

## **Program Outcomes**

1. Ability to understand and apply knowledge on analysis, design and development of software Applications.
2. Utilize skills and knowledge for computing practice with commitment on social, ethical and legal values.
3. Ability to work with latest computing technologies and pursue careers in IT industry/consultancy/ research and development, teaching and allied areas.

## **Course Outcomes**

### **1<sup>ST</sup> Semester**

#### **Ability Enhancement Course-1(AEC-1): Environment Science**

The students will be able to

- a. To identify, formulate and solve environmental problems by utilizing the concept of environmental studies.
- b. To avoid environmental pollution & Global Problems.
- c. To understand human activities which are causing environmental degradation and the measures to be taken to avoid this problem.
- d. To create awareness among people about protection of wild life & forests.

#### **Core Course-1(CC-1): Digital Logic**

The students will be able to

- a. Get a thorough knowledge of Digital electronics.
- b. Be able to design simple logic circuits.
- c. The students will acquire knowledge about the design and organization of components in computing systems.

#### **Core Course- 2(CC-2): Programming Using C**

The students will be able to

- a. Solve problems systematically and to implement the solution in C language.
- b. Develop programming skills.
- c. Develop the knowledge of how to learn a programming language, which will help in learning other Computer Languages in the curriculum.

#### **Generic Elective/ Inter-disciplinary Course -1(GEC-1): Principles of Management**

The students will be able to

- a. Integrate management principles into management practices.
- b. Assess managerial practices and choices relative to ethical principles and standards.
- c. Specify how the managerial tasks of planning, organizing, and controlling can be executed in a variety of circumstances.

## **2<sup>ND</sup> SEMESTER**

### **Ability Enhancement Course-2(AEC-2): English**

The student will be able to

- a. Give oral presentations and receive feedback on their performance.
- b. Increase their reading speed and comprehension of academic articles.
- c. Improve their reading fluency skills through extensive reading.
- d. Enlarge their vocabulary by keeping a vocabulary journal.

### **Core Course-3 (CC-3): Programming Using C++**

The students will be able to

- a. Design the classes needed, given a problem specification.
- b. Implement the designed classes using the object oriented programming language.
- c. Learn how to test, verify, and debug object-oriented programs and create programs using object oriented principles.

### **Core Course- 4 (CC-4): Data Structure**

The students will be able to

- a. Choose appropriate data structure for solving problems considering resource constraints such as time and space.
- b. To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps binary search trees, and graphs and writing programs for these solutions.

### **Generic Elective/ Inter-disciplinary Course -2 (GEC-2): Statistics**

Students will be able to

- a. Organize, manage and present data.
- b. Analyze statistical data graphically using frequency distributions and cumulative frequency distributions.
- c. Analyze statistical data using measures of central tendency, dispersion and location.
- d. Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events.
- e. Translate real-world problems into probability models.

### **3<sup>rd</sup> Semester**

#### **Core Course-5 (CC-5): Computer Organisation**

The students will be able to

- a. To understand the structure, function and characteristics of computer systems.
- b. To understand the design of the various functional units and components of computers.
- c. To identify the elements of modern instructions sets and their impact on processor design.

#### **Core Course- 6(CC-6): Java Programming**

The students will be able to

- a. Use the syntax and semantics of java programming language and basic concepts of OOP.
- b. Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
- c. Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.
- d. Design event driven GUI and web related applications which mimic the real word scenarios.

#### **Core Course -7(CC-7): Discrete Mathematical structure**

The students will be able to

- a. Write an argument using logical notation and determine if the argument is or is not valid.
- b. Demonstrate the ability to write and evaluate a proof **or** outline the basic structure of and give examples of each proof technique described.

#### **Skill Enhancement Course- 1(SEC-1): Python Programming**

The students will be able to

- a. Understand why Python is a useful scripting language for developers.
- b. Learn how to design and program Python applications.

#### **Generic Elective- 3(GE-3): Business Accounting**

The students will be able to

- a. Know and apply accounting and finance theory.

- b. Explain and apply international accounting standards.
- c. Critically evaluate financial statement information.
- d. Evaluate and compare different investments.

## **4th Semester**

### **Core Course-8(CC-8): Operating System**

The students will be able to

- a. Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.
- b. Analyze important algorithms eg. Process scheduling and memory management algorithms etc.

