Department of Computer Science

1) Program : B.Sc.(Computer Science)

	Program Specific Outcomes
PO1	To offer eligible candidate specialization in a wide range of computer application.
PO2	To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
PO3	4 To create awareness about process and product standards. To train students in professional skills related to Software Industry.
PO4	The banking sector, central services, defense services(air forces, navy, army) hire such professionals.
PO5	To prepare necessary knowledge base for research and development in Computer Science .
PO6	To integrate both theoretical and practical components of study.
PO7	To imbibe quality software development practices.
PO8	To help students build-up a successful career in Computer Science

Program Specific outcomes (PSOs) for Undergraduate Courses.

1) **Program : Bachelor of Computer Science**

Program Outcomes	
PSO1	Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems.
PSO2	Design, implements, test, and evaluate a computer system, component, or algorithm to meet desired needs and to solve a computational problem.
PSO3	To Enhance skills and adapt new computing technologies for attaining professional excellence and carrying research.
PSO4	Development of communication skills, in overall progression of student.
PSO5	The syllabus of Statistics for First Year of this course covers basic concepts and terminology in Statistics and covers basic tools and methods required for data analysis. The teachers teaching this syllabus and students should give emphasis on understanding the concepts and ability to apply statistical tools and techniques and not on the theoretical discussion. It is expected that at the end of the course, a student should be well equipped to learn and apply acquired techniques in computer based applications.

COURSE OUTCOMES (COs) FOR UNDERGRADUATE COURSES

1)Program: B.Sc.(Computer Science)

<table>
<tr><th colspan="2">Course Outcomes</th></tr>
<tr><th>Subject Code :</th><th>F.Y.B.Sc.(Computer Science) SEM-I</th></tr>
<tr>
<td>CS-111
(Problem solving using Computer and 'C' Programming)</td>
<td>
a) Understand basics of different computer peripherals and interfaces.
b) Describe architecture of various computer hardware devices and their functioning.
c) Study the details of system buses, memory system, and I/O interfaces.
d) Identify the existing configuration of the computers and peripherals.
e) Analyze progress in contemporary peripherals and bus systems..
f) Define the basic concepts of algorithms and analyze the performance of algorithms
</td>
</tr>
<tr>
<td>CS-112
(Database Management System)</td>
<td>
a) In this way, data appears centralized logically.
b) Data integrity: Data integrity means the reliability and accuracy of data. Integrity rules are designed to keep the data consistent and correct.
c) Describe DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical and network models.
</td>
</tr>
<tr>
<td>CSST-111
(Descriptive Statistics)</td>
<td>
a) To provide basic information about variables in a dataset.
b) To highlight potential relationships between variables.
c) The three most common descriptive statistics can be displayed graphically or pictorially and are measures of: Graphical/Pictorial Methods.
</td>
</tr>
<tr>
<td>CSST-112
(Mathematical Statistics)</td>
<td>
a) Express the concepts of factorial and the basic principal of counting.
b) Solve the problems about permutation, combination and Binomial Theorem.
c) express the concept of probability and its features.
d) Explain the concept of a random event.
e) Express the probability definitions.
f) Define the sample space.
g) Formulate theorems about the concept of probability.
h) Calculate probabilities using Conditional probability, Rule of total probability and Bayes' theorem.
</td>
</tr>
<tr>
<td>ELC-111
(Semiconductor Devices and Basic Electronic Systems)</td>
<td>
a) Explains the working principle of a p-n junction.
b) Describes electronic behavior of a diode in a circuit.
c) Explains current-voltage characteristics of a diode under forward and reverse bias.
d) Explains the working principle of a junction transistor.
e) Explains the behavior of carriers in a junction transistor.
</td>
</tr>
</table>

ELC-112 (Principle of Digital Electronics)	a) Represent numerical values in various number systems and perform number conversions between different number systems b) Explain operation of logic gates using IEEE/ANSI standard symbols, use of different minimization techniques for combinational circuits. c) Analyze and design digital combinational circuits. d) Analyze and design sequential logic circuits.
MTC-111 (Matrix Algebra)	On successful completion of this course unit students will be able to: a) Understand the basic ideas of vector algebra: linear dependence and independence and spanning; b) Know how to find the row space, column space and null space of a matrix, and be familiar with the concepts of dimension of a subspace and the rank and nullity of a matrix, and to understand the relationship of these concepts to associated systems of linear equations; c) Be familiar with the notion of a linear transformation and its matrix;
MTC-112 (Discrete Mathematics)	a) Determine equivalent logic expressions b) Describe useful standard library functions, create functions, and declare parameters c) Use graphs and trees d) Apply basic and advanced principles of counting e) Define sets and sequences f) And calculate discrete probabilities. g) Design and evaluate Euler and Hamilton circuits
Subject Code :	**F.Y.B.Sc.(Computer Science) SEM-II**
Cs-121 (Advanced 'C' Programming)	a) C language is one of the most popular programming languages which are able to make low level applications like device drivers, operating systems, firmware etc along with the high level applications like desktop applications. b) C language is much popular for embedded systems programming due to its flexibility.

