS (19A52506a)	CO1	Understand the importance of effective technical communication
	CO2	Apply the knowledge of basic skills to become good orators
	CO3	Analyze non-verbal language suitable to different situations in professional life
	CO4	Evaluate different kinds of methods used for effective presentations
	CO5	Create trust among people and develop employability skills
ARTIFICIAL INTELLIGENCE LABORATORY (19A05502P)	CO1	Implement search algorithms (L3) 2. 3.
	CO2	Solve Artificial intelligence problems (L3)
	CO3	Design chatbot and virtual assistant (L6)
Computer Networks Laboratory (19A05504P)	CO1	Design scripts for Wired network simulation (L6)
	CO2	Design scripts of static and mobile wireless networks simulation (L6)
	CO3	Analyze the data traffic using tools (L4)
	CO4	Design JAVA programs for client-server communication (L6)

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		Construct a wired and wireless networks using the real hardware (L3)
OBJECT-ORIENTED ANALYSIS DESIGN AND TESTING LAB (19A05503P)	CO1	Design use case, sequence and collaboration diagrams (L6)
	CO2	Develop the different models to document an Object-oriented design.(L3)
	CO3	Demonstrate class level and system integration testing (L2)
MANDATORY COURSE: CONSTITUTION OF INDIA (19A99501)	CO1	Understand historical background of the constitution making and its importance for building a democratic India.
	CO2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary
	CO3	Analyze the decentralization of power between central, state and local selfgovernment
	CO4	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy
	CO5	Understand the value of the fundamental rights and duties for becoming good citizen of India. Understand the value of the fundamental rights and duties for becoming good citizen of India. Understand the value of the fundamental rights and duties for becoming good citizen of India.
THIRD YEAR: II SEMESTER		
COURSE NAME (CODE)	COURSE OUTCOMES (CO)	
CRYPTOGRAPHY AND NETWORK SECURITY (19A05601)	CO1	Identify various type of vulnerabilities of a computer network (L2)
	CO2	Outline various security algorithms (L4)
	CO3	Design secure systems (L6)
	CO4	Investigate the threats and identify the solutions for threats (L4)
BIG DATA ANALYTICS (19A05602T)	CO1	Explain the concepts and challenges of big data (L2)
	CO2	Determine why existing technologies are inadequate to analyze the large data. (L5)
	CO3	Outline the operations viz. Collect, manage, store, query, and analyze various forms of big data. (L2)
	CO4	Apply large-scale analytic tools to solve some of the open big data problems. (L3)
	CO5	Analyze the impact of big data for business decisions and strategies.(L4)
	CO6	Design different big data applications. (L6)
ENGLISH LANGUAGE SKILLS (19A52601T)	CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
	CO2	Apply grammatical structures to formulate sentences and correct word forms

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	CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions
	CO4	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts
	CO5	Create a coherent paragraph interpreting a figure/graph/chart/table
REAL TIME SYSTEMS (19A05603c)	CO1	Explain real-time concepts such as preemptive multitasking, task priorities, priority inversions, mutual exclusion, context switching, and synchronization, interrupt latency and response time, and semaphores. (L2)
	CO2	Describe how tasks are managed. (L1)
	CO3	Discuss how tasks can communicate using semaphores, mailboxes, and queues. (L6)
	CO4	Build a real-time system on an embedded processor.(L6
	CO5	Examine the real time operating systems like RT Linux, Vx Works, MicroC /OSII, Tiny OS (L4)
SOFT SKILLS (19A52604a)	CO1	Recognize the importance of verbal and non verbal skills
	CO2	Develop the interpersonal and intrapersonal skills
	CO3	Apply the knowledge in setting the SMART goals and achieve the set goals
	CO4	Analyze difficult situations and solve the problems in stress-free environment
	CO5	Create trust among people and develop employability skills
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (19A52602b)	CO1	Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets
	CO2	Apply concepts of production , cost and revenues for effective business decisions
	CO3	Students can analyze how to invest their capital and maximize returns
	CO4	Evaluate the capital budgeting techniques
	CO5	Prepare the accounting statements and evaluate the financial performance of business entity.
BIG DATA ANALYTICS LABORATORY (19A05602P)	CO1	Configure Hadoop and perform File Management Tasks (L2)
	CO2	Apply MapReduce programs to real time issues like word count, weather dataset and sales of a company (L3)
	CO3	Critically analyze huge data set using Hadoop distributed file systems and MapReduce (L5)
	CO4	Apply different data processing tools like Pig, Hive and Spark.(L6)
ENGLISH LANGUAGE SKILLS LAB (19A52601P)	CO1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
	CO2	Apply communication skills through various language learning activities
	CO3	Analyze the English speech sounds, stress, rhythm,

