INFORMATION TECHNOLOGY	
1 year - 1 semester	
COURSE OUTCOMES	**COMMUNICATIVE ENGLISH**
CO1	At the end of the module, the learners will be able to • understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
CO2	ask and answer general questions on familiar topics and introduce oneself/others • employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
CO3	employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
CO4	recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
CO5	form sentences using proper grammatical structures and correct word forms
COURSE OUTCOMES	**MATHEMATICS-I**
CO1`	At the end of the course, the student will be able to • utilize mean value theorems to real life problems (L3)
CO2	solve the differential equations related to various engineering fields (L3)
CO3	familiarize with functions of several variables which is useful in optimization (L3)
CO4	apply double integration techniques in evaluating areas bounded by region (L3)
CO5	learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)
COURSE OUTCOMES	**APPLIED PHYSICS**
CO1	Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)
CO2	Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).
CO3	Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one- dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).

COURSE OUTCOMES	
CO4	Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)
CO5	Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).
COURSE OUTCOMES	**PROGRAMMING FOR PROBLEM SOLVING USING C**
CO1	To write algorithms and to draw flowcharts for solving problems
CO2	To convert flowcharts/algorithms to C Programs, compile and debug programs
CO3	To use different operators, data types and write programs that use two-way/ multi-way selection
CO4	To select the best loop construct for a given problem
CO5	To design and implement programs to analyze the different pointer applications
COURSE OUTCOMES	**COMPUTER ENGINEERING WORKSHOP**
CO1	Identify, assemble and update the components of a computer
CO2	Configure, evaluate and select hardware platforms for the implementation and execution of computer applications, services and systems
CO3	Make use of tools for converting pdf to word and vice versa
CO4	Develop presentation, documents and small applications using productivity tools such as word processor, presentation tools, spreadsheets, HTML, LaTex
COURSE OUTCOMES	**PROGRAMMING FOR PROBLEM SOLVING USING C LAB**
CO1	Apply the principles of C language in problem solving.•
CO2	To design flowcharts, algorithms and knowing how to debug programs.
CO3	To design & develop of C programs using arrays, strings pointers & functions.
CO4	To design & develop of C programs using arrays, strings pointers & functions.
	1 year - 2 semester
COURSE OUTCOMES	**MATHEMATICS-II**
CO1	develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
CO2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)
CO3	evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
CO4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
CO5	apply numerical integral techniques to different Engineering problems (L3)

COURSE OUTCOMES	APPLIED CHEMISTRY
CO1	Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers
CO2	Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion
CO3	Synthesize nanomaterials for modern advances of engineering technology
CO4	Analyze the principles of different analytical instruments and their applications
CO5	Obtain the knowledge of computational chemistry and molecular machines
COURSE OUTCOMES	COMPUTER ORGANIZATION
CO1	Demonstrate and understanding of the design of the functional units of a digital computer system.
CO2	Relate Postulates of Boolean algebra and minimize combinational functions
CO3	Recognize and manipulate representations of numbers stored in digital computers
CO4	Build the logic families and realization of logic gates.
CO5	Design and analyze combinational and sequential circuits
COURSE OUTCOMES	PYTHON PROGRAMMING
CO1	Develop essential programming skills in computer programming concepts like data types, containers
CO2	Apply the basics of programming in the Python language
CO3	Solve coding tasks related conditional execution, loops •
CO4	Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming
COURSE OUTCOMES	DATA STRUCTURES
CO1	Summarize the properties, interfaces, and behaviors of basic abstract data types
CO2	Discuss the computational efficiency of the principal algorithms for sorting & searching•
CO3	Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
CO4	Demonstrate different methods for traversing trees
COURSE OUTCOMES	PYTHON PROGRAMMING LAB
CO1	Develop essential programming skills in computer programming concepts like data types, containers
CO2	Apply the basics of programming in the Python language
CO3	Solve coding tasks related conditional execution, loops
CO4	Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming
COURSE OUTCOMES	DATA STRUCTURES LAB
CO1	Use basic data structures such as arrays and linked list.
CO2	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
CO3	Use various searching and sorting algorithms
	2 year -1 semester