CS-122 (Relational Database Management System)	a) a) Identify basic database storage structures and access techniques such as file organizations, indexing methods including B-tree, and hashing. b) Learn and apply Structured query language (SQL) for database definition and database manipulation. c) Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database. d) d)Understand various transaction processing, concurrency control mechanisms and database protection mechanisms.
CSST-121 (Methods of Applied Statistics)	a) **Applied Statistical Methods** covers the fundamental understanding of **statistical methods** necessary to deal with a wide variety of practical problems. b) Other chapters explore the distribution of several important **statistics**; point and interval estimation; and simple linear regression.
CSST-122 (Continuous Probability Distributions and Testing of Hypothesis)	a) The **purpose of hypothesis testing** is to determine whether there is enough statistical evidence in favor of a certain belief, or **hypothesis**, about a parameter. b) H**ypothesis** is basically an idea that must be put to the test. **Research** questions should lead to clear, testable predictions. The more specific these predictions are, the easier it is to reduce the number of ways in which the results could be explained.
ELC-121 (Instrumentation System)	a) The students will be able to handle any kind of process by framing it in block diagram, mathematical model and different process variables. b) The students will be able to handle different types of controller like electronic, pneumatic and hydraulic. c) The students will be able to implement different control schemes to various processes. d) The students will be able to design relay logic for various processes
ELC-122 (Basics of Computer Organizations)	a) Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os. b) Analyze the performance of commercially available computers. c) To develop logic for assembly language programming

MTC-121 (Linear Algebra)	On successful completion of this course unit students will be able to: a) Understand the basic ideas of vector algebra: linear dependence and independence and spanning; b) Know how to find the row space, column space and null space of a matrix, and be familiar with the concepts of dimension of a subspace and the rank and nullity of a matrix, and to understand the relationship of these concepts to associated systems of linear equations; c) Be familiar with the notion of a linear transformation and its matrix; d) Find the Gram-Schmidt orthogonalization of a matrix.
MTC-122 (Graph Theory)	a) Define the basic concepts of graphs. b) Identify Eulerian and Hamiltonian graphs. c) Explain the concepts of connectedness and distance. d) Summarize the basic properties of trees and their applications. e) Know the concept of the planar graph and its theory. f) Know the concept of graph coloring and its theory g) Summarize the theory of matching in graphs.

Course Outcomes	
Subject Code :	**S.Y.B.Sc.(Computer Science)SEM-III**
CS-231 (Data Structures and Algorithms-I)	a) Understand the concept of Dynamic memory management, data types, algorithms, Big O notation. b) Understand basic data structures such as arrays, linked lists, stacks and queues. c) Describe the hash function and concepts of collision and its resolution methods d) Solve problem involving graphs, trees and heaps e) Apply Algorithm for solving problems like sorting, searching, f) insertion and deletion of data.

CS-232 (Software Engineering)	a) Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
	b) Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare as well as global, cultural, social, environmental, and economic factors.
	c) Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

MT-231 (Group Theory)	On completion of this unit successful students will be able to: a) Demonstrate when a binary algebraic structure forms a group. b) Construct Caley tables. c) Determine possible subgroups of a group. d) Identify normal subgroups of a group. e) Examine symmetric and permutation groups. f) Explain group and subgroup orders using Lagrange's theorem.
MT-232 (Numerical analysis)	a) Student will be able to apply numerical derivation and numerical integration methods. b) find the numerical differentiation by using the n-point method c) find the numerical integration by using the trapezodial rule d) find the numerical integration by the Simpson's rules e) find the numerical integration by using the Romberg integration method
ELC-231 (Microcontroller, Architecture & Programming)	a) Define Embedded system and its Applications in industry. b) Understand working of PIC 18F Microcontroller Architecture and Programming model. c) Understand the concept of Timer, Interrupt, I/O Port interfacing with PIC 18F Microcontroller. d) Understand the concept of Interfacing with Real time System. e) Define Microprocessor and Microcontroller family with comparison. f) Understand working of 8051/8052and MCS251 Microcontroller Architecture and Programming model. g) Understand the concept of Timer, Interrupt, I/O Port interfacing with 8051 Microcontroller. h) Understand the concept of Interfacing with Real time System
ELC-232 (Digital Communication & Networking)	a) Convert between wavelengths and frequencies b) describe the main differences between lasers and LEDs as used as light sources for optical-fibre communications systems c) describe the difference between direct and external modulation of a laser d) describe the difference in structure and performance of step-index multimode, graded-index multimode and single-mode optical fibres e) draw up a power budget for an optical-fibre communication link and use it to estimate the maximum link distance.
Subject Code :	**S.Y.B.Sc.(Computer Science) SEM-IV**

