III SEMESTER

SUB: Mathematics for Computer Science Sub Code: BCS301

After successful completion of this course, the students will be able to:

CO	Description
C201.1	Explain the basic concepts of probability, random variables, probability distribution
C201.2	Apply suitable probability distribution models for the given scenario.
C201.3	Apply the notion of a discrete-time Markov chain and n-step transition probabilities to solve the given problem
C201.4	Use statistical methodology and tools in the engineering problem-solving process. Compute the confidence intervals for the mean of the population.
C201.5	Apply the ANOVA test related to engineering problems.

SUB: Digital Design and Computer Organization Sub Code: BCS302

After successful completion of this course, the students will be able to:

CO	Description
C202.1	Apply the K–Map techniques to simplify various Boolean expressions.
C202.2	Design different types of combinational and sequential circuits along with Verilog programs.
C202.3	Describe the fundamentals of machine instructions, addressing modes and Processor performance.
C202.4	Explain the approaches involved in achieving communication between processor and I/O devices.
C202.5	Analyze internal Organization of Memory and Impact of cache/Pipelining on Processor Performance.

SUB: Operating Systems Sub Code: BCS303

After successful completion of this course, the students will be able to:

CO	Description
C203.1	Explain the structure and functionality of operating system
C203.2	Apply appropriate CPU scheduling algorithms for the given problem.
C203.3	Analyze the various techniques for process synchronization and deadlock handling
C203.4	Apply the various techniques for memory management
C203.5	Explain file and secondary storage management strategies.
C203.6	Describe the need for information protection mechanisms

SUB: Data Structures and Applications — Sub Code: BCS304

After successful completion of this course, the students will be able to:

CO	Description
C204.1	Explain different data structures and their applications.
C204.2	Apply Arrays, Stacks and Queue data structures to solve the given problems.
C204.3	Use the concept of linked list in problem solving.
C204.4	Develop solutions using trees and graphs to model the real-world problem.
C204.5	Explain the advanced Data Structures concepts such as Hashing Techniques and Optimal Binary Search Trees.

SUB: Data Structures Laboratory — Sub Code: BCSL305

After successful completion of this course, the students will be able to:

CO	Description
C205.1	Analyze various linear and non-linear data structures
C205.2	Demonstrate the working nature of different types of data structures and their applications
C205.3	Use appropriate searching and sorting algorithms for the given scenario.
C205.4	Apply the appropriate data structure for solving real world problems
C205.5	Analyze various linear and non-linear data structures

SUB: Object Oriented Programming with Java — Sub Code: BCS306A

After successful completion of this course, the students will be able to:

CO	Description
C206.1	Demonstrate proficiency in writing simple programs involving branching and looping structures.
C206.2	Design a class involving data members and methods for the given scenario.
C206.3	Apply the concepts of inheritance and interfaces in solving real world problems.
C206.4	Use the concept of packages and exception handling in solving complex problem.
C206.5	Apply concepts of multithreading, autoboxing and enumerations in program development.

SUB: Social Connect & Responsibility Sub Code: BSCK307

After successful completion of this course, the students will be able to:

CO	Description
C208.1	Communicate and connect to the surrounding.
C208.2	Create a responsible connection with the society.
C208.3	Involve in the community in general in which they work.
C208.4	Notice the needs and problems of the community and involve them in problem – solving.
C208.5	Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
C208.6	Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

SUB: Data Visualization with Python Sub Code: BCS358D

After successful completion of this course, the students will be able to:

CO	Description
C212.1	Demonstrate the use of IDLE or PyCharm IDE to create Python Applications
C212.2	Use Python programming constructs to develop programs for solving real-world problems
C212.3	Use Matplotlib for drawing different Plots
C212.4	Demonstrate working with Seaborn, Bokeh for visualization.
C212.5	Use Plotly for drawing Time Series and Maps.