COURSE OUTCOME	MATHEMATICS - III
CO1	Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
CO2	Estimate the work done against a field, circulation and flux using vector calculus (L5)
CO3	Apply the Laplace transform for solving differential equations (L3)
CO4	Find or compute the Fourier series of periodic signals (L3)
CO5	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)
COURSE OUTCOME	OBJECT ORIENTED PROGRAMMING THROUGH C++
CO1	Classify object oriented programming and procedural programming
CO2	Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling
CO3	Build C++ classes using appropriate encapsulation and design principles
CO4	Apply object oriented or non-object oriented techniques to solve bigger computing problems
COURSE OUTCOME	OPERATING SYSTEMS
CO1	Introduce to the internal operation of modern operating systems
CO2	Define, explain, processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems
CO3	Understand File Systems in Operating System like UNIX/Linux and Windows
CO4	Understand Input Output Management and use of Device Driver and Secondary Storage (Disk) Mechanism
CO5	Analyze Security and Protection Mechanism in Operating System
COURSE OUTCOME	DATABASE MANAGEMENT SYSTEMS
CO1	Describe a relational database and object-oriented database
CO2	Create, maintain and manipulate a relational database using SQL
CO3	Describe ER model and normalization for database design
CO4	Examine issues in data storage and query processing and can formulate appropriate solutions
CO5	Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
COURSE OUTCOME	DISCRETE MATHEMATICS AND GRAPH THEORY
CO1	Demonstrate skills in solving mathematical problems
CO2	Comprehend mathematical principles and logic•
CO3	Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software
CO4	Manipulate and analyze data numerically and/or graphically using appropriate Software
COURSE OUTCOMES	OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB
CO1	By the end of this lab the student is able to
CO2	Apply the various OOPs concepts with the help of programs
COURSE OUTCOMES	OPERATING SYSTEM LAB
CO1	To use Unix utilities and perform basic shell control of the utilities
CO2	To use the Unix file system and file access control
CO3	To use of an operating system to develop software

CO4	Students will be able to use Linux environment efficiently
CO5	Solve problems using bash for shell scripting
COURSE OUTCOMES	**DATABASE MANAGEMENT SYSTEMS LAB**
CO1	Utilize SQL to execute queries for creating database and performing data manipulation operations
CO2	Examine integrity constraints to build efficient databases
CO3	Apply Queries using Advanced Concepts of SQL
CO4	Build PL/SQL programs including stored procedures, functions, cursors and triggers
COURSE OUTCOMES	**ANIMATIONS- 2D ANIMATION**
CO1	learn various tools of digital 2-D animation
CO2	understand production pipeline to create 2-D animation.
CO3	analyze special effects in animation to bring interest and awe in the scenes and backgrounds
CO4	apply the tools to create 2D animation for films and videos
COURSE OUTCOMES	**DISTRIBUTED TECHNOLOGIES-SQLITE**
CO1	learn about SQLite which is a relational database that is present in android and helps the users by storing important information.
CO2	Perform various operations on server less database SQLite
CO3	implement a small, fast, self-contained, high-reliability, full-featured using SQL database engine.
COURSE OUTCOMES	**CONSTITUTION OF INDIA**
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	Understand the value of the fundamental rights and duties for becoming good citizen of India.
CO4	Analyze the decentralization of power between central, state and local self-government
CO5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy
	2 year -2 semester
COURSE OUTCOMES	**STATISTICS WITH R**
CO1	List motivation for learning a programming language
CO2	Access online resources for R and import new function packages into the R workspace
CO3	Import, review, manipulate and summarize data-sets in R
CO4	Explore data-sets to create testable hypotheses and identify appropriate statistical tests
CO5	Perform appropriate statistical tests using R , Create and edit visualizations with R
COURSE OUTCOMES	**PRINCIPLES OF SOFTWARE ENGINEERING**
CO1	Transform an Object-Oriented Design into high quality, executable code
CO2	Skills to design, implement, and execute test cases at the Unit and Integration level
CO3	Compare conventional and agile software methods

COURSE OUTCOMES	AUTOMATA THEORY AND COMPILER DESIGN
CO1	Ability to design, develop, and implement a compiler for any language
CO2	Able to use LEX and YACC tools for developing a scanner and a parser
CO3	Able to design and implement LL and LR parsers
CO4	Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity
CO5	Ability to design algorithms to generate machine code
COURSE OUTCOMES	JAVA PROGRAMMING
CO1	Able to realize the concept of Object Oriented Programming & Java Programming Constructs
CO2	Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
CO3	Apply the concept of exception handling and Input/ Output operations
CO4	Able to design the applications of Java & Java applet
CO5	Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
COURSE OUTCOMES	MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY
CO1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product
CO2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs
CO3	To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles
CO4	To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation
CO5	Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals
COURSE OUTCOMES	UNIFIED MODELING LANGUAGE (UML) LAB
CO1	Know the syntax of different UML diagrams
CO2	Create use case documents that capture requirements for a software system
CO3	Create class diagrams that model both the domain model and design model of a software system
CO4	Create interaction diagrams that model the dynamic aspects of a software system
CO5	Write code that builds a software system
COURSE OUTCOMES	FOSS LAB
CO1	Demonstrate UNIX commands for file handling and process control
CO2	Construct regular expressions for pattern matching and apply them to various filters for a specific task.
CO3	Analyze a given problem and apply requisite facets of shell programming in order to devise a shell script to solve the problem
COURSE OUTCOMES	JAVA PROGRAMMING LAB