CS-241 (Data Structures and Algorithms-II)	a) Define the basic concepts of algorithms and analyze the performance of algorithms. b) Discuss various algorithm design techniques for developing algorithms. c) Discuss various searching, sorting and graph traversal algorithms.
CS-242 (Computer Network)	a) Implement any topology using network devices b) Understand the TCP/IP configuration for Windows and Linux c) Implement device sharing on network d) d)Learn the major software and hardware technologies used on computer networks
MT-241 (Calculus)	a) Be able to solve algebraic equations and inequalities involving the square root and modulus function understand the difference between equations and identities, and be able to prove simple identities and inequalities. b) Be able to recognize odd, even, periodic, increasing, decreasing functions. c) Understand the operation of composition of functions. d) Be able to calculate limits by substitution and by eliminating zero denominators. e) Be able to calculate limits at infinity of rational functions. f) Calculate limits in indeterminate forms by a repeated use of L'Hopital's rule.

MT-242 (Operational Research)	a) Apply the techniques used in operations research to solve real life problem in mining Industry select an optimum solution with profit maximization; b) Have complete understand of the significant role operation research play in mining Project completion at every stage of the mines (Skills) use operations research to: c) Solve transportation problems during the allocation of trucks to excavators d) Formulate operation research models to solve real life problem e) Proficiently allocating scarce resources to optimise and maximise profit f) Eliminate customers / clients waiting period for service delivery turn real life problems into formulation of models to be solve by linear programming etc. g) Determine critical path analysis to solve real life project scheduling time and timely. h) Delivery use critical path analysis & programming evaluation production & review techniques.
ELC-241 (Embedded System Design)	a) Designing using ARM processors. b) Use Real time software for designing instrumentation. c) systems Design with configurable hardware systems
ELC- 242 (Wireless Communication & Internet of things)	a) Basics of Wireless Communication Systems. b) Understands Wireless Transceivers and Advanced Transceivers. c) Understands Wireless Application Protocol. d) Understands Different Wireless trends in Industry

Course Outcomes	
Subject Code :	**T.Y.B.Sc.(Computer Science)SEM-V**
CS-331 (Systems Programming)	a) To understand the design structure of a simple editor. b) To understand the design structure of Assembler and macro processor for a hypothetical simulated computer. c) To understand the working of linkers and loaders and other development utilities. d) To understand Complexity of Operating system as a software
CS-332 (Theoretical Computer Science)	a) To have an understanding of finite state and pushdown automata. b) To have a knowledge of regular languages and context free languages. c) To know the relation between regular language, context free language and corresponding recognizers. d) To study the Turing machine and classes of problems.
CS-333 (Computer Networks -I)	a) Understand different types of networks, various topologies and application of networks. b) Understand types of addresses, data communication. c) Understand the concept of networking models, protocols, functionality of each layer. d) Learn basic networking hardware and tools.
CS-334 (Internet Programming I)	a) Learn Core-PHP, Server Side Scripting Language. b) Learn PHP-Database handling.
CS-335 (Programming in Java-I)	a) Students will be able to: b) Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. c) Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem d) Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved. e) Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development. f) Identify and describe common abstract

CS-336 (Object Oriented Software Engineering)	a) Understanding importance of Object Orientation in Software engineering b) Understand the components of Unified Modeling Language C Understand techniques and diagrams related to structural modeling c) Understand techniques and diagrams related to behavioral modeling d) Understand techniques of Object Oriented analysis, design and testing

Subject Code :	T.Y.B.Sc.(Computer Science)SEM-VI
CS-341 (Operating Systems)	a) To understand design issues related to process management and various related algorithms . b) To understand design issues related to memory management and various related algorithms . c) To understand design issues related to File management and various related algorithms
CS-342 (Compiler Construction	a) To understand design issues of a lexical analyzer and use of Lex tool b) To understand design issues of a parser and use of Yacc tool c) To understand issues related to memory allocation d) To understand and design code generation schemes
CS-343 (Computer Networks –II)	a) Basic networking concepts. b) Understand wired and wireless networks, its types, functionality of layer. c) Understand importance of network security and cryptography.
CS-344 (Internet Programming II)	a) Learn different technologies used at client Side Scripting Language. b) Learn XML,CSS and XML parsers. c) One PHP framework for effective design of web application. d) Learn JavaScript to program the behavior of web pages. e) Learn AJAX to make our application more dynamic.
CS-345 (Programming in Java-II)	a) learn the Internet Programming, using Java Applets b) create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings c) apply event handling on AWT and Swing components. d) learn to access database through Java programs, using Java Data Base Connectivity (JDBC) e) create dynamic web pages, using Servlets and JSP. f) To develop a game application using multithreading CO-4 To learn socket programming concept
CS-346 (Computer Graphics)	a) Computer programming skills in C programming language. b) Basic understanding of use of data structures. c) Basic Mathematical concepts related to matrices and geometry.