

Programme Name: B.Sc., Computer Science

Program Code: 22K

Graduate attributes:

GA1	Domain Knowledge	Knowledge
GA2	Domain Analysis	
GA3	Design and Development of Solutions	
GA4	Communication Skills	Skills
GA5	Innovative and Entrepreneurial Skills	
GA6	Leadership and Management Skills	
GA7	Individual and Team Work	Attitude
GA8	Ethical and Social Responsibility	
GA9	Life-long Learning	

PROGRAMME EDUCATIONAL OUTCOME (PEO's)

The B. Sc. Computer Science program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	To enrich knowledge in core areas related to the field of computer science and mathematics.
PEO2	To provide opportunities for acquiring in-depth knowledge in Industry 4.0/5.0 tools and techniques and there by design and implement software projects to meet customer's business objectives.
PEO3	To enable graduates to pursue higher education leading to Master and Research Degrees or have a successful career in industries associated with Computer Science or as entrepreneurs
PEO4	To enhance communicative skills and inculcate team spirit through professional activities, skills in handling complex problems in data analysis and research project to make them a better team player
PEO5	To embed human values and professional ethics in the young minds and contribute towards nation building.
PEO6	To develop project

PROGRAMME SPECIFIC OUTCOME (PSO's)

After the successful completion of B.Sc. Computer Science program, the students are expected to	
PSO1	Impart the fundamental principles and methods of Computer Science to a wide range of applications.
PSO2	Develop and deploy applications of varying complexity using the acquired knowledge in various programming languages, data structures and algorithms, database and networking skills.
PSO3	To investigate, analyze complex problems by the application of suitable mathematical and research tools, to design Information Technology products and solutions
PSO4	To identify and utilize the state-of-the-art tools and techniques in the design and development of software products and solutions.
PSO5	Ability to identify, interpret, analyze and design solutions using appropriate algorithms of varying complexities in the field of information and communication technology.

PROGRAMME OUTCOME(PO's)

On successful completion of the B.Sc. Computer Science program	
PO1	Disciplinary knowledge: Capable to apply the knowledge of mathematics, algorithmic principles and computing fundamentals in the modeling and design of computer based systems of varying complexity.
PO2	Scientific reasoning/ Problem analysis: Ability to critically analyze, categorizes, formulate and solve the problems that emerges in the field of computer science.
PO3	Problem solving: Able to provide software solutions for complex scientific and business related problems or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
PO4	Environment and sustainability: Understand the impact of software solutions in environmental and societal context and strive for sustainable development.
PO5	Modern tool usage: Use contemporary techniques, skills and tools necessary for integrated solutions.
PO6	Ethics: Function effectively with social, cultural and ethical responsibility as an individual or as a team member with positive attitude.
PO7	Cooperation / Team Work: Function effectively as member or leader on multidisciplinary teams to accomplish a common objective.
PO8	Communication Skills: An ability to communicate effectively with diverse types of audience and also able to prepare and present technical documents to different groups.
PO9	Self-directed and Life-long Learning: Graduates will recognize the need for self-motivation to engage in lifelong learning to be in par with changing technology.
PO10	Enhance the research culture and uphold the scientific integrity and objectivity

COURSE OUTCOME(CO's)

SEMESTER - I

Course Name: Computing Fundamentals and C Programming

#	Course Outcome	
CO1	Learn about the Computer fundamentals and the Problem solving	K2
CO2	Understand the basic concepts of C programming	K2
CO3	Describe the reason why different decision making and loop constructs are available for iteration in C	K3
CO4	Demonstrate the concept of User defined functions , Recursions , Scope and Lifetime of Variables, Structures and Unions	K4
CO5	Develop C programs using pointers Arrays and file management	K3

Course Name: Digital Fundamentals and Computer Architecture

#	Course Outcome	
CO1	Learn the basic structure of number system methods like binary, octal and hexadecimal and understand the arithmetic and logical operations are performed by computers.	K3
CO2	Define the functions to simplify the Boolean equations using logic gates.	K1
CO3	Understand various data transfer techniques in digital computer and control unit operations.	K2
CO4	Compare the functions of the memory organization	K4
CO5	Analyze architectures and computational designs concepts related to architecture organization and addressing modes	K4