CO1	Evaluate default value of all primitive data type, Operations, Expressions, Control- flow, Strings
CO2	Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
CO3	Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
CO4	Construct Threads, Event Handling, implement packages, developing applets
COURSE OUTCOMES	**ANIMATIONS- INTRODUCTION TO 3D**
CO1	To understand different styles and treatment of content in 3d model creation
CO2	To analyze the importance of cognitive 3d designing.
CO3	To apply tools to create effective 3D modelling texturing and lighting
	3 year -1 semester
COURSE OUTCOMES	**COMPUTER NETWORKS**
CO1	Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards
CO2	Discuss different transmission media and different switching networks
CO3	Analyze data link layer services, functions and protocols like HDLC and PPP
CO4	Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols
CO5	Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc
COURSE OUTCOMES	**DESIGN AND ANALYSIS OF ALGORITHMS**
CO1	Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms
CO2	List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method
CO3	Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.
CO4	Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches
CO5	Demonstrate NP- Completeness theory ,lower bound theory and String Matching
COURSE OUTCOMES	**DATA MINING TECHNIQUES**
CO1	Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications.
CO2	Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration, data transformation and data reduction and Process raw data to make it suitable for various data mining algorithms.

CO3	Choose appropriate classification technique to perform classification, model building and evaluation
CO4	Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent itemsets generation.
CO5	Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result.
COURSE OUTCOMES	**DevOps (Job Oriented Course)**
CO1	Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility
CO2	Describe DevOps & DevSecOps methodologies and their key concepts
CO3	Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models
CO4	Set up complete private infrastructure using version control systems and CI/CD tools
CO5	Acquire the knowledge of maturity model, Maturity Assessment
COURSE OUTCOMES	**ARTIFICIAL INTELLIGENCE**
CO1	Understand the fundamental concepts in Artificial Intelligence
CO2	Analyze the applications of search strategies and problem reductions
CO3	Apply the mathematical logic concepts.
CO4	Develop the Knowledge representations in Artificial Intelligence.
CO5	Explain the Fuzzy logic systems
COURSE OUTCOMES	**DATA MINING TECHNIQUES WITH R LAB**
CO1	Extend the functionality of R by using add-on packages
CO2	Extract data from files and other sources and perform various data manipulation tasks on them.
CO3	Code statistical functions in R
CO4	Use R Graphics and Tables to visualize results of various statistical operations on data
CO5	Apply the knowledge of R gained to data Analytics for real life applications
COURSE OUTCOMES	**COMPUTER NETWORKS LAB**
CO1	Know how reliable data communication is achieved through data link layer.
CO2	Suggest appropriate routing algorithm for the network
CO3	Provide internet connection to the system and its installation
CO4	Work on various network management tools
COURSE OUTCOMES	**ANIMATION COURSE: ANIMATION DESIGN**
CO1	learn various tools of digital 2-D animation
CO2	understand production pipeline to create 2-D animation
CO3	apply the tools to create 2D animation for films and videos
CO4	understand different styles and treatment of content in 3D model creation
CO5	apply tools to create effective 3D modelling texturing and lighting
COURSE OUTCOMES	**EMPLOYABILITY SKILLS-I**
CO1	Understand the corporate etiquette.
CO2	Make presentations effectively with appropriate body language
CO3	Be composed with positive attitude