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III SEMESTER

SUB: Transform Calculus, Fourier Series And Numerical Techniques Sub Code: 21MAT31

After successful completion of this course, the students will be able to:

CO	Description
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
C201.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

SUB: Data Structures and Applications Sub Code: 21CS32

After successful completion of this course, the students will be able to:

CO	Description
C202.1	Identify different data structures and their applications.
C202.2	Apply stack and queues in solving problems.
C202.3	Demonstrate application of linked list.
C202.4	Explore the applications of trees and graphs to model and solve the real world problem.
C202.5	Make use of Hashing techniques and resolve collisions during mapping of key value pairs.

SUB: Analog and Digital Electronics Sub Code: 21CS33

After successful completion of this course, the students will be able to:

CO	Description
C203.1	Design and analyze application of analog circuits using photo devices, timer IC, power supply regulator IC and OPAMP.
C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
C203.3	Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods
C203.4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
C203.5	Develop simple HDL programs.

SUB: Computer Organization and Architecture Sub Code: 21CS34

After successful completion of this course, the students will be able to:

CO	Description
C204.1	Explain the organization and architecture of computer systems with machine instructions and programs
C204.2	Analyze the input/output devices communicating with computer system
C204.3	Demonstrate the functions of different types of memory devices
C204.4	Apply different data types on simple arithmetic and logical unit
C204.5	Analyze the functions of basic processing unit, Parallel processing and pipelining.

SUB: Object Oriented Programming Lab with Java Sub Code: 21CSL35

After successful completion of this course, the students will be able to:

CO	Description
C205.1	Use Eclipse/NetBeans IDE to design, develop, debug Java Projects.
C205.2	Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP.
C205.3	Demonstrate the ability to design and develop java programs, analyze, and interpret object-oriented data and document results.
C205.4	Apply the concepts of multiprogramming, exception/event handling, abstraction to develop robust programs.
C205.5	Develop user friendly applications using File I/O and GUI concepts.

SUB: Programming in C++ Sub Code: 21CS382

After successful completion of this course, the students will be able to:

CO	Description
C210.1	Explain the object oriented programming concepts, terminologies in object oriented programming and difference between C and C++ language.
C210.2	Understand and define different types of functions inside the class and out side the class definition
C210.3	Design and implement inheritance and polymorphism in C++ programming language.
C210.4	Design and Develop programs using text as well as binary file handling concepts.
C210.5	Design and implement exception handling code to handle run time errors in the program.

SUB: Social Connect and Responsibility Sub Code: 21SCR36

After successful completion of this course, the students will be able to:

CO	Description
C206.1	Develop an eco-friendly relationship for saving the natural resources and

	preservation of nature.
C206.2	Develop multicultural awareness and appreciation for Music and Drama by exposing learners to various forms of Art.
C206.3	Understand the concept of agricultural operations.
C206.4	Develop an eco-friendly relationship for saving the natural resources and preservation of nature.
C206.5	Describe the regional culinary practices and its importance in day-to-day life.

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IV SEMESTER

SUB: Mathematical Foundations for Computing Probability and Statistics

Sub Code: 21MATCS41

After successful completion of this course, the students will be able to:

CO	Description
C211.1	Apply the concepts of logic for effective computation and relating problems in the Engineering domain.
C211.2	Analyze the concepts of functions and relations to various fields of Engineering. Comprehend the concepts of Graph Theory for various applications of Computational Sciences.
C211.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
C211.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the Statistical data.
C211.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

SUB: Design and Analysis of Algorithms

Sub Code: 21CS42

After successful completion of this course, the students will be able to:

CO	Description
C212.1	Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.
C212.2	Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same
C212.3	Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.
C212.4	Apply and analyze dynamic programming approaches to solve some problems. and improve an algorithm time efficiency by sacrificing space.
C212.5	Apply and analyze backtracking, branch and bound methods and to describe P, NP and NP-Complete problems.

SUB: Microcontrollers and Embedded Systems

Sub Code: 21CS43

After successful completion of this course, the students will be able to:

CO	Description
C213.1	Explain C-Compilers and optimization
C213.2	Describe the ARM microcontroller's architectural features and program module.