Course Name: PROGRAMMING LAB - C

#	Course Outcome	
CO1	Remember and Understand the logic for a given problem and to generate Prime numbers & Fibonacci Series (Program-1,2,3)	K1, K2
CO2	Apply the concepts to print the Magic square, Sorting the data , Strings, Recursive functions and Pointers (Program-4,5,6,8,10)	K2, K3
CO3	Remember the logic used in counting the vowels in a sentence (Program-7)	K1
CO4	Apply and Analyze the concepts of Structures and File management (Program-9,11,12)	K3, K4

SEMESTER - II

Course Name: C++ PROGRAMMING

#	Course Outcome	
C01	Define the different programming paradigm such as procedure oriented and object oriented programming methodology and conceptualize elements of OO methodology	K1
C02	Illustrate and model real world objects and map it into programming objects for a legacy system.	K2
C03	Identify the concepts of inheritance and its types and develop applications using overloading features.	K3
C04	Discover the usage of pointers with classes	K4
C05	Explain the usage of Files, templates and understand the importance of exception Handling	K5

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Course Name: INTERNET BASICS

#	Course Outcome	
C01	Understand the fundamentals of Internet and the Web concepts	K2
C02	Explain the usage of internet concepts and analyze its components	K2
C03	Identify and apply the online information resources	K3
C04	Inspect and utilize the appropriate Google Apps for education effectively	K3, K4

SEMESTER - III

Course Name: Data Structures

#	Course Outcome	
C01	Understand the basic concepts of data structures and algorithms	K1-K2
C02	Construct and analyze of stack and queue operations with illustrations	K2-K4
C03	Enhance the knowledge of Linked List and dynamic storage management.	K2-K3
C04	Demonstrate the concept of trees and its applications	K2-K3
C05	Design and implement various sorting and searching algorithms for applications and understand the concept of file organizations	K1-K4

Course Name: Java Programming

#	Course Outcome	
C01	The competence and the development of small to medium sized application programs that demonstrate professionally acceptable coding	K1-K2
C02	Demonstrate the concept of object oriented programming through Java	K2-K4
C03	Apply the concept of Inheritance, Modularity, Concurrency, Exceptions handling and data persistence to develop java program	K3
C04	Develop java programs for applets and graphics programming	K3
C05	Understand the fundamental concepts of AWT controls, layouts and events	K1-K2

Course Name: Programming Lab - JAVA

#	Course Outcome	
C01	Understand the basic concepts of Java Programming with emphasis on ethics and principles of professional coding	K1, K2
C02	Demonstrate the creation of objects, classes and methods and the concepts of constructor, methods overloading, Arrays, branching and looping	K2
C03	Create data files and Design a page using AWT controls and Mouse Events in Java programming Implement the concepts of code reusability and debugging.	K2, K3
C04	Develop applications using Strings, Interfaces and Packages and applets	K3
C05	Construct Java programs using Multithreaded Programming and Exception Handling	K3

Course Name:Skill Based Subject I:Software Engineering and Software Project Management

#	Course Outcome	
C01	Understand the basic concepts of software engineering	K1
C02	Apply the software engineering models in developing software applications	K2-K3
C03	Implement the object oriented design in various projects	K4
C04	Knowledge on how to do a software project with in-depth analysis.	K3
C05	To inculcate knowledge on Software engineering concepts in turn gives a roadmap to design a new software project.	K1-K4

SEMESTER - IV

Course Name: System Software and Operating Systems

#	Course Outcome	
C01	Know the program generation and program execution activities in detail	K1
C02	Understand the concepts of Macro Expansions and Gain the knowledge of Editing processes	K2-K3
C03	Remember the basic concepts of operating system	K1
C04	Understand the concepts like interrupts, deadlock , memory management and file management	K2
C05	Analyze the need for scheduling algorithms and implement different algorithms used for representation, scheduling, and allocation in DOS and UNIX operating system.	K1-K4

Course Name: Linux and Shell Programming

#	Course Outcome	
C01	Describe the architecture and features of Linux Operating System and distinguish it from other Operating System.	K1
C02	Develop Linux utilities to perform File processing, Directory handling, User Management and display system configuration	K2-K3
C03	Develop shell scripts using pipes, redirection, filters and Pipes	K2
C04	Apply and change the ownership and file permissions using advance Unix commands.	K3
C05	Build Regular expression to perform pattern matching using utilities and implement shell scripts for real time applications.	K3-K6

Course Name: Programming Lab – LINUX and SHELL PROGRAMMING

#	Course Outcome	
C01	Develop Linux utilities to perform File processing, Directory handling and User Management	K1, K2
C02	Understand and develop shell scripts using pipes, redirection, filters, Pipes and display system configuration	K2-K3
C03	Develop simple shell scripts applicable to file access permission network administration	K3
C04	Apply and change the ownership and file permissions using advance Unix commands	K4, K5
C05	Create shell scripts for real time applications	K6

Course Name: Skill Based Subject 2 (Lab) : Software Project Management

#	Course Outcome	
C01	Prepare a Project Plan with requirement analysis and specification	K1, K2
C02	Understand and develop cost estimation model for real time applications.	K2, K3
C03	Implement the concepts of checkpoints in design phase	K3,
C04	Analyze the Development phase of the database and text area of the applications	K4, K5
C05	Create SDLC for real time applications.	K6

SEMESTER - V**Course Name: RDBMS & Oracle**

#	Course Outcome	
C01	Understand the basic concepts of Relational Data Model, Entity-Relationship Model and process of Normalization	K1-K2
C02	Understand and construct database using Structured Query Language (SQL) in Oracle9i environment.	K1-K3
C03	Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Functions.	K1-K4
C04	Understand and use built-in functions and enhance the knowledge of handling multiple tables	K1-K3
C05	Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	K2-K4

Course Name: Visual Basic

#	Course Outcome	
C01	Demonstrate fundamental skills in utilizing the tools of a visual environment such as command, menus and toolbars.	K1
C02	Implement SDI and MDI applications using forms, dialogs and other types of GUI components.	K2
C03	Understand the connectivity between VB with MS-ACCESS database.	K3
C04	Implement the methods and techniques to develop projects.	K4
C05	Attain a good practical skill of managing ODBC and Data Access Objects	K2-K4

Course Name: Programming Lab – VB & Oracle

#	Course Outcome	
C01	Understand the concepts of Visual Basic.	K1
C02	Learn the advantages of Controls in VB	K2
C03	Design and develop the event- driven applications using Visual Basic framework.	K3
C04	Apply the knowledge of database methods.	K4
C05	Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Functions	K6

Course Name: Elective – I: PYTHON Programming

#	Course Outcome	
C01	Remembering the concept of operators, data types, looping statements in Python programming.	K1
C02	Understanding the concepts of Input / Output operations in file..	K2
C03	Applying the concept of functions and exception handling	K3
C04	Analyzing the structures of list, tuples and maintaining dictionaries	K4
C05	Demonstrate significant experience with python program development environment	K4-K6

Course Name: Elective – I: Computer Networks

#	Course Outcome	
C01	Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.	K1
C02	Understand Internet structure and can see how standard problems are solved and the use of cryptography and network security.	K2
C03	Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.	K3
C04	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies	K4
C05	Knowledge about different computer networks, reference models and the functions of each layer in the models	K2- K4

Course Name: Elective – I Organizational Behaviour

#	Course Outcome	
C01	Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.	K1
C02	Develop Managerial skills for Individual Behaviors.	K2
C03	Analyze the complexities associated with management of the group behavior in the organization. Analyze how to manage the Stress during a job.	K3
C04	Develop an Organizational Behaviour model for any type of Organization.	K3
C05	Analyze the Common biases and eradication in Decision Making Process.	K4

Course Name: :Skill Based Subject I:Software Testing

#	Course Outcome	
C01	Explain the basic concepts and the processes that lead to software testing	K2
C02	Design test cases from the given requirements using Black box testing techniques	K3
C03	Identify the test cases from Source code by means of white box testing techniques	K3
C04	Know about user acceptance testing and generate test cases for it	K4
C05	Examine the test adequacy criteria to complete the testing process	K4

SEMESTER - VI

Course Name: Graphics & Multimedia

#	Course Outcome	
C01	Explain applications, principles, commonly used and techniques of computer graphics and algorithms for Line-Drawing, Circle-Generating and Ellipse- Generating.	K2
C02	Students will get the concepts of 2D and 3D, Viewing, Curves and surfaces, Hidden Line/surface elimination techniques	K3
C03	Studies concepts of Multimedia Systems, Text, Audio and Video tools	K3
C04	Compressing audio and video using MPEG-1 and MPEG-2	K4
C05	Creates Animation with special effects using algorithms	K6