CO4	Understand the core competencies to succeed in professional and personal life
COURSE OUTCOMES	**COMPUTER NETWORKS**
CO1	Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards.
CO2	Discuss different transmission media and different switching networks.
CO3	Analyze data link layer services, functions and protocols like HDLC and PPP
CO4	Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols
CO5	Suggest appropriate routing algorithm for the network
	3 year - 2semester
COURSE OUTCOMES	**MACHINE LEARNING**
CO1	Explain the fundamental usage of the concept Machine Learning system
CO2	Demonstrate on various regression Technique
CO3	Analyze the Ensemble Learning Methods
CO4	Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.
CO5	Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
COURSE OUTCOMES	**BIG DATA ANALYTICS**
CO1	Illustrate big data challenges in different domains including social media, transportation, finance and medicine
CO2	Use various techniques for mining data stream
CO3	Design and develop Hadoop
CO4	Identify the characteristics of datasets and compare the trivial data and big data for various applications
CO5	Explore the various search methods and visualization techniques
COURSE OUTCOMES	**CRYPTOGRAPHY AND NETWORK SECURITY**
CO1	Explain different security threats and countermeasures and foundation course of cryptography mathematics.
CO2	Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography
CO3	Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more
CO4	Design applications of hash algorithms, digital signatures and key management techniques
CO5	Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and IPsec
COURSE OUTCOMES	**MOBILE COMPUTING**
CO1	Develop a strong grounding in the fundamentals of mobile Networks

CO2	Apply knowledge in MAC, Network, and Transport Layer protocols of Wireless Network
CO3	Comprehend, design, and develop a lightweight network stack
CO4	Analyze the Mobile Network Layer system working
CO5	Explain about the WAP Model
COURSE OUTCOMES	**MACHINE LEARNING USING PYTHON LAB**
CO1	Implement procedures for the machine learning algorithms
CO2	Design and Develop Python programs for various Learning algorithms
CO3	Apply appropriate data sets to the Machine Learning algorithms
CO4	Develop Machine Learning algorithms to solve real world problems
COURSE OUTCOMES	**CRYPTOGRAPHY AND NETWORK SECURITY LAB**
CO1	Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher
CO2	Demonstrate the different algorithms like DES, BlowFish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm
CO3	Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm
COURSE OUTCOMES	**DATA SCIENCE: NATURAL LANGUAGE PROCESSING (Skill Oriented Course)**
CO1	Explore natural language processing (NLP) libraries in Python
CO2	Learn various techniques for implementing NLP including parsing & text processing
CO3	Understand how to use NLP for text feature engineering
COURSE OUTCOMES	**DATA STRUCTURES AND ALGORITHMS**
CO1	Introduce the fundamental concept of data structures and abstract data types
CO2	Emphasize the importance of data structures in developing and implementing efficient algorithms
CO3	Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
CO4	Demonstrate the different data structures implementation
	4 year- 1 semester
COURSE OUTCOMES	**CLOUD COMPUTING (Professional Elective-III)**
CO1	Illustrate the key dimensions of the challenge of Cloud Computing
CO2	Classify the Levels of Virtualization and mechanism of tools
CO3	Analyze Cloud infrastructure including Google Cloud and Amazon Cloud
CO4	Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud
CO5	Assess control storage systems and cloud security, the risks involved its impact and develop cloud application
COURSE OUTCOMES	**DEEP LEARNING TECHNIQUES (Professional Elective-IV)**
CO1	Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning
CO2	Discuss the Neural Network training, various random models.
CO3	Explain the Techniques of Keras, TensorFlow, Theano and CNTK

CO4	Classify the Concepts of CNN and RNN
CO5	Implement Interactive Applications of Deep Learning
COURSE OUTCOMES	**BLOCK-CHAIN TECHNOLOGIES (Professional Elective-V)**
CO1	Demonstrate the block chain basics, Crypto currency
CO2	To compare and contrast the use of different private vs. public block chain and use cases
CO3	Design an innovative Bit coin Block chain and scripts, Block chain Science on varies coins
CO4	Classify Permission Block chain and use cases – Hyper ledger, Corda
CO5	Make Use of Block-chain in E-Governance, Land Registration, Medical Information Systems and others
COURSE OUTCOMES	**SECURE CODING TECHNIQUES (Skill Oriented Course)**
CO1	Implement Network Configuration
CO2	Install Programming APIs and Implement OWASP design principles while designing a web application
CO3	Write Python script to implement web request
CO4	Understand the importance of security in all phases of SDLC
CO5	Write secure coding using some of the practices in C/C++/Java and Python programming languages
COURSE OUTCOMES	**SOFTWARE ENGINEERING**
CO1	Ability to transform an Object-Oriented Design into high quality, executable code
CO2	Skills to design, implement, and execute test cases at the Unit and Integration level
CO3	Compare conventional and agile software methods
CO4	Prepare SRS document, design document, test cases and software configuration management and risk management related document.
CO5	Develop function oriented and object oriented software design using tools like rational rose.