SUBJECT TITLE	COURSE OUTCOMES
PROGRAMMING FOR PROBLEM SOLVING	After successful completion of course the student should be able to 1. Formulate simple algorithms for arithmetic and logical problems. 2. Translate the algorithms to programs (in C language). 3. Debug the programs to correct the syntax and logical errors. 4. Use conditional branching, iteration, recursion, arrays, pointers and structures to formulate algorithms and programs. 5. Decompose a problem into functions and synthesize a complete program using divide and conquer approach. 6. Maintain data using files
PROGRAMMING FOR PROBLEM SOLVING LAB	After successful completion of course the student should be able to 1. Formulate the algorithms for simple problems. 2. Translate given algorithms to a working program. 3. Correct syntax errors as reported by the compilers. 4. Identify and correct logical errors encountered at run time. 5. Write iterative as well as recursive programs. 6. Represent data in arrays, strings and structures and manipulate them through a program to be able to declare pointers of different types and use them in defining self-referential Structures. Create, read and write to and from simple text files.
DISCRETE MATHEMATICS	After successful completion of course the student should be able to 1. Represent different information in the form of sets, relate them and express in terms of functions 2. Apply principles of mathematical induction to prove various theorems. 3. Derive the solution using deductive logic and prove the solution based on logical

	inference for a given a problem 4. Classify the algebraic structure for a given a mathematical problem 5. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra 6. Develop the given problem as graph networks and solve with techniques of graph theory.
Data Structures	After successful completion of course the student should be able to 1. Understand the basic concepts of Object-Oriented Programming like inheritance, polymorphism, etc. 2. Analyze object-oriented concepts and identify various types of errors. 3. Solve various real time problems using data structures using Stacks, Queues and linked list. 4. Apply Graph search, traversal algorithms, etc. using OOPS concepts. 5. Develop algorithms and programs for various sorting and searching techniques.
Data Communication	After successful completion of course the student should be able to 1. Understand data, signals and transmission media. 2. Evaluate performance of the channel. 3. Analyse various transmission media, data encoding, modulation and multiplexing techniques. 4. Represent various data encoding and modulation techniques. 5. Identify the errors using source and coding methods.
Data Structures Lab	After successful completion of course the student should be able to 1. Identify and implement the appropriate data structure for a given problem. 2. Determine and simulate the appropriate searching and sorting techniques for a given

	problem.
IT Workshop	After successful completion of course the student should be able to perform all maintenance tasks related to desktop, laptop and mobile phones
Computer Architecture and Organization	After successful completion of course the student should be able to 1. Identify and explain the building blocks of computer, instruction execution cycle. 2. Recognize addressing modes, and data/instruction formats. 3. Perform the arithmetic operations using various algorithms and number systems. 4. Explain various I/O transfers, interrupts, and memory organization. 5. Design memory in various ways 6. Detect errors in the transmission. 7. Compare various cache memory mapping techniques. 8. Determine the advantage of the pipelining and parallel processors.
Object Oriented Programming	After successful completion of course the student should be able to 1. Understand the basic concepts of object oriented programming 2. Solve problems using object-oriented approach and implement them using Java 3. Write efficient programs with multitasking. 4. Create own Exceptions and handle Exceptions. 5. Develop GUI Components and application projects 6. Design Java Application to connect Database.
Database Management Systems	After successful completion of course the students should be able to 1. Understand the basics of database systems and recovery techniques 2. Write relational algebra expressions for a given query and optimize the developed expressions

	3. Design ER model for given database specifications
	4. Perform normalization for the given schema and various operations of indexing.
	5. Construct the SQL queries for given specifications
	6. Optimize its execution using Query optimization algorithms for a given query.
	7. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system
	8. Implement the isolation property, including locking, time stamping based on concurrency control and serializability of scheduling.
Theory of Computation	After successful completion of course the student should be able to 1. Understand a formal notation for strings, languages and machines, the hierarchy of formal languages, grammars and machines. 2. Design finite automata to accept a set of strings of a language, context free grammars to generate strings of context free language. 3. Apply concepts of context free grammars to resolve the real-time problems. 4. Determine whether the given language is regular or not, equivalence of languages accepted by Push Down Automata and languages generated by context free grammars 5. Analyse languages of Turing machine