Course Name: Project Work Lab

#	Course Outcome	
C01	Formulate a real world problem and develop its requirements develop a design solution for a set of requirements	K3
C02	Test and validate the conformance of the developed prototype against the original requirements of the problem.	K5
C03	Work as a responsible member and possibly a leader of a team in developing software solutions.	K3
C04	Express technical ideas, strategies and methodologies in written form. Self-learn new tools, algorithms and techniques that contribute to the software solution of the project.	K1-K4
C05	Generate alternative solutions, compare them and select the optimum one	K6

Course Name: Programming Lab – Graphics & Multimedia

#	Course Outcome	
C01	Understand the basic concepts of computer graphics.	K1
C02	Design scan conversion problems using C and C++ programming.	K2
C03	Apply clipping and filling techniques for modifying an object.	K3
C04	Understand the concepts of different type of geometric transformation of objects in 2D.	K4
C05	Understand and develop the practical implementation of modeling, rendering, viewing of objects in 2D	K6

Course Name: Elective –II Network Security and Cryptography

#	Course Outcome	
C01	Remember the basic concept of Cryptography and various types of attacks.	K1
C02	Understand about various types of protocols for Internet Security.	K2
C03	Implement various algorithms for Cryptography	K3
C04	Review Firewall and IP security	K4
C05	To be familiar with network security threats and countermeasure	K3-K5

Course Name: Elective –II Artificial Intelligence and Expert Systems

#	Course Outcome	
C01	Understand the nature of AI problems and task domains of AI.	K1
C02	Apply the appropriate search procedures to solve the problems by using best algorithms.	K2
C03	Analyze and select the suitable knowledge representation method.	K3
C04	Manipulate the acquired knowledge and infer new knowledge.	K4
C05	Demonstrate the development of AI systems by encoding the knowledge.	K5

Course Name: Elective –II Web Technology

#	Course Outcome	
C01	Understand and analyse the TCP/IP basics.	K1
C02	Understand Domain server name, FTP, TFTP, basics of WWW, web browser architecture.	K2
C03	Knowledge of Microsoft and java technologies, dynamic web pages, DHTML, ASP and JSP.	K2-K3
C04	Understanding active web pages, Java Applet, Java bean, CORBA, RMI and EDI architecture	K2-K3
C05	Knowledge on XML, XML parser, WAP	K4-K6

Course Name: Elective –III Data Mining

#	Course Outcome	
C01	Identify data mining tools and techniques in building intelligent machines understand	K1-K2
C02	Analyze various data mining algorithms in applying in real time applications.	K2-K4
C03	Demonstrate the data mining algorithms to combinatorial optimization problems	K2-K3
C04	Illustrate the mining techniques like association, classification and clustering on transactional databases.	K2-K3
C05	Perform exploratory analysis of the data to be used for mining.	K3-K6

Course Name: Elective –III Open Source Software

#	Course Outcome	
C01	Understand the significance of open source practices and guidelines.	K2
C02	Manipulate open source databases based on user requirements	K3
C03	Implement web programming with PHP	K3
C04	Integrate open source web frameworks in an application	K4
C05	Write desktop and web applications with Python	K6

Course Name: Elective –III Internet of Things (IoT)

#	Course Outcome	
C01	To understand the fundamentals of Internet of Things.	K1
C02	To know the basics of communication protocols and the designing principles of Web connectivity.	K2
C03	To gain the knowledge of Internet connectivity principles	K2-K3
C04	Designing and develop smart city in IoT	K2-K3
C05	Analyzing and evaluate the data received through sensors in IOT.	K4-K5

Course Name: Skill Based Subject - IV Programming Lab – Software Testing

#	Course Outcome	
C01	Understand the importance of software quality/software testing and apply software testing techniques for information systems development	K1
C02	Generate test cases from software requirements using various test processes for continuous quality improvement.	K2
C03	Understand flow graphs and apply path testing	K3
C04	Apply software testing techniques in commercial environments and assess the adequacy of test suites using control flow, data flow and program mutation	K4
C05	Identify the inputs and deliverables of the testing process and work together as a team in preparing a report	K6