### **Core Course-9(CC-9): Computer Networks**

The students will be able to

- a. Understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Model.
- b. Understand various types of transmission media, network devices; and parameters of evaluation of performance for each media and device.
- c. Understand the concept of flow control, error control and LAN protocols; to explain the design of, and algorithms used in, the physical, data link layers.
- d. Understand the working principles of LAN and the concepts behind physical and logical addressing, sub netting and super netting.

### **Core Course– 10(CC-10): Database System**

The students will be able to

- a. Define program-data independence, data models for database systems, database schema and database instances.
- b. Translate queries to Relational Algebra. Identify Structure Query Language statements used in creation and manipulation of Database.
- c. Identify the methodology of conceptual modeling through Entity Relationship model.
- d. Identify the methodology of logical model. Identify the methodology of physical model.
- e. Develop an understanding of the differences between OODBMS, ORDBMS and RDBMS and the practical implications of each approach. Analyze and design a real database application.

### **Skill Enhancement Course 2(SEC-2): Android Programming**

The students will be able to

- a. Install and configure Android application development tools.
- b. Design and develop user Interfaces for the Android platform.
- c. Save state information across important operating system events.
- d. Apply Java programming concepts to Android application development.

#### **Generic Elective 4(GE-4): Business Economics**

The students will be able to

- a. To analyze the causes and consequences of different market conditions.
- b. To integrate the concept of price and output decisions of firms under various market structure.
- c. The objective of this course is to impart the knowledge of economics as a subject and its importance while business.

### **5<sup>th</sup> Semester**

#### **Core Course-11(CC-11): Web Technology**

The students will be able to

- a. Analyze a web page and identify its elements and attributes.
- b. Create web pages using XHTML and Cascading Style Sheets.
- c. Build dynamic web pages using JavaScript (Client side programming).
- d. Can perform database connectivity.

#### **Core Course-12(CC-12): Software Engineering**

The students will be able to

- a. Apply software engineering principles and techniques.
- b. Develop, maintain and evaluate large-scale software systems.
- c. Produce efficient, reliable, robust and cost-effective software solutions.
- d. Perform independent research and analysis.
- e. Work as an effective member or leader of software engineering teams.

#### **Discipline Specific Elective-1(DSE-1): Unix Programming**

The students will be able to

- a. Run various UNIX commands on a standard UNIX/LINUX Operating system.
- b. Run C / C++ programs on UNIX.
- c. Do shell programming on UNIX OS.
- d. Understand and handle UNIX system calls.

#### **Discipline Specific Elective-2(DSE-2): Data Mining**

The students will be able to

- a. Understand standard data mining methods and techniques such as association rules, data clustering and classification.
- b. Gain practical intuition about how to apply these techniques on datasets of realistic sizes using modern data analysis frameworks.

## **6<sup>th</sup> Semester**

### **Core Course -13(CC-13): Computer Graphics**

The students will be able to

- a. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
- b. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- c. Use of geometric transformations on graphics objects and their application in composite form.
- d. Extract scene with different clipping methods and its transformation to graphics display device.
- e. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.

### **Core Course-14(CC-14): Numerical Techniques**

The students will be able to

- a. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.
- b. Analyze and evaluate the accuracy of common numerical methods.

### **Discipline Specific Elective –3(DSE-3): Data Science**

The students will be able to

- a. Critically apply the theories and methodologies of data science to new research in their primary area of study.
- b. Apply appropriate principles, frameworks, and models to evaluate and interpret the frontiers of knowledge in their primary area of study.
- c. Demonstrate expository and oral communication skills appropriate to a Ph.D., publishing and presenting work in their field.
- d. Critique data practices for ethical issues, including discriminatory practices, power imbalances, and invasions of privacy.
- e. Demonstrate advanced competency in data science tools and techniques, applied statistical analysis, and a domain area relevant to their area of specialization.

### **Discipline Specific Elective –4(DSE-4): Ecommerce/Project Work**

The students will be able to

- a. Analyze the impact of E-commerce on business models and strategy.
- b. Describe the major types of E-commerce.
- c. Explain the process that should be followed in building an E-commerce presence.
- d. Identify the key security threats in the E-commerce environment.
- e. Describe how procurement and supply chains relate to B2B E-commerce.

**Project Work:**

The students will be able to

- a. To apply the software engineering principles on software project
- b. Develop a software product using the Agile methodology

**7<sup>th</sup> Semester**

**Core Course-15(CC-15): Combinatory and Graph Theory**

The students will be able to

- a. Understand and explain the basic concepts of graph theory.
- b. Apply the basic concepts of mathematical logic.
- c. Analyze the basic concepts of mathematical logic.
- d. Evaluate some real time problems using concepts of graph theory.

**Core Course-16(CC-16): Compiler Design**

The students will be able to

- a. Realize basics of compiler design and apply for real time applications.
- b. Introduce different translation languages.
- c. Understand the importance of code optimization.
- d. Know about compiler generation tools and techniques.

**Core Course-17(CC-17): Distributed System**

The students will be able to

- a. Outline the potential benefits of distributed systems.
- b. Summarize the major security issues associated with distributed systems along with the range of techniques available for increasing system security.
- c. Apply standard design principles in the construction of these systems.
- d. Select appropriate approaches for building a range of distributed systems, including some that employ middleware.

**Core Course-18(CC-18): Network security**

The students will be able to

- a. Understand various Cryptographic Techniques.
- b. Apply various public key cryptography techniques.
- c. Implement Hashing and Digital Signature techniques.
- d. Implement system level security applications.

## **8<sup>th</sup> semester**

### **Core Course-19(CC-19): Algorithms Design and Analysis**

The students will be able to

- a. Design algorithms for various applications such as Robotics, Artificial Intelligence, Machine learning, Computer Networks, Parallel computing, etc.
- b. Use the appropriate data structure in context of solution of given problem.
- c. Develop programming skills which require solving given problems.

### **Core Course-20(CC-20): Theory of Computation**

The students will be able to

- a. Model, compare and analyze different computational models using combinatorial methods.
- b. Apply rigorously formal mathematical methods to prove properties of languages, grammars and automata.
- c. Construct algorithms for different problems and argue formally about correctness on different restricted machine models of computation.

### **Core Course-21(CC-21): Advanced Computer Architecture**

The students will be able to

- a. Understand the Concept of Parallel Processing and its applications
- b. Implement the Hardware for Arithmetic Operations
- c. Analyze the performance of different scalar Computers
- d. Develop the Pipelining Concept for a given set of Instructions

### **Core Course- 22(CC-22): Artificial Intelligence**

The students will be able to

- a. Have fundamental understanding of the basic concepts of artificial intelligence (AI).
- b. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- c. Have fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- d. Have knowledge of current scope and limitations, and societal implications of AI.
- e. Have basic foundation of machine learning.



## **9<sup>th</sup> semester**

### **Core Course- 23(CC-23): Cloud Computing**

The students will be able to

- a. Understand the fundamental principles of distributed computing.
- b. Understand how the distributed computing environments known as Grids can be built from lower-level services.
- c. Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing.
- d. Analyze the performance of Cloud Computing.
- e. Understand the concept of Cloud Security.

### **Core Course-24(CC-24): Internet of Things**

The students will be able to

- a. Able to understand the application areas of IoT.
- b. Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
- c. Able to understand building blocks of Internet of Things and characteristics.

### **Core Course- 25(CC-25): Machine Learning**

The students will be able to

- a. To introduce students to the basic concepts and techniques of Machine Learning.
- b. To develop skills of using recent machine learning software for solving practical problems.
- c. To gain experience of doing independent study and research.

### **Core Course-26(CC-26): Block Chain Technology**

The students will be able to

- a. Understand and explore the working of Block chain technology (Understanding)
- b. Analyze the working of Smart Contracts (Analyze)
- c. Understand and analyze the working of Hyper ledger (Analyze).
- d. Apply the learning of solidity and de-centralized apps on Ethereum

## **10<sup>th</sup> Semester**

### **Major Project**

- a. Its aim is to demonstrate the skill and knowledge students have acquired in their studies.
- b. It is also a way of identifying the students' ability to perform an industrial project or applied research linked to the knowledge they have gained in their discipline.
- c. It allows students to choose methods, tools and make decisions throughout the entire project, much like what a professional undertakes when carrying out a task.