Object Oriented Programming Lab	On successful completion of the course students should be able to:
	1. Demonstrate knowledge in:
	  a. Data Types, Variables, Expressions
	  b. Control statements, Strings and Text files.
	  c. Lists, Dictionaries and Functions.
	  d. Objects and Design with classes
	  e. Exception Handling and GUI
	2. Analyze complex computational problems.
	3. Design solutions for real life computational problems
	4. Solve complex problems using python and Java scripting constructs.

Database Management Systems Lab	On successful completion of course students should be able to 1. Define a problem at the view level 2. Understand the physical structure of the database to handle data 3. Implement the logic by using software 4. Understand the transaction system and could extract data efficiently
Mathematical Toolkit Lab	On successful completion of course the students should be able to 1.Express programming and simulation for engineering problems 2. Write basic engineering problems in MATLAB
Design and Analysis of Algorithms	After successful completing the course the students should be able to 1. Understand the fundamental concepts of various algorithms. 2. Analyse the performance of algorithms. 3. Apply appropriate algorithm design techniques for solving real time problems. 4. Choose the algorithmic design methods to test the impact on performance of algorithms. 5. Evaluate tractable and Intractable Problems.
Operating Systems	On the successful completion of the course, students should able to 1. Understand the fundamental concepts of operating systems and its structure, processes and threads. 2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time. 3. Analyze the memory management techniques. 4. Apply page replacement algorithms to resolve the issues in virtual memory. 5. Acquire the knowledge on files and I/O

	management system.
Compiler Design	After successful completion of course the student should be able to 1. Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyser, and also able to use the Compiler tools like LEX, YACC, runtime environment, etc. 2. Perform parsing using various parsing techniques. 3. Develop programs by Syntax directed translation using synthesized and inherited attributes. 4. Use the tools related to compiler design effectively and efficiently 5. Write intermediate code, optimized code and generate the appropriate target code
Software Engineering	After successful completion of course the student should be able to 1. Learn the concepts of software development life cycle models. 2. Develop correct and robust software products by gathering requirements. 3. Analyse various metrics for estimation of software. 4. Manage and maintain Software Project to ensure good quality software with high reliability. 5. Gain knowledge in different Key Process Areas like planning and estimation of software projects, the implementation issues, validation and verification procedures.
Design Patterns	After successful completion of the course the student should be able to 1. Learn fundamental concepts of design patterns 2. Identify and apply the appropriate design pattern to solve real-time problems 3. Know how to format a document using document editor. 4. Label out the solutions to design problems using creational, structural and behavioral patterns.

	5. Choose different creational, structural and behavioral patterns to solve design problems. 6. Categorize creational, structural and behavioral patterns.
Software Project Management	After successful completion of course the student should be able to 1. Analyse the issues and challenges faced while managing the software project, various estimation techniques. 2. Evaluatethe defect removal efficiency for achieving high quality software. 3. Understand the concepts of project scheduling, tracking, Risk analysis, Quality management and Projectestimation using different techniques. 4. Identify project goals, constraints, deliverables, performance criteria, control needs and resource requirements in consultation with stakeholders. 5. Determine the trends and techniques involved in software project management.
Software Testing	After successful completion of course the students should be able to 1. Familiar about the processes involved in various testing methodologies. 2. Analyse the techniques in both structure and behaviour of the software. 3. Specify the design and analysis of steps in Software management. 4. Collection of metrics on various types of Environments. 5. Articulate how the Methods of Regression Test tools. 6. Various Test Processes and continuous Quality improvement.
Operating Systems Lab	After successful completion of the course students should be able to 1. Develop synchronized programs using multithreading concepts and deadlocks. 2. Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority.

	3. Implement memory management schemes and page replacement schemes, file management techniques
Software Engineering and Object-Oriented Analysis and Design Lab	After successful completion of course the student should be able to 1. Find solutions to the problems using object-oriented approach 2. Represent using UML notation and interact with the customer to refine the UML diagrams 3. Develop a software project from requirements gathered to implementation. 4. Obtain knowledge about principles and practices for estimation and maintenance of software systems 5. Focus on the fundamentals of modelling a software project.
Machine Learning	After successful completion of course the student should be able to 1. Familiarize with various types of machine learning algorithms and solve it. 2. Articulate how these algorithms are fundamentally different from traditional programming algorithms. 3. Practice the Bayesian and computational algorithms related to the real time application. 4. Implement the effective of analytical concepts, inductive analytical approaches andreinforced learning algorithms. 5. Construct various instant based learning and learning set of rules.
Computer Networks	After successful completion of course the student should be able to 1. Understand and explore the basics of Computer Networks and Various Protocols 2. Administrate a network and schedule flow of information 3. Examine the network security issues in Mobile and ad hoc networks. 4. Demonstrate the TCP/IP and OSI fashions with merits and demerits. 5. Evaluate the shortest path by using Routing

	algorithms. Design the Application layer protocols
Artificial Intelligence	After successful completion of course the student should be able to 1. Recognize various AI domains and identify problem solving techniques to apply them in real time applications. 2. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them. 3. Represent Knowledge in propositional calculus and Predicate calculus. 4. Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information. 5. Get wide exposure about strong and weak slot & fillers available. 6. Gain an in-depth understanding of the computational properties of natural languages and the techniques for processing linguistic information.
Data Mining	After the successful completion of course the students should be able to 1. Understand the basic concepts of data warehouse and data mining. 2. Apply pre-processing techniques for data cleansing. 3. Identify and design multidimensional models for data warehousing. 4. Analyze and Evaluate performance of algorithms for Association Rules, Classification and Clustering techniques. 5. Develop research interest towards advances in data mining.
Neural Networks	After successful completion of course the student should be able to 1. Analyse simple neural nets for pattern classification 2. Understand the Pattern Association and its applications 3. Apply contextual knowledge to solve problems related to vector Quantization

	4. Devise the algorithms using Adaptive Resonance operations.
Deep Learning	After successful completion of course the students should be able to 1. Understand the cloud-based gaming, standard protocols and mechanisms to support Gaming. 2. Determine the suitability of cloud with gaming environment and hardware necessary for Gaming. 3. Develop applications based on animation. 4. Analyse numerous opportunities exist for practitioners seeking to create Mobile Gaming.
Machine Learning and Artificial Intelligence Lab	1. Gain wide exposure on the basic concepts in Artificial Intelligence. 2. Apply various Heuristic search procedures to determine optimal solutions in real time applications. 3. Use PROLOG for developing AI applications. 4. Implementation procedures for the machine learning algorithms. 5. Apply appropriate data sets to the Machine Learning algorithms. 6. Analyse Machine Learning algorithms to solve real world problems.
Computer Networks Lab	1. Develop the programs related to Bit stuffing, character count 2. Apply appropriate algorithm for the finding of shortest route. 3. Implement the encryption and decryption concepts in network layer 4. Enable communication between the peers
Cryptography and Network Security	After successful completion of the course the students should be able to 1. Identify the security issues in the network and resolve it. 2. Analyse the vulnerabilities in any computing system and hence be able to design a security solution.

	3. Evaluate security mechanisms using rigorous approaches by key ciphers and Hash functions. 4. Demonstrate various network security applications, IPSec, Firewall, IDS, Web Security, Email Security and Malicious software etc.,
Internet and Web Programming	After Successful completion of course the students should be able to 1. Apply a structured approach to identifying needs, interests, and functionality of a website. 2. Design dynamic websites that meet specified needs and interests. 3. Use JavaScript to add dynamic content to pages. 4. Critique JavaScript code written by others, identifying examples of both good and bad practice. 5. Modify existing HTML, CSS, and JavaScript code to extend and alter its functionality, and to correct errors and cases of poor practice. 6. Develop web-based applications using Perl and Python programming.
Cloud Computing	After successful completion of course the student should be able to 1. Define cloud computing and related concepts 2. Understand the key dimensions of the challenges and benefits of Cloud Computing 3. Understand the hardware necessary for cloud computing and how components fit together. 4. Determine the suitability of in-house v/s hosted solutions 5. Understanding the systems, protocols and mechanisms to support cloud computing and develop applications for cloud computing. 6. Determine numerous opportunities exist for practitioners seeking to create solutions for cloud computing.
Distributed computing	After successful completion of course the

	students should be able to 1. Gain advanced knowledge in, IPC mechanisms and Event Synchronization, Distributed Computing Paradigms, SOCKET API, Group Communication, Distributed Objects, Remote Method Invocation (RMI) and Internet Applications 2. Analyse message passing, client- server and peer -to-peer models to understand distributed computing paradigms. 3. Design and Implement application programs on distributed computing systems. 4. Apply appropriate techniques and tools to design distributed computing systems and deploying in Internet applications
Mobile computing	To expose the students to the following 1. To make students understand the concept of mobile computing paradigm, its novel applications and limitations. 2. To provide the typical mobile networking infrastructure knowledge through a popular GSM architecture 3. To furnish the knowledge of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer 4. To Provide the concepts of platforms and protocols used in broadcasting and synchronization in the mobile environment
Big Data Analytics	After successful completion of course the student should be able to 1. Perform data gathering of large data from a range of data sources. 2. Critically analyse existing Big Data datasets and implementations, takingpracticality, and usefulness metrics into consideration. 3. Understand the role of statistics in the analysis of largeof datasets 4. Apply suitable statistical measures and analyses techniques fordata of various structure and content and present summary statistics 5. Demonstrate advanced knowledge of statistical dataanalytics as applied to large data sets

	6. Employ advanced statistical analytical skills to test assumptions, and togenerate and present new information and insights from large datasets
Data Science	After successful Completion of course the students should be able to 1. Present a report on how data is collected, managed and stored for data Science 2. Demonstrate scholarly knowledge while uncovering the concept of machine learning for analysis 3. Perform experiments on the estimation of the likelihood of events for generating recommendation and sentiment analysis for twitter real- time data 4. Determine how data science can be applied in real time application
Block Chain Technology	After successful completion of course the student should be able to 1. Understand basic concepts of block chain technology and its platforms 2. To develop various types of environments in block chain technology 3. To provide security prospects in an organization.
Cryptography and Network Security Lab	After successful completion of the lab, students can able to 1. Develop and implement a java interface for encryption and decryption algorithms i.e., AES, MD5 and RSA algorithms
Internet and Web Programming Lab	After successful completion of course the students should be able 1 Use Javascript and XHTML to create web pages with advanced interactivity 2 Program basic functions in Javascript and XHTML 3 Use javascript to create functional forms 4 Us Javascript to control browser frames and windows 5 Use cascading style sheets to

	design web pages
Wireless Networks	After successful completion of the course students should be able to 1. Demonstrate Conversant with the latest 3G/4G and WiMAX networks and its architecture. 2. Design wireless network environment for any application using latest wireless protocols and standards. 3. Implement different type of applications for smart phones and mobile devices with latest network strategies.
Information Security	After successful completion of course the students should be able to 1. Formulate information security governance, and related legal and regulatory issues. 2. Devices how threats to an organization are discovered, analyzed, and dealt with. 3. Evaluate network security threats and countermeasures. 4. Construct network security designs using available secure solutions (such as PGP, SSL, IPSec, etc) 5. Acquire the knowledge of advanced security issues and technologies (such as DDoS attack detection and containment, and anonymous communications)
Internet of Things	After successful completion of course the students should be able to 1. Analysing and understanding the vision of IoT from a global context. 2. Determine the Market perspective of IoT. 3. Can use devices like Raspberry PI-Interfaces, Gateways and Data Management in IoT. 4. Able to build architecture in IoT.
Cyber Physical Systems	After successful completion of course the student should be able to 1. Understand how cyber security is going to help the implications of cybercrime. 2. Illustrate various aspects of Cyber security, Cyber crimes and its related laws in Indian

	and Global Act.
	3. Analyse the legal perspectives and laws related to cybercrimes in Indian context.
	4. Apply security and privacy methods in development of modern applications and in organizations to protect people and to prevent cyber crimes.
Fault Tolerant Computing	After successful completion of course the student should be able to
	1. Perform probabilistic dependability analysis of fault-tolerant computer system using fault-trees, reliability block diagrams.
	2. Describe the principles and properties of techniques used for error detection, error recovery and error masking in computer systems.
	3. Design system architectures for fault-tolerant computer systems from a given requirements specification.
	Formulate requirements for fault-tolerant computer systems used in business, safety and mission critical applications.
Speech and Natural Language Processing	Aftersuccessful completion of course the students should be able to
	1. Acquainted with natural language processing and learn how to apply basic algorithms in this field.
	2. Evaluate the algorithmic description of the main language levels: morphology, syntax, semantics, and pragmatics, as well as the resources of natural language data - corpora.
	3. Demonstrate the basics of knowledge representation, inference, and relations to the artificial intelligence.
Basics of Data Structures	After successful completion of course the student should be able to
	1. Understand the basic concepts of Object-Oriented Programming like inheritance, polymorphism, etc.
	2. Analyze object-oriented concepts and identify various types of errors.
	3. Solve various real time problems using data structures using Stacks, Queues and linked list.

	4. Apply Graph search, traversal algorithms, etc. using OOPS concepts. 5. Develop algorithms and programs for various sorting and searching techniques.
Introduction to programming with Python	After successful completion of course the student should be able to 1. Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. 2. Express proficiency in the handling of strings and functions. 3. Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. 4. Identify the commonly used operations involving file systems and regular expressions. 5. Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
Fundamentals of Computer Organization	After successful completion of course the student should be able to 1. Demonstrate knowledge on Computer Arithmetic units, Register Transfer and Computer Instructions, Design of Control Unit, Input Output Organization and Memory system, Pipelining and Multiprocessing. 2. Analyze the functional units of a digital computer. 3. Design the functional modules in a digital computer - Arithmetic Units, Memory and I/O. 4. Investigate the performance of memory, I/O, and pipelined processors. 5. Select appropriate techniques of I/O, Pipelining and Multiprocessing to solve computing problems. Apply contextual knowledge of computer systems development to societal applications.
Basics of Computer Networks	After successful completion of course the student should be able to

	1. Understand and explore the basics of Computer Networks and Various Protocols 2. Administrate a network and schedule flow of information 3. Examine the network security issues in Mobile and ad hoc networks. 4. Demonstrate the TCP/IP and OSI fashions with merits and demerits. 5. Evaluate the shortest path by using Routing algorithms. 6. Design the Application layer protocols
Introduction to C++ Programming	After successful completion of course the student should be able to 1. Able to develop programs with reusability 2. Construct programs for file handling Handle exceptions in programming 3. Apply applications for a range of problems using object-oriented programming techniques
Introduction to Artificial Intelligence	After successful completion of course the student should be able to 1. Recognize various AI domains and identify problem solving techniques to apply them in real time applications. 2. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search based techniques to solve them. 3. Represent Knowledge in propositional calculus and Predicate calculus. 4. Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information. 5. Get wide exposure about strong and weak slot & fillers available.
Introduction to Java Programming	After successful completion of course the student should be able to 1. Identify classes, objects, members of a class and relationships among them needed for a specific problem 2. Write Java application programs using OOP

	principles and proper program structuring 3. Demonstrate the concepts of polymorphism and inheritance 4. Write Java programs to implement error handling techniques using exception handling
Fundamentals of Internet of Things	After successful completion of course the students should be able to 1. Analysing and understanding the vision of IoT from a global context. 2. Determine the Market perspective of IoT. 3. Can use devices like Raspberry PI-Interfaces, Gateways and Data Management in IoT. 4. Able to build architecture in IoT.