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		intonation and syllable division for better listening and speaking comprehension.
	CO4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
	CO5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
MANDATORY COURSE: RESEARCH METHODOLOGY (19A99601)	CO1	Understand basic concepts and its methodologies
	CO2	Demonstrate the knowledge of research processes
	CO3	comprehend and explain research articles in their academic discipline
	CO4	Analyze various types of testing tools used in research
	CO5	Design a research paper without any ethical issues
FOURTH YEAR : 1ST SEMESTER		
Course Name (Code)	Course Outcomes (COs)	
INTERNET OF THINGS (19A05701T)	CO1	Choose the sensors and actuators for an IoT application (L1)
	CO2	Select protocols for a specific IoT application (L2)
	CO3	Utilize the cloud platform and APIs for IoT applications (L3)
	CO4	Experiment with embedded boards for creating IoT prototypes (L3)
	CO5	Design a solution for a given IoT application (L6)
SOFTWARE TESTING (19A05702T)	CO1	Choose Test cases that are geared to discover the program defects (L5)
	CO2	Design test cases before writing code and run these tests automatically (L6)
	CO3	Formulate test cases for testing different programming constructs .(L6)
	CO4	Test the applications using different testing methods and automation tools.(L3)
CLOUD COMPUTING (19A05703a)	CO1	Outline the procedure for Cloud deployment (L2)
	CO2	Distinguish different cloud service models and deployment models (L4)
	CO3	Compare different cloud services. (L5)
	CO4	Design applications for an organization which use cloud environment. (L6)
INTRODUCTION TO MICROCONTROLLERS & APPLICATIONS (19A04704a)	CO1	Understand the importance of Microcontroller and Acquire the knowledge of Architecture of 8051 Microcontroller.
	CO2	Apply and Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to using 8051 I/O ports.
	CO3	Develop the 8051 Assembly level programs using 8051 instruction set.
	CO4	Design the Interrupt system, operation of Timers/Counters and Serial port of 8051.

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MANAGEMENT SCIENCE (19A52701b)	CO1	Understand the concepts & principles of management and designs of organization in a practical world
	CO2	Apply the knowledge of Work-study principles & Quality Control techniques in industry
	CO3	Analyze the concepts of HRM in Recruitment, Selection and Training & Development.
	CO4	Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT
	CO5	Create Modern technology in management science
SOFTWARE TESTING LAB (19A05702P)	CO1	Demonstrate the basic testing procedures.(L2)
	CO2	Formulate test cases and test suites (L6)
	CO3	Make use of the Selenium and Bugzilla tools to perform testing (L3)
	CO4	Construct and test simple programs. (L6)
	CO5	Demonstrate bug tracking (L2)
INTERNET OF THINGS LABORATORY (19A05701P)	CO1	Choose the sensors and actuators for an IoT application (L1)
	CO2	Select protocols for a specific IoT application (L2)
	CO3	Utilize the cloud platform and APIs for IoT application (L3)
	CO4	Experiment with embedded boards for creating IoT prototypes (L3)
	CO5	Design a solution for a given IoT application (L6)
FOURTH YEAR:II SEMESTER		
AD HOC AND SENSOR NETWORKS (19A05801c)	CO1	List the design issues for Adhoc and sensor networks(L1)
	CO2	Analyze the use of TCP in Wireless networks.(L4)
	CO3	Justify the need for new MAC Protocols for Adhoc networks.(L5)
	CO4	Extend the existing protocols to make them suitable for Adhoc Networks.(L2)
	CO5	Evaluate the performance of Protocols in Adhoc and sensor networks.(L5)
	CO6	Design new Protocols for Adhoc and Sensor networks.(L6)
PRINCIPLES OF CELLULAR AND MOBILE COMMUNICATIONS (19A04802b)	CO1	Understand the concepts and operation of cellular systems (L1)
	CO2	Apply the concepts of cellular systems to solve engineering problems (L2).
	CO3	Analyse cellular systems for meaningful conclusions, Evaluate suitability of a cellular system in real time applications (L3).
	CO4	Design cellular patterns based on frequency reuse factor (L4).