C213.3	Apply the knowledge gained from programming on ARM to different applications
C213.4	Program the basic hardware components and their application selection method.
C213.5	Demonstrate the need for a real-time operating system for embedded system applications.

SUB: Operating Systems Sub Code: 21CS44

After successful completion of this course, the students will be able to:

CO	Description
C214.1	Demonstrate need for Operating System and its types.
C214.2	Explain the multithreaded systems and scheduling algorithms.
C214.3	Illustrate the concept of process synchronization and Deadlock.
C214.4	Explain the concept of memory management and File System.
C214.5	Illustrate the different concepts of disk management, Protection and Linux System case studies.

SUB: Biology for Engineers Sub Code: 21BE45

After successful completion of this course, the students will be able to:

CO	Description
C215.1	Elucidate the basic biological concepts via relevant industrial applications and case studies.
C215.2	Evaluate the principles of design and development, for exploring novel bioengineering projects.
C215.3	Corroborate the concepts of biometrics for specific requirements.
C215.4	Think critically towards exploring innovative bio based solutions for socially relevant problems.
C215.5	Future Trends in Bioengineering

SUB: Python Programming Laboratory Sub Code: 21CSL46

After successful completion of this course, the students will be able to:

CO	Description
C216.1	Demonstrate proficiency in handling of loops and creation of functions.
C216.2	Identify the methods to create and manipulate lists, tuples and dictionaries.
C216.3	Discover the commonly used operations involving regular expressions and file system.
C216.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C216.5	Determine the need for scraping websites and working with PDF, JSON and other file formats.

SUB: Constitution of India, Professional Ethics — Sub Code: 21CIP47

After successful completion of this course, the students will be able to:

CO	Description
C217.1	Analyse the basic structure of Indian Constitution
C217.2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
C217.3	Know about our Union Government, political structure & codes, procedures.
C217.4	Understand our State Executive & Elections system of India.
C217.5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

SUB: Web Programming — Sub Code: 21CSL481

After successful completion of this course, the students will be able to:

CO	Description
C218.1	Describe the fundamentals of web and concept of HTML.
C218.2	Use the concepts of HTML, XHTML to construct the web pages.
C218.3	Interpret CSS for dynamic documents
C218.4	Evaluate different concepts of JavaScript & Construct dynamic documents.
C218.5	Design a small project with JavaScript and XHTML.

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V SEMESTER

SUB: Automata Theory and compiler Design — Sub Code: 21CS51

After successful completion of this course, the students will be able to:

CO	Description
C301.1	Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation.
C301.2	Design and develop lexical analyzers, parsers and code generators.
C301.3	Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
C301.4	Acquire fundamental understanding of the structure of a Compiler and Apply concepts automata theory and Theory of Computation to design Compilers
C301.5	Design computations models for problems in Automata theory and adaptation of such model in the field of compilers

SUB: Computer Networks — Sub Code: 21CS52

After successful completion of this course, the students will be able to:

CO	Description
C302.1	Learn the basic needs of communication system.
C302.2	Interpret the communication challenges and its solution.
C302.3	Identify and organize the communication system network components.
C302.4	Design communication networks for user requirements.

SUB: Database Management Systems — Sub Code: 21CS53

After successful completion of this course, the students will be able to:

CO	Description
C303.1	Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS
C303.2	Use Structured Query Language (SQL) for database manipulation and also demonstrate the basic of query evaluation.
C303.3	Design and build simple database systems and relate the concept of transaction, concurrency control and recovery in database
C303.4	Develop application to interact with databases, relational algebra expression.
C303.5	Develop applications using tuple and domain relation expression from queries.

SUB: Artificial Intelligence and Machine Learning — Sub Code: 21CS54

After successful completion of this course, the students will be able to:

CO	Description
C304.1	Apply the knowledge of searching and reasoning techniques for different applications.
C304.2	Have a good understanding of machine leaning in relation to other fields and fundamental issues and challenges of machine learning.
C304.3	Apply the knowledge of classification algorithms on various dataset and compare results
C304.4	Model the neuron and Neural Network, and to analyze ANN learning and its applications.
C304.5	Identifying the suitable clustering algorithm for different pattern

SUB: Database Management Systems Laboratory with Mini Project Sub Code: 21CSL55
After successful completion of this course, the students will be able to:

CO	Description
C305.1	Demonstrate the working of Create, Update and query on the database.
C305.2	Demonstrate the working of different concepts of DBMS
C305.3	Implement, analyze and evaluate the project developed for an application.

SUB: Research Methodology & Intellectual Property Rights Sub Code: 21RMI56
After successful completion of this course, the students will be able to:

CO	Description
C306.1	To know the meaning of engineering research
C306.2	To know the procedure of Literature Review and Technical Reading.
C306.3	To know the fundamentals of patent law sand drafting procedure.
C306.4	Understanding the copyright laws and subject matters of copyrights and designs
C306.5	Understanding the basic principles of design rights.

SUB: Environmental Studies Sub Code: 21CIV57
After successful completion of this course, the students will be able to:

CO	Description
C307.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.
C307.2	'Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
C307.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.
C307.4	Apply their ecological knowledge to illustrate and graph a problem and describe the

	realities that managers face when dealing with complex issues.
C307.5	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.

SUB: Angular JS and Node JS Sub Code: 21CSL581

After successful completion of this course, the students will be able to:

CO	Description
C308.1	Describe the features of Angular JS.
C308.2	Recognize the form validations and controls.
C308.3	Implement Directives and Controllers.
C308.4	Evaluate and create database for simple application.
C308.5	Plan and build webservers with node using Node .JS.

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III SEMESTER

SUB: Transform Calculus, Fourier Series And Numerical Techniques Sub Code: 18MAT31

After successful completion of this course, the students will be able to:

CO	Description
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
C201.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

SUB: Data Structures and Applications Sub Code: 18CS32

After successful completion of this course, the students will be able to:

CO	Description
C202.1	Use different types of data structures, operations and algorithms
C202.2	Apply searching and sorting operations on files
C202.3	Use stack, Queue, Lists, Trees and Graphs in problem solving
C202.4	Implement all data structures in a high-level language for problem solving.

SUB: Analog and Digital Electronics Sub Code: 18CS33

After successful completion of this course, the students will be able to:

CO	Description
C203.1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
C203.3	Simplify digital circuits using Karnaugh Map and Quine-McClusky Methods
C203.4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
C203.5	Develop simple HDL programs.

SUB: Computer Organization — Sub Code: 18CS34

After successful completion of this course, the students will be able to:

CO	Description
C204.1	Explain the basic structure of computers, performance of processor, memory organization, machine instructions and assembly language.
C204.2	Demonstrate functioning of different subsystems, such as processor, input output and memory.
C204.3	Explain the working principles of different type's memory system.
C204.4	Apply the knowledge of arithmetic operations and analyze simple arithmetic and logical units.
C204.5	Illustrate hardwired control and micro programmed control, pipelining, embedded system and other computing systems.

SUB: Software Engineering — Sub Code: 18CS35

After successful completion of this course, the students will be able to:

CO	Description
C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.
C205.2	Assess professional and ethical responsibility
C205.3	Function on multi-disciplinary teams
C205.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

SUB: Discrete Mathematical Structures — Sub Code: 18CS36

After successful completion of this course, the students will be able to:

CO	Description
C206.1	Demonstrate the correctness of an argument using propositional and predicate logic, and truth tables.
C206.2	Demonstrate the properties of Integers & fundamental principles of Counting.
C206.3	Make use of Relation and Function's properties to solve logical problems.
C206.4	Solve problems involving principle of Inclusion & Exclusion, and recurrence relations.
C206.5	Explain the fundamentals of Graphs and Trees.

SUB: Analog and Digital Electronics Laboratory Sub Code: 18CSL37

After successful completion of this course, the students will be able to:

CO	Description
C207.1	Use appropriate design equations / methods to design the given circuit.
C207.2	Examine and verify the design of both analog and digital circuits using simulators
C207.3	Make us of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.
C207.4	Compile a laboratory journal which includes; aim, tool /instruments /software /components used, design equations used and designs, schematics, program listing, procedure followed, relevant theory, results as graphs and tables, interpreting and concluding the findings.

SUB: Data Structures Laboratory Sub Code: 18CSL38

After successful completion of this course, the students will be able to:

CO	Description
C208.1	Implement various linear and non-linear data structures.
C208.2	Demonstrate the working nature of different types of data structures and their applications.
C208.3	Implement the searching and sorting algorithms.
C208.4	Select the appropriate data structures for solving computing problems.

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IV SEMESTER

SUB: Complex Analysis, Probability and Statistical Methods Sub Code: 18MAT41

After successful completion of this course, the students will be able to:

CO	Description
C210.1	Use the concepts of analytic function and complex potentials to solve the problems arising in Electromagnetic field theory.
C210.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow Visualization and image processing.
C210.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
C210.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the Statistical data.
C210.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

SUB: Design and Analysis of Algorithms Sub Code: 18CS42

After successful completion of this course, the students will be able to:

CO	Description
C211.1	Explain the specifications of algorithms, fundamental data structures and their operations.
C211.2	Explain various searching problem solving techniques.
C211.3	Explain various sorting problem solving techniques.
C211.4	Estimate the computational complexity of different algorithms.
C211.5	Choose appropriate algorithmic strategies for problem solving.

SUB: Operating Systems Sub Code: 18CS43

After successful completion of this course, the students will be able to:

CO	Description
C212.1	Demonstrate need for Operating System and its types.
C212.2	Explain the multithreaded systems and scheduling algorithms.
C212.3	Illustrate the concept of process synchronization and Deadlock.
C212.4	Explain the concept of memory management and File System.
C212.5	Illustrate the different concepts of disk management, Protection and Linux System case studies.

SUB: Microcontrollers and Embedded Systems Sub Code: 18CS44

After successful completion of this course, the students will be able to:

CO	Description
C213.1	Describe the architectural features and instructions of ARM microcontroller.
C213.2	Apply the knowledge gained for Programming ARM for different applications.
C213.3	Interface external devices and I/O with ARM microcontroller.
C213.4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C213.5	Develop the hardware /software co-design and firmware design approaches.

SUB: Object Oriented Concepts Sub Code: 18CS45

After successful completion of this course, the students will be able to:

CO	Description
C214.1	Explain concepts of object oriented programming with C++.
C214.2	Develop Java programs to solve problems.
C214.3	Explain Inheritance, Exceptions, Packages and Interfaces in Java.
C214.4	Develop multithreaded programs.
C214.5	Develop simple event based Graphical User Interfaces using Swings.

SUB: Data Communication Sub Code: 18CS46

After successful completion of this course, the students will be able to:

CO	Description
C215.1	Explain the various components of data communication.
C215.2	Explain the fundamentals of digital communication and switching.
C215.3	Compare and contrast data link layer protocols.
C215.4	Summarize IEEE 802.xx standards

SUB: Design, Analysis of Algorithms Laboratory Sub Code: 18CSL47

After successful completion of this course, the students will be able to:

CO	Description
C216.1	Develop Java programs to demonstrate Inheritance, Exception handling and multi-threading concepts.
C216.2	Develop a Java Program to demonstrate the stack operations.
C216.3	Develop the variety of algorithms using Greedy, dynamic programming and Backtracking techniques.
C216.4	Analyze the performance of sorting algorithms based on divide-and-conquer technique.

SUB: Microcontrollers and Embedded Systems Laboratory Sub Code: 18CSL48

After successful completion of this course, the students will be able to:

CO	Description
C217.1	Develop and test Assembly Language Program (ALP) using ARM7TDMI/LPC2148
C217.2	Conduct the following experiments on an ARM7TDMI/LPC2148 evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4 tool /compiler tool/ compiler.
C217.3	Choose micro controllers for various kinds of applications.

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V SEMESTER

SUB: Management & Entrepreneurship For IT Industry — Sub Code: 18CS51

After successful completion of this course, the students will be able to:

CO	Description
C301.1	Explain the basic concepts of management, planning, Organizing and Staffing.
C301.2	Summarize the appropriate leadership styles, motivation theories, communications, Coordination and controlling, methods
C301.3	Interpret the meaning of entrepreneur, entrepreneurship and role in economic development on India. Along with Identification of business opportunities and feasibility study
C301.4	Inferring the new ideas, Prepare project report based on guidelines of planning commission by utilizing the resources available effectively through ERP
C301.5	Explain the IPRs and institutional support in Micro and Small Enterprises as per the Indian Industrial Policy 2007.

SUB: Computer Networks — Sub Code: 18CS52

After successful completion of this course, the students will be able to:

CO	Description
C302.1	Explain principles of application layer protocols
C302.2	Identify transport layer services and infer UDP and TCP protocols
C302.3	Classify routers, IP and Routing Algorithms in network layer
C302.4	Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard
C302.5	Explain Multimedia Networking and Network Management

SUB: Database Management Systems — Sub Code: 18CS53

After successful completion of this course, the students will be able to:

CO	Description
C303.1	Define, Identify and analyze database objects, enforce integrity constraints on a database using RDBMS.
C303.2	Use Structured Query Language (SQL) for database manipulation.
C303.3	Build simple database systems
C303.4	Develop application to interact with databases.

SUB: Automata Theory and Computability — Sub Code: 18CS54

After successful completion of this course, the students will be able to:

CO	Description
C304.1	Apply the fundamental understanding of automata theory to design FSMs for regular Languages.
C304.2	Demonstrate the understanding of the regular expressions & Regular grammar and their Equivalence.
C304.3	Apply the fundamental understanding of automata theory to design and develop CFG and PDA and their relative powers.
C304.4	Apply the fundamental understanding of automata theory to design and develop Turing Machine.
C304.5	Explain the fundamental understanding of Decidability and Complexity of the problems.

SUB: Application Development Using Python — Sub Code: 18CS55

After successful completion of this course, the students will be able to:

CO	Description
C305.1	Demonstrate proficiency in handling of loops and creation of functions
C305.2	Identify the methods to create and manipulate lists, tuples and dictionaries.
C305.3	Discover the commonly used operations involving regular expressions and file system.
C305.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C305.5	Determine the need for scraping websites and working with CSV, JSON and other file formats.

SUB: Unix Programming — Sub Code: 18CS56

After successful completion of this course, the students will be able to:

CO	Description
C306.1	Explain Unix Architecture, File system and use of Basic Commands
C306.2	Illustrate Shell Programming and to write Shell Scripts
C306.3	Categorize, compare and make use of Unix System Calls
C306.4	Build an application/service over a Unix system
C306.5	Explain signal and daemon characteristics

SUB: Computer Networks Laboratory — Sub Code: 18CSL57

After successful completion of this course, the students will be able to:

CO	Description
C307.1	Analyze and Compare various networking protocols.
C307.2	Demonstrate the working of different concepts of networking.
C307.3	Implement, analyze and evaluate networking protocols in NS2 / NS3 and Java Programming.

SUB: DBMS Laboratory with Mini Project — Sub Code: 18CSL58

After successful completion of this course, the students will be able to:

CO	Description
C308.1	Demonstrate creation and manipulation operations on database.
C308.2	Demonstrate the working of different concepts of DBMS
C308.3	Develop and demonstrate the project developed for an application.

SUB: Environmental Studies — Sub Code: 18CIV59

After successful completion of this course, the students will be able to:

CO	Description
C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.
C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components
C309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

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VI SEMESTER

SUB: System Software and Compilers Sub Code: 18CS61

After successful completion of this course, the students will be able to:

CO	Description
C310.1	Explain system software such as assemblers and Loader
C310.2	Apply the fundamental concepts learnt for designing & implementing lexical analysis phase of compiler.
C310.3	Apply the concepts studied for designing & Developing Syntax analysis phase.
C310.4	Make use of translation techniques learnt for code generation phase.
C310.5	Utilize LEX and YACC tools for implementing different concepts of system software.

SUB: Computer Graphics and Visualization Sub Code: 18CS62

After successful completion of this course, the students will be able to:

CO	Description
C311.1	Explain hardware, software and OpenGL Graphics Primitives.
C311.2	Illustrate Geometric transformations on both 2D and 3D objects.
C311.3	Apply concepts of clipping, color and Illumination Models in 2D and 3D objects.
C311.4	Apply the concepts of viewing and visible surface detection of 3D objects
C311.5	Explain curve generating concepts and interactive computer graphics using the OpenGL.

SUB: Web Technology and its Applications Sub Code: 18CS63

After successful completion of this course, the students will be able to:

CO	Description
C312.1	Adapt HTML and CSS syntax and semantics to build web pages.
C312.2	Construct and visually format tables and forms using HTML and CSS.
C312.3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
C312.4	Appraise the principles of object oriented development using PHP
C312.5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.

SUB: Data Mining and Data Warehousing Sub Code: 18CS641

After successful completion of this course, the students will be able to:

CO	Description
C313.1	Explain data warehouse and multi-dimensional data models.
C313.2	Explain various operations on data warehouse and data models.
C313.3	Apply concept, algorithms and applications of association rules for solving data mining problems.
C313.4	Apply concept, algorithms and applications of classifications for solving data mining problems.
C313.5	Apply concept, algorithms and applications clustering for solving data mining problems.

SUB: Programming in Java Sub Code: 18CS653

After successful completion of this course, the students will be able to:

CO	Description
C320.1	Explain the object-oriented concepts and JAVA.
C320.2	Develop computer programs to solve real world problems in Java.
C320.3	Develop simple GUI interfaces for a computer program to interact with users.

SUB: System Software Laboratory Sub Code: 18CSL66

After successful completion of this course, the students will be able to:

CO	Description
C322.1	Demonstrate the Lexical analysis using Lexer.
C322.2	Demonstrate the syntax analysis phase of Compiler design using Parser.
C322.3	Develop the different CPU scheduling algorithms.
C322.4	Demonstrate the different memory management algorithms.
C322.5	Demonstrate the deadlock handling algorithm.

SUB: Computer Graphics Laboratory with Mini Project Sub Code: 18CSL67

After successful completion of this course, the students will be able to:

CO	Description
C323.1	Demonstrate simple algorithms using OpenGL Graphics Primitives and attributes.
C323.2	Demonstrate line drawing and clipping algorithms using OpenGL functions.
C323.3	Demonstrate 2D and 3D Geometric transformations using OpenGL functions.
C323.4	Demonstrate computer graphics applications using OpenGL.
C323.5	Make use of OpenGL functions to animate real world problems.

SUB: Mobile Application Development Sub Code: 18CSMP68

After successful completion of this course, the students will be able to:

CO	Description
C324.1	Create, test and debug Android application by setting up Android development environment.
C324.2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
C324.3	Infer long running tasks and background work in Android applications.
C324.4	Demonstrate methods in storing, sharing and retrieving data in Android applications.
C324.5	Infer the role of permissions and security for Android applications.

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VII SEMESTER

SUB: Artificial Intelligence and Machine Learning — Sub Code: 18CS71

After successful completion of this course, the students will be able to:

CO	Description
C401.1	Appraise the theory of Artificial intelligence and Machine Learning
C401.2	Illustrate the working of AI and ML Algorithms.
C401.3	Demonstrate the applications of AI and ML.

SUB: Big Data Analytics — Sub Code: 18CS82

After successful completion of this course, the students will be able to:

CO	Description
C402.1	Understand fundamentals of Big Data analytics.
C402.2	Investigate Hadoop framework and Hadoop Distributed File system.
C402.3	Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data.
C402.4	Demonstrate the MapReduce programming model to process the big data along with Hadoop tools.
C402.5	Use Machine Learning algorithms for real world big data and analyze web contents and Social Networks to provide analytics with relevant visualization tools.

SUB: Advanced Computer Architecture — Sub Code: 18CS733

After successful completion of this course, the students will be able to:

CO	Description
C405.1	Explain the fundamentals of computer architecture.
C405.2	Explain the basic concepts of Pipelining.
C405.3	Explain Internal Data Forwarding, Software Interlocking, Hardware Score boarding, Hazard avoidance, Branch handling and Instruction issuing techniques.
C405.4	Explain multi-processor and thread level parallelism.
C405.5	Explain parallel programming model.

SUB: Cryptography Sub Code: 18CS744

After successful completion of this course, the students will be able to:

CO	Description
C411.1	Define and Explain cryptography, its principles and algorithms.
C411.2	Illustrate Public and Private key cryptography
C411.3	Explain Key management, distribution and certification
C411.4	Explain authentication protocols
C411.5	Explain IP Security.

SUB: Artificial Intelligence and Machine Learning Laboratory Sub Code: 18CSL76

After successful completion of this course, the students will be able to:

CO	Description
C417.1	Implement and demonstrate AI and ML algorithms.
C417.2	Evaluate different algorithms.

SUB: Project Work Phase - I Sub Code: 18CSP77

After successful completion of this course, the students will be able to:

CO	Description
C418.1	Understanding of the state of things.(Literature Survey)
C418.2	Serious needs/problems of the people where it demands solution.(Problem Identification)
C418.3	Discover answers to problems through the application of scientific procedures. (Methodology)
C418.4	Written and overall communication.
C418.5	Understand the planning of Project.

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VIII SEMESTER

SUB: Internet of Things Sub Code: 18CS81

After successful completion of this course, the students will be able to:

CO	Description
C419.1	Assess the genesis and impact of IoT applications, architectures in real world.
C419.2	Illustrate diverse methods of deploying smart objects and connect them to network.
C419.3	Compare different Application protocols for IoT.
C419.4	Infer the role of Data Analytics and Security in IoT.
C419.5	Appraise and Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry.

SUB: Storage Area Networks Sub Code: 18CS822

After successful completion of this course, the students will be able to:

CO	Description
C421.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization.
C421.2	Explain components and the implementation **Network-Attached Storage** NAS.
C421.3	Describe CAS architecture and types of archives and forms of virtualization.
C421.4	Illustrate the storage infrastructure and management activities.

SUB: Project Work Phase - 2 Sub Code: 18CSP83

After successful completion of this course, the students will be able to:

CO	Description
C424.1	Determine, dissect, and estimate the parameters, required in the solution.
C424.2	Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics.
C424.3	Compile the report and take part in presentation.
C424.4	Formulate and Analyze the problem and determine the scope of the solution chosen
C424.5	Identify a issue and derive problem related to society, environment, economics, energy and technology

SUB: Technical Seminar Sub Code: 18CSS84

After successful completion of this course, the students will be able to:

CO	Description
C425.1	Choose the modern topic, carryout the comprehensive survey & understand the relevance.
C425.2	Analyze and interpret the impact of the topic on the society/Environment/ domain.
C425.3	Build the report with Technical content and communicating it to the audience, following the moral and ethics.
C425.4	Select appropriate Communication and Visual aids for effective presentation

SUB: Internship Sub Code: 18CSI85

After successful completion of this course, the students will be able to:

CO	Description
C426.1	Adapt easily to the industry environment.
C426.2	Take part in team work.
C426.3	Make use of modern tools.
C426.4	Decide upon project planning and financing.
C426.5	Adapt ethical values.
C426.6	Motivate for lifelong learning.

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