PSG College of Arts & Science

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B.Sc. COMPUTER SCIENCE

2016 - 2019

B.Sc. COMPUTER SCIENCE
SCHEME OF EXAMINATIONS
(For students admitted from 2014-15 & onwards)

CODE NO.	SUBJECT	EXAM DURA-TION (Hrs)	Max. Marks			Credit points
			CA	CE	Total	
First Semester						
Part –I						
14LAU01 12LAU01 14LAU01	Tamil – I OR Hindi – I OR French-I	3	25	75	100	3
14EU01	Communicative English – I Interpersonal Communication	3	25	75	100	3
14CMU01	Programming in C	3	25	75	100	3
14CMU02	Fundamentals of Digital Computers	3	25	75	100	3
14CMU03	Mathematics – I **(Allied – MA)**	3	25	75	100	4
14CMU04	LAB-I (C Programming Lab)	3	40	60	100	2
14CMU05	LAB-II (Office Automation Lab)	3	40	60	100	2
Second Semester						
Part – I						
14LAU02 12LAU02 14LAU02	Tamil – II OR Hindi – II OR French-II	3	25	75	100	3
Part – II						
14EU02	Communicative English II– Academic Communication	3	25	75	100	3
Part – III						
14CMU06	Object Oriented Programming using C++	3	25	75	100	3
14CMU07	Data Structures	3	25	75	100	3
14CMU08	Mathematics – II **(Allied-MA)**	3	25	75	100	4
14CMU09	LAB-III(C++ Programming Lab)	3	40	60	100	2
14CMU10	LAB-IV (Data Structures using C Lab)	3	40	60	100	2
Part – IV						
14VEU01	Value Education	-	100	-	100	2

CODE NO.	SUBJECT	EXAM DURA-TION (Hrs)	Max. Marks			Credit points
			CA	CE	Total	
Third Semester						
Part – III						
14CMU11	Programming in JAVA	3	25	75	100	3
14CMU12	Relational Database Management System	3	25	75	100	3
14CMU13	System Analysis and Design	3	25	75	100	3
14CMU14	Microprocessor and ALP	--	100	--	100	3
14CMU15	Business Accounting (**Allied-CO**)	3	25	75	100	4
14CMU16	Lab-V (JAVA Programming Lab)	3	40	60	100	2
14CMU17	Lab-VI (RDBMS Lab)	3	40	60	100	2
Part – IV						
14ESU01	Environmental Studies	--	100	--	100	2
Fourth Semester						
Part – III						
14CMU18	VB.Net Programming	3	25	75	100	3
14CMU19	Computer Graphics	3	25	75	100	3
14CMU20	Computer Networks	3	25	75	100	3
14CMU21	Industrial and Organizational Psychology (**Allied – PS**)	3	25	75	100	4
14CMU22	Statistics and Operations Research (**Allied-ST**)	3	25	75	100	4
14CMU23	Lab –VII (VB.Net Programming Lab)	3	40	60	100	2
14CMU24	Lab-VIII (Computer Graphics and Animation Lab)	3	40	60	100	2
Part – IV						
14SBU01	**Skill Based Subject:** Internet Security	--	100	--	100	2
Placement Training to be completed in IV Semester (Mandatory)						

FOUR WEEKS FOR MINI PROJECT DURING SUMMER VACATION

CODE NO.	SUBJECT	EXAM DURA-TION (Hrs)	Max. Marks			Credit points
			CA	CE	Total	
Fifth Semester						
Part – III						
14CMU25	Web Science	3	25	75	100	3
14CMU26	C# Programming	3	25	75	100	3
14CMU27	Software Engineering	3	25	75	100	3
14CMU28	System Programming and Operating System	--	100	--	100	3
14CMU29A 14CMU29B	***Core Elective – I*** : Cryptography and Network Security OR Mobile Computing	3	25	75	100	4
14CMU30	Lab - IX (Web Science Lab)	3	40	60	100	2
14CMU31	Lab - X (C# Programming Lab)	3	40	60	100	2
14CMU32	Mini Project	--	40	60	100	4
Part IV						
14NME01	**Non-Major Elective (1):** EDC	--	100	--	100	2
14NME02	**Non-Major Elective (2):** General Awareness (On-line Test)	**1½**	--	100	100	2
Sixth Semester						
Part – III						
14CMU33	PHP Programming	3	25	75	100	3
14CMU34	Data mining	3	25	75	100	4
14CMU35A 14CMU35B	***Core Elective – II*** : Neural Networks and Fuzzy Logic OR Cloud Computing	3	25	75	100	4
14CMU36	Lab – XI (PHP Programming Lab)	3	40	60	100	2
14CMU37	Major Project	-	80	120	200	8
					Total Credits	**136**

PART – V		
Extension Activity: NSS / NCC / Sports / Department Extension Activity	I-VI Semesters	2
Competence Enhancement: Add-on Course / Women's Studies / Extra paper	I-VI Semesters	2
	Grand Total	**140**

14CMU01 PROGRAMMING IN C SEMESTER - I

OBJECTIVES: Total Hours: 45

To make the students proficient in:

- C language elements, Expressions, Functions, Pointers, Structures, File concepts.
- Solving the problem using C

UNIT I (9 Hours)

INTRODUCTION TO C: The C Character Set – Identifiers and Keywords – Data Types – Constants – Variables and Arrays – Declarations – Expressions – Statements – Symbolic Constants.

OPERATORS AND EXPRESSIONS: Arithmetic Operators – Unary Operators – Relational and Logical Operators – Assignment Operators – The Conditional Operator.

UNIT II (9 Hours)

INPUT AND OUTPUT STATEMENTS: Single Character Input – Single Character Output – Entering Input Data – Writing Output Data – The Gets and Puts Function.

CONTROL STATEMENTS: Branching – Looping – Nested Control Structures – Switch Statement – Break Statement – Continue Statement – Comma Operator – GOTO Statement.

UNIT III (9 Hours)

FUNCTIONS: Defining a Function – Accessing a Function – Function Prototypes – Passing Arguments to a Function – Recursion.

PROGRAM STRUCTURE: Storage Classes – Atomic Variables – Global Variables- Static Variables.

ARRAYS: Defining an Array – Passing Arrays to Functions – Multidimensional Arrays.

UNIT IV (9 Hours)

STRINGS: Defining a String – NULL Character – Initialization of Strings – Reading & Writing a String – Processing a String – Searching and Sorting of Strings.

POINTERS: Pointer Declarations – Passing Pointers to a Function – Dynamic Memory Allocation – Array of Pointers.

STRUCTURES AND UNIONS: Definition of Structures – User- Defined Data Types – Structures and Pointers – Passing Structures to Functions – Unions.

UNIT V (9 Hours)

FILE HANDLING: Opening and Closing a File – Reading and Writing a Data File – Processing a Data File – Unformatted Data Files - Concepts of Binary Files.

LOW LEVEL PROGRAMMING: Register Variables – Bitwise Operations – Bit Fields.

ADDITIONAL FEATURES OF C: Enumerations – Command Line Parameters.

TEXT BOOK:

Byron Gottfried**,** "Programming with C" Third Edition, McGraw Hill Education (India) Pvt Ltd., 2013.

REFERENCE BOOKS:

1. Yashavant Kanetkar "Let Us C" , BPB Publications, 9th Revised and updated edition, Tata McGraw Hill, 2013
2. Venugopal K.R, Sudeep R.P, "Programming with C", Tata McGraw Hill,2000.

14CMU02 FUNDAMENTALS OF DIGITAL COMPUTERS SEMESTER – I

OBJECTIVES: **Total Hours: 45**

Introducing digital fundamentals and organization to:

- Enable the students to have knowledge on digital circuits.
- Understand the Computer system architecture.

UNIT – I (9 Hours)

BINARY SYSTEMS : Digital computers and digital systems – Binary Numbers – Number base conversion – Octal and Hexadecimal numbers – Complements – Binary codes – Binary Storage and Registers – Binary Logic – Integrated circuits.

BOOLEAN ALGEBRA AND LOGIC GATES: Basic definitions – digital logic gates.

UNIT – II (9 Hours)

SIMPLIFICATION OF BOOLEAN FUNCTIONS : The map methods – NAND and NOR implementation.

COMBINATION LOGIC AND SEQUENTIAL LOGIC : Adders – Subtractors – BCD adder – Decoders – Demultiplexers – Encoders – Multiplexers – Flip-Flops : RS, D, JK, T, Master Slave – Shift registers.

UNIT – III (9 Hours)

REGISTER TRANSFER AND MICROOPERATIONS: Bus and memory transfers – Arithmetic Microoperations – Logic Microoperations – Shift Microoperations – Arithmetic logic shift unit.

UNIT – IV (9 Hours)

CENTRAL PROCESSING UNIT: General register organization – Stack organization – Instruction formats – Addressing Modes – Data transfer and manipulation – program control.

UNIT – V (9 Hours)

INPUT-OUTPUT ORGANIZATION: Asynchronous data transfer – Direct Memory Access.

MEMORY ORGANIZATION: Memory hierarchy – Main Memory – Auxiliary memory – Associative memory – Cache memory – Virtual memory.

TEXT BOOKS:

1. Morris Mano, “Digital Logic and Computer Design”, Prentice Hall of India, 2007. (Unit - I & II).
2. Morris Mano, “Computer System Architecture”, Prentice Hall of India , 3rd Edition, 2007. (Unit - III, IV & V).

REFERENCE BOOKS:

1. Thomas C.Bartee,”Digital Computer Fundamentals”, Tata Mcgraw hill, Reprint 2007.
2. John D. Carpinelli, “Computer Organization & Architecture”, Pearson Education, 2007.

14CMU03 **MATHEMATICS - I**

Total Hours:45

Unit I : Chapter III (Sections 3.2 to 3.4) **9hrs**

Matrices: Rank of matrices-Consistency and inconsistency-Eigen values and Eigen vectors.

Unit II Sections: (2.1 to 2.4, 4.5.1,4.5.3, 4.5.4, 4.6) **9hrs**
Differential equations: Second order Ordinary Differential Equations with constant coefficients - First order Partial Differential Equations(Standard I, III & IV) - Lagrange's Differential Equations.

Unit III: Chapter IV(Sections :4.1, 4.2, 4.6 & 4.7)(Problems only) **9hrs**
Numerical methods:
Solution of System of Simultaneous Algebraic Equations : Gauss Elimination Method - Gauss Jordan Method - Gauss Jacobi Iterative Method - Gauss Seidal Iterative Method.

Unit IV :Chapter V(Sections : 5.1 to 5.10, 6.1 to 6.5) (Problems only) **9hrs**
Numerical methods:
Difference table – Interpolation - Newton's Forward Interpolation formula - Newton's Backward Interpolation Formula - Construction of polynomials - Equidistant terms with one or more missing values.

Unit V (Sections: 9.1 to 9.3, 9.8 , 9.10) (Problems only) **9hrs**
Numerical methods:
Numerical Differentiation:
Newton's Forward and Newton's Backward formula to compute the Derivatives.
Numerical Integration:
The Trapezoidal rule - Simpson's $1/3^{rd}$ and $3/8^{th}$ rule.

Text Book:

1. **S. Narayanan and T.K. Manickavachagam Pillai** ,"**Ancillary Mathematics**" (**For Unit I), S. Viswanathan (Printers & Publishers) Pvt Ltd, 2012**
2. **S. Narayanan and T.K. Manickavachagam Pillai, " Calculus" Volume III (For Unit II), S. Viswanathan (Printers & Publishers) Pvt Ltd, 2011**
3. **Dr. M.K. Venkataraman** "**Numerical methods in Science and Engineering**" **(For Unit III, IV,V), The National Publishing Company , 2013**

14CMU04 LAB-I (C PROGRAMMING LAB) SEMESTER - I

1. Students Mark Sheet preparation.
2. Convert decimal to binary and binary to decimal using menu.
3. Find the factorial of a given number using Recursion.
4. Reverse an array element.
5. Find the number of vowels, consonants, digits and white spaces in a given string.
6. Find the Length of a string using Pointers.
7. Prepare an Electricity Bill using structure.
8. Read ‘n’ characters from a given text file from EOF position.
9. Create an Employee information system using file concept.
10. Find the sum of given numbers using Command line arguments.

14CMU05 LAB-II (OFFICE AUTOMATION LAB) SEMESTER -I

MS-WORD

1. Mail Merge
2. Prepare a newspaper for two column format (Page which includes border, background, Pictures, Header and Footer)

MS-EXCEL

3. Analyze a sample Sales Information System using Pivot Table and Pivot Chart.
4. Prepare an employee Pay slip and Calculate the Net pay using the formula (BP: 8000, HRA: 12%, PF: 5%, DA: 2%, TA 2.5%)
5. Implement Grouping Concept in MS-Excel.

MS-ACCESS

6. Create a database for Student Information System and Create necessary Query, Forms, and Reports
7. Create a database for Library Information System and Create necessary Query, Forms, and
Reports.

MS-POWER POINT

8. Prepare 10 to 15 slides on any of the topic of current IT trend with all necessary formats.
9. Prepare a presentation which imports pictures & videos.
10. Prepare 10 slides for an Advertisement Company to exhibit its features.

14CMU06 OBJECT ORIENTED PROGRAMMING USING C++ SEMESTER – II

OBJECTIVES: **Total Hours: 38**

- To know about the object oriented programming concepts.
- To understand the concepts of Files, Error handling and Templates.

UNIT-I (7 Hours)

INTRODUCTION TO C++: Object oriented technology - key concepts of object oriented programming - advantages of OOP.

INPUT AND OUTPUT IN C++: Streams in C++ - predefined streams - buffering - Stream classes - member functions of I stream class - unformatted console I/O operations - formatted console I/O operations - manipulators - user-defined manipulators - manipulators with parameters. C++ declarations - Types of tokens - data types in C++ - typecasting - operators of C and C++ - control structures.

UNIT-II (7 Hours)

FUNCTIONS IN C++: Introduction - parts of function - passing arguments - default arguments -const arguments - inline functions - library functions.

CLASSES AND OBJECTS: introduction - classes in C++ - declaring objects - defining member function - characteristics of member function - data hiding or encapsulation - classes, objects and memory - Static member variables and functions - array of objects - friend function - local classes - overloading member function.

CONSTRUCTORS AND DESTRUCTORS: introduction - characteristics of constructors and destructors - Constructors with argument - copy constructors - destructors.

UNIT-III (8 Hours)

OPERATOR OVERLOADING AND TYPE CONVERSION: introduction - overloading Unary operators - overloading Binary operator - rules for overloading operators.

INHERITANCE: Types of inheritance - virtual base class - object as class member - overloading member function.

POINTERS AND ARRAYS: Introduction - pointer declaration - void pointers - pointer to class - this pointer - pointer to members - accessing private members with pointers - arrays - characteristics of arrays.

UNIT-IV (8 Hours)

C++ AND MEMORY: The new and delete operators - dynamic objects.

BINDING POLYMORPHISM AND VIRTUAL FUNCTIONS: binding in C++ - virtual functions - rules for virtual functions - array of pointers - abstract classes - working of virtual functions.

APPLICATION WITH FILES: Introduction - file stream classes - steps of file operations - file opening modes - sequential read and write operations - Random Access operation - error handling functions - command line arguments.

UNIT-V **(8 Hours)**

TEMPLATES: Definition of class template - working of function templates - function templates with more arguments.

EXCEPTION HANDLING: Principles of exception handling - the keyword try - throw and catch - exception handling mechanism.

WORKING WITH STRINGS: Introduction - declaring and initializing string objects - handling string objects - comparing and exchanging strings.

TEXT BOOK:

1.Ashok N. Kamthane, "Object - Oriented Programming with C++", Dorling Kindersley Pvt Ltd, Seventh impression 2009.

REFERENCE BOOKS:

1. Bruce Eckel, "Thinking in c++", Pearson education Inc, 2007.
2. Herbert Schildt, "C++: The Complete Reference", 3rd edition, TMH.

14CMU07 DATA STRUCTURES SEMESTER – II

OBJECTIVES: **Total Hours: 38**

- To study specific data structures such as Static and Dynamic lists, Linear and Non-linear data structures.
- To learn efficient searching and sorting techniques.

UNIT - I **(7 Hours)**

INTRODUCTION: Basic Terminology, Data structure, Time and space complexity – Array – Structures – Pointers – Matrices - Sparse matrices - Application – String processing.

UNIT - II **(8 Hours)**

SORTING: Bubble sort - Insertion sort - Selection sort - Merge sort - Radix sort - Quick sort - Time and Space complexity.

SEARCHING: Binary search - Sequential search – Index search - Hashing.

UNIT - III **(7 Hours)**

LINKED LIST: Linked list - Dynamic memory allocation – Representation - Insertion, deletion and searching - Traversing in a list - Doubly linked list.

UNIT - IV **(8 Hours)**

STACK: Stack – Linked stack – Application – Expression - Infix-Prefix-Postfix Conversion & Evaluation - Recursion.

QUEUE : Queue - Linked queue - Circular queue – Dequeue - Priority queue - Application.

UNIT - V **(8 Hours)**

TREES: Binary trees-Traversal - BST-traversing - Insertion and deletion of nodes

AVL SEARCH TREES: Introduction – Application of all trees - Heap sort.

GRAPH: Terminology – Representation – Traversing - Shortest path problem.

TEXT BOOK:

1. Seymour Lipschutz – Schaum Series: “Theory and Problems of Data Structures”, TMH, New Delhi, 2002.

REFERENCE BOOKS:

1. Ellis Horowitz, Sartaj Sahni,” Fundamentals of Data Structures”, Galgotia Publications, 2000.
2. Tremblay Sorenson, “An Introduction to data structures with Applications”, Second Edition, Tata Mcgraw Hill Publishing Company

14CMU08 **MATHEMATICS II** **Total Hours:45**

UNIT-I: (12.1 to 12.12 except 12.4, 12.6 -12.10) **9hrs**

Mathematical logic: Introduction-propositional Calculus – Basic Logical Operations – Conditional Statements – Bi conditional Statements - Tautologies - Contradiction – Argument - Methods of proof .

UNIT-II: (3.1 to 3.7 & 3.11) **9hrs**

Relations: Introduction – Cartesian product of sets – Binary Relations - Set operations on Relations – Types of Relations – Partial order Relations – Equivalence Relation – Composition of Relations.

UNIT-III: (4.1 to 4.6) **9hrs**

Functions : Introduction – Definition and Notation of a function - Types of Functions – Invertible Functions – Composition of Functions –Identity Function.

UNIT-IV: (15.3 to 15.7) **9hrs**

Languages Grammar and Automata: Languages- Regular expressions and Regular Languages- Grammar- Finite-state Machine- Finite-state Automata

UNIT-V: (9.2 to 9.5, 9.8, 10.2 & 10.3) **9hrs**

Graph Theory : Introduction –Basic Terminology –Paths- Cycles and Connectivity- Subgraphs- Types of Graphs –Representation of Graphs in Computer Memory.
Trees : Definitions and properties of Trees- Binary trees .

Text Book:

J.K. Sharma ,"Discrete Mathematics" by Macmillan Publishers India Ltd – Third Edition 2011

14CMU09 LAB - III (C++ PROGRAMMING LAB) SEMESTER – II

1. Prepare employee pay slip using class.
2. Implement the concept of inline and static functions.
3. Implement the concept of friend function by adding two complex numbers.
4. Create library management system using array of objects. Each object will have book name, author name, publisher name, number of copies, and available copies.
5. Implement string manipulation using operator overloading.
6. Implement the concept of multiple constructors.
7. Prepare the student mark list using inheritance.
8. Implement virtual function to display the area of circle and area of triangle.
9. Implement templates to read a set of integers and floats and find average, min and max value.
10. Compare contents of two files using command line arguments.

14CMU10 LAB - IV (DATA STRUCTURES USING C LAB) SEMESTER – II

1. Implement the concept of Bubble sort.
2. Implement the concept of Insertion sort.
3. Implement the concept of Selection sort.
4. Implement the concept of Quick sort.
5. Search a given number using Binary search.
6. Search a given number using Linear search.
7. Implement Stack operations using Linked list.
8. Implement Queue operations using Linked list.
9. Convert an Infix expression to Postfix expression.
10. Create a Binary search tree and traverse it using Function.

14CMU11 PROGRAMMING IN JAVA SEMESTER – III

OBJECTIVES: Total Hours :45

- To learn Object Oriented Concepts.
- To learn Graphical Interface and Database Connectivity

UNIT-I (9 Hours)

AN OVERVIEW OF JAVA : object-oriented programming - Lexical issues - Java class libraries

DATA TYPES, VARIABLES AND ARRAYS : Simple types - Integer, floating point types, characters, Boolean - Literals – Variables - Type conversion and casting - Automatic type promotion in Expressions – Arrays.

OPERATORS : Arithmetic operators, Bit wise operators, Relational operators, Boolean Logical operators, The Assignment operators, The?: Operators - Operators precedence - Using parenthesis.

CONTROL STATEMENTS : Selection Statements - Iteration Statements - Jump statements.

UNIT–II (10 Hours)

INTRODUCING CLASSES : Class Fundamentals – Declaring objects – Assigning object reference variables – Introducing methods – Constructors – this keyword – Garbage collection – Finalize() method – A stack class.

STRING HANDLING : The string constructors - String length - Special string operations - Character extraction - String comparison - Searching strings - Modifying a string - String buffer.

INHERITANCE : Inheritance basis – Using super – Creating a multilevel hierarchy – When constructors are called – Method overriding – Dynamic method dispatch – Using abstract classes – Using final with Inheritance – The object class.

PACKAGES & INTERFACES: Packages, Access protection – Importing packages – Interfaces.

UNIT–III (10 Hours)

EXCEPTION HANDLING : Exception handling fundamentals - Exception types - Uncaught exceptions - Using try and catch - Multiple catch clauses - Nested try statements - Throw - Throws - Finally - Java's built in exceptions – Creating your own exceptions subclasses – Using exceptions.

MULTITHREADED PROGRAMMING: The java threads method - thread priorities - Synchronization – Inter thread communication – Suspending, Resuming and Stopping threads.

INPUT/OUTPUT: Files - Stream Classes - The Byte streams - The character streams - Using stream I/O.

UNIT–IV **(9 Hours)**

APPLET CLASS: Applet Basics – Applