DEPARTMENT OF COMPUTER SCIENCE& ENGINEERING

SECOND YEAR

SEMESTER-I		
Course Name & Code	**Course Outcomes**	**Bloom's Level**
APPLIED MATHEMATICS-I (CS211-19)	Solve higher order linear differential equation with constant coefficient	BL3
	Apply Laplace and inverse Laplace transforms for solving linear differential equations.	BL3
	Express a function in terms of sine's and cosines components so as to model simple periodic functions and solve problems on even and odd functions	BL4
	Find the relation between two variables for the given data using regression	BL4
	Solve problems on Z transform and explain its properties	BL2
	Sketch and explain various problems based on queuing theory	BL3
Discrete Mathematical structure (CS212)	Make use of connectives and develop well-formed formulas and find the equivalence of formulas and equivalent normal forms.	BL2 Understand
	Construct principal normal forms for given statement formulas.	BL3 Apply
	Apply set theory and relations to draw conclusions.	BL3 Apply
	Define the function and apply it to different scenarios.	BL2 Understand
	Demonstrate use of Algebraic structures with examples.	BL2 Understand
	Illustrate the concepts of algebraic systems, lattices &Boolean algebra with examples.	BL2 Understand
Data Communication(CS 213)	Send data through various data communication modes.	BL1
	Differentiate between the OSI reference model and TCP/IP model.	BL2
	Identify and classify different physical media and devices.	BL2
	Demonstrate functions of Data Link Layer.	BL3
	Implement IEEE standard frame format and	BL3

	understdifferent medium access protocols.	
	Simulate different routing algorithms in Network Layer.	BL4
DIGITAL TECHNIQUES (CS214-19)	Design and analyze digital circuits.	BL1, BL2
	Demonstrate the principles of combinational logic design and sequential circuit design.	BL1, BL2
	Design different digital circuits based on available instruction set.	BL1, BL2
	Design Digital circuit using VHDL code.	BL1, BL2
	Design, implement and analyze, asynchronous and synchronous sequential circuits.	BL1, BL2
	Explain Boolean algebra and the various methods of Boolean function reduction, Kmap Reduction.	BL1, BL2
Computer Graphics (CS215)	Summarize the working principle of display devices, interactive input devices and graphic applications.	BL2
	Analyse line, circle, ellipse and character generation algorithms.	BL3
	Evaluate geometrical transformations including translation, scaling, rotation, reflection and shear for 2-Dimensional objects.	BL2
	Apply clipping procedure on points, lines and polygons using clipping algorithms.	BL4
	Applying Warnock algo. to detect hidden surfaces.	BL2
	Explain Curves in Computer Graphics	BL3
ADVANCED C CONCEPTS (CS216-19)	Define and demonstrate storage classes in C.	BL1, BL2
	Develop recursive solutions for given problems.	BL3, BL6
	Implement file concepts and pointer concepts.	BL3
	Describe and implement searching algorithms - linear, binary search technique.	BL2,BL3
	Describe and implement sorting algorithms –like selection sort, insertion sort, merge sort etc.	BL2,BL3
	Describe and implement hashing technique.	BL2,BL3

SEMESTER - II		
Course Name & Code	**Course Outcomes**	**Bloom's Level**
Theory of Computation (CS222)	Construct finite automaton for a given regular expression and Simplify automata	BL3 APPLY
	Apply the Kleene's Theorem to solve NFA problems	BL3 APPLY
	Explain Context Free Grammar and parsing techniques.	BL2 UNDERSTAND
	Construct a pushdown automaton for a given CFL and CFG.	BL3 APPLY
	Explain Pumping Lemma property and closure properties of context-free languages.	BL2 UNDERSTAND
	Construct a Turing machine for given problem and variations of Turing machines	BL3 APPLY
Microprocessors CS223	Explain the basic microprocessor architecture, its functionality	BL2 Understand
	Apply knowledge and demonstrate programming proficiency using the various addressing modes and instructions of the 8086 microprocessor	BL3 Apply
	Explain the effects of the configuration of the bus on the overall performance of a system	BL2 Understand
	List out different types of interrupts and its functions	BL2 Understand
	Outline the architecture and operation of Programmable Interface Devices and interfacing with 8086	BL2 Understand
	Explain the advanced microprocessor series of 8086	BL2 Understand
Data Structures (CS224)	Explain the basic concepts of data structures and demonstrate stack as a linear data structure	BL2 Understand
	Develop programming skills to implement and analyze Queues as a linear data structures.	BL3 Apply
	Develop programming skills to implement Linked list as a linear data structures and apply this data structure for problem solving.	BL3 Apply
	Develop programming skills to implement and analyze Binary Tree, Binary Search Tree as a nonlinear data structure.	BL3 Apply
	Apply various operations on multi-way search trees, B-trees, AVL tree and evaluate their performance.	BL3 Apply
	Develop skills to design and implement graph data structure and build real life applications using it	BL3 Apply
Computer Networks cs225	Demonstrate the purpose of IP	BL2
	Analyse application protocol using the services offered by the transport layer protocol such as, TCP,UDP etc.	BL4
	Develop client server model , chat application program using socket programming	BL3

	Show the function the functioning of DHCP ,DNS BOOTP.	BL1
	Explain the various features and oeration of application layer protocol	BL2
	Explain the functioning of web based mail system and web services mechanism	BL2
Object oriented programming through C++ CS226	Illustrate principles of OOP like data abstraction,polymorphism,Inheritance and File handling.	BL3
	Implement OOPS concepts through C++	BL3
	Demonstrate understanding of Object oriented concepts like inheritance,operator overloading ,streams etc.	BL3
	Solve the real world problems using learned object oriented concepts.	BL5

THIRD YEAR

SEMESTER-I		
Software Engineering(CS313)	Develop the software project using appropriate process	BL1 REMEMBER
	Develop a software project from requirement gathering to implementation.	BL2 UNDERSTAND
	Create design of system by using different design techniques	BL2 UNDERSTAND
	Estimate the cost and effort of software project.	BL5 EVALUATE
	Improve quality of the software project by applying testing of software	BL3 APPLY
	Influence activities in software project by using project planning, execution & closure with new agile method	BL3 APPLY
Java Programming (CS317)	Understand Java Runtime Environment and fundamentals of java.	BL2 UNDERSTAND
	Develop Object oriented programming paradigms using Java language.	BL3 APPLY
	Construct the basic Java API Classes in Application programming.	BL3 APPLY
	Apply Client Server methodology using socket programming in java and implement the concept of RMI.	BL3 APPLY
	Apply and analyze platform independent application runtime environment to create standalone GUI using Java language.	BL3 APPLY
	Build connection between different types of databases using java.	BL3 APPLY
Database Engineering (CS314)	Define and apply the basic concepts of database system design, relational model and schema.	BL 2 UNDERSTAND
	Design principles for logical design of database, including the E-R method and normalization approach for any real time application.	BL6 CREATE
	Evaluate, using relational algebra and SQL, solutions to a broad range of query problems in a relational DBMS.	BL 5 EVALUATING
	Demonstrate an understanding of normalization theory and apply such knowledge to normalize a database.	BL 2 UNDERSTAND
	Compare the basic database storage structures and access techniques: indexing methods including B-	BL4 ANALYZE

	tree, and hashing.	
	Be familiar with the basic issues of transaction processing (ACID properties), different methods of concurrency control and recovery techniques.	BL 2 UNDERSTAND
SYSTEM PROGRAMMING (CS311-20)	Identify the requirement of different System Software for the execution of application software.	BL2
	Design and implement various System Programs Assembler and Macros.	BL6
	Recognize the importance of language processing development tools in formal language implementation.	BL2
	Examine the function of linker and loader	BL4
OPERATING SYSTEMS (CS312-20)	Explain the role of operating system and working of different operating systems.	BL1
	Understanding the concepts of process and threads along with its working.	BL2
	Gain knowledge of process scheduling and working with different scheduling algorithms.	BL2
	Interpreting typical semaphore problem and other problems of synchronization along with monitors.	BL3
	Learn the principles of deadlock and methods for handling deadlocks along with different memory management techniques.	BL4
	Demonstrate virtual memory management and different page replacement techniques in use.	BL4
DESIGN AND ANALYSIS OF ALGORITHM (CS315)	Analyze the Asymptotic Performance of Algorithm (Best, Worst. Average Case).	BL4
	Calculate the time and space complexity of an algorithm.	BL4
	Demonstrate the familiarity with the major Algorithm (Searching and Sorting) .	BL4
	Apply important algorithmic design paradigms and methods of analysis(Divide & Conquer, Greedy, Dynamic, Backtracking approach)	BL3
	Apply algorithm design paradigm to solve real life problem	BL3
	Identify P, NP, NP-complete and NP-Hard Problem and differentiate between tractable and intractable problems.	BL4
PYTHON	Install and run python interpreter.	BL4

PROGRAMMING (CS316-20)	Develop proficiency in creating applications using python programming language.	BL4
	Design various data structure problems available in python and apply them in solving computational problem.	BL4
	Use fundamental library packages available in python.	BL3
	Design python application using procedure oriented and objects oriented approach.	BL4
	Develop database application in python.	BL4
	To be able to do testing and debugging of code written in python.	BL4

SEMESTER - II		
Mobile Application Development (CS325)	Understand mobile app development aspects	BL2 UNDERSTAND
	Understand services and bound services application	BL2 UNDERSTAND
	Demonstrate new applications to handle devices with capabilities as communication, computing etc.	BL3 APPLY
	Analyse testing, signing, packaging and distribution of mobile apps	BL4 ANALYZE
	Develop mobile applications using modern mobile development tools for android.	BL6 CREATE
Unix Operating System (CS 322)	1. Describe architecture of Unix, its kernel and file system.	BL2 UNDERSTAND
	2. Apply algorithms of buffer allocation, buffer releasing, buffer reading and writing	BL3 APPLY
	3. Apply algorithms of regular file for inode assignment and disk block allocation.	BL3 APPLY
	4. Use system calls and program the Shell.	BL3 APPLY
	5. Describe structure of process, Memory and I/O management.	BL3 APPLY
	6. Implement programs using shell script.	BL3 APPLY
Computer Organization and Architecture (CS323)	Describe the functional architecture of computing systems.	BL 2 UNDERSTAND
	Analyze various algorithms for arithmetic computation and arrive at fastest one.	BL 2 UNDERSTAND
	Use ARC Processor based instructions to write assembly language program.	BL4 ANALYZE

	Analyze different method of control unit design.	BL3 APPLY
	Exemplify in a better way the I/O and memory organization	BL3 APPLY
	Demonstrate the design aspects of memory, instruction level parallelism and multiprocessors.	BL4 ANALYZE
Artificial Intelligence(CS324)	Illustarte and solve sequence of actions for an agent as a search problem.	BL2 Understanding
	Infer from represented knowledge using logical and probabilistic reasoning methods	BL2 Understanding
	Solve agent decision problems using probability theory	BL3 Applying
	Analyze forms of learning and demonstrate their working.	BL4 Analyzing
	Determine and implement an appropriate given real world supervised learning problem	BL5 Evaluate
Compiler Construction	Students can analyze various phases of compiler	BL4
	Students can build lexical analyzer using different lex tools	BL3
	Students will be able to design the parser for compiler.	BL6
	Students can analyze intermediate code and optimize it if possible.	BL4
	Students can discover various issues in the design of code generation	BL4
	Students can apply different optimization techniques in the design of compiler	BL3
CS326A - Elective-I : 1. OBJECT ORIENTED MODELING & DESIGN	Demonstrate the key principles used in OO analysis, design and development	BL2 UNDERSTAND
	Explain the working understanding of the object oriented analysis and design.	BL2 UNDERSTAND
	Apply the knowledge of object oriented modeling and design to the given software development project	BL2 UNDERSTAND
	Apply the knowledge of behavioural and architectural modeling using UML for a given software development project.	BL2 UNDERSTAND
	List the objects of Unified Modeling Language for a given problem statement.	BL3 APPLY
	Devise the real world problem using object oriented modeling technique.	BL3 APPLY

FOURTH YEAR

SEMESTER-I		
ACA CS411	Distinguish the concepts of parallelism, multiprocessor systems & SIMD architectures	BL2: Understanding
	Estimate instruction sets, RISC & CISC processors and working of memory hierarchy technology	BL3: Application
	Compare the performance of conventional linear and non-linear pipelines	BL 5: Evaluating
	Select multiprocessor and multicomputer architectures, synchronization mechanisms	BL4: Analysis
	Analyse dataflow architectures, operators, static and dynamic, SIMD architectures	BL4: Analysis
	Compare the different types of parallel programming models and optimizing the compilers.	BL 5: Evaluating
Distributed Systems CS412	Define the basics of distributed systems and middlewar	BL 1: Remembering
	Explain distributed systems using various techniques such as IPC,RMI,CORBA and various architectures used to design distributed systems, such as client-server and peer-to-peer. .	BL2: Understanding
	Write typical algorithms related to synchronization and deadlock in distributed systems	BL 5: Evaluating
	Evaluate various distributed mutual exclusion algorithms and distributed deadlock detection algorithms.	BL 5: Evaluating
	Apply knowledge of various Distributed File system, its architecture and working for active research at the forefront of these areas.	BL3: Application
	Apply emerging trends of distributed systems in a real world setting across GRID,SOA areas.	BL3: Application
MDS	Discuss different database architectures	BL2: Understanding
	Compare different parallel algorithms	BL5: Evaluate
	Solve queries based on OLAP concepts	BL6: Create
	Create object oriented databases and measure	BL6: Create

	the cost of query processing	
	Discuss big data with hadoop concepts	BL2: Understanding
	Create databases using SQL, NoSQL & PostgreSQL concept	BL6: Create
INTERNET OF THINGS IoT (CS414-19)	Understand basics of Internet of Things	BL2 UNDERSTAND
	Identify the Architecture and various elements of an IoT System	BL2 UNDERSTAND
	Understand the IoT standards and connectivity protocols	BL3 APPLY
	Describe security concerns and challenges while implementing IoT solutions	BL3 APPLY
	Describe components of IoT Architecture and platforms of IoT ecosystem	BL3 APPLY
	Describe and choose Sensors and Actuators	BL3 APPLY
PROGRAMMING WITH PYTHON (CS416-19)	Utilize Python standard library modules in writing Python scripts for problem solving.	BL3 APPLY
	Demonstrate Python scripts in procedural and object-oriented style.	BL2 UNDERSTAND
	Develop Python scripts to perform database operation	BL3 APPLY
	Develop Python scripts to perform network and web related operations.	BL3 APPLY
	Test and profile Python scripts	BL6 CREATE
	Developing custom exception	BL3 APPLY
OOMD (Elective) (CS-415-19-C)	Demonstrate the key principles used in OO analysis, design and development	BL2 UNDERSTAND
	Explain the working understanding of the object oriented analysis and design.	BL2 UNDERSTAND
	Apply the knowledge of object oriented modeling and design to the given software development project	BL2 UNDERSTAND
	Apply the knowledge of behavioural and architectural modeling using UML for a given software development project.	BL2 UNDERSTAND
	List the objects of Unified Modeling Language for a given problem statement.	BL3 APPLY
	Devise the real world problem using object oriented modeling technique.	BL3 APPLY

PROJECT PHASE-I (CS417-19)	Identify, Interpret & Define A Realistic Problem Statement.	Bl2 Understand
	Select & Apply An Appropriate Technique To Create A Design	Bl3 Apply
	Analyse The Needs To Meet Desired Within Realistic Multiple Constraints	Bl4 Analyze
	Develop Soft Skills Including Presentation, Writing & Convincing.	Bl6 Create
	Categorize The Impact Of Engineering Solutions In A Global, Economic, Environmental,	Bl4 Analyze
VOCATIONAL TRAINING (CS418-19)	Dentify Problem Statement	Bl2 Understand
	Understand Professional Ethics	Bl2 Understand
	Get Antiquated With Latest Technologies	Bl5 Evaluate
	Develop Presentation Skills	Bl6 Create

SEMESTER - II		
MIS(CS421)	Understand the need of MIS and its uses in business	BL2: Understanding
	Use computerized management information systems in business	BL3: Apply
	In depth analysis and decision making	BL2: Understanding
	Understand information system using principles of communication technologies	BL2: Understanding
	Apply modern project management techniques	BL3: Apply
	Understand security related issues in information system	BL2: Understanding
ICS	Apply the concepts of symmetric ciphers.	3 Application
	Use the block ciphers for encryption and decryption.	5 Evaluating
	Implement the algorithms used in public key cryptography.	6 Creating
	Evaluate the security used in IP and email.	5 Evaluating
	Implement the algorithms used in message authentication and hash functions.	6 Creating
	Demonstrate application of block chain technology.	4 Analysis
BDA	Identify need for Big Data analysis	BL2: Understanding
	Student must be able to understand the specialized aspects of big	BL2:

	data with the help of different big data applications	Understanding
	Analyse and identify Big data processing technology for analysing big data	BL4: Analysis
	Apply the knowledge of new technologies like hadoop to identify and solve the problems of digital world	BL3: Application
	Write a Map reduce Programs to process big data by identifying the use case	BL3: Application
	Build the solution for a given problem by using different data management technologies like HIVE,Cassendra ,Pig etc.	BL3: Application
Software Testing and Quality Asurance (CS4 24 A)	Identify what a software bug is, how serious they can be, and why they occur	BL2: Understanding
	Test software to meet quality objectives and requirements	BL 5: Evaluating
	Apply testing skills to common testing tasks	BL3: Application
	Perform the planning and documentation of the test efforts	BL3: Application
	Describe software quality concepts, assurance and standards	BL2: Understanding
	Use testing tools to test software in order to improve test efficiency with automation	BL3: Application
Web Technology (CS425)	Develop The Web Pages Using Html And Css.	Bl1 Remember
	Develop The Responsive Web Applications	Bl3 Apply
	Show The Forms And Validations For Your Website	Bl2 Understand
	Construct The Structure Of Web Page, To Store The Data In Web Document, And Transport Information Through Web.	Bl2 Understand
	Develop Web Application Using Client/Server Side Scripting Technologies For A Given Problem.	Bl2 Understand
	Develop Simple Web Application Using Server Side Php Programing And Database Connectivity Using Mysql.	Bl3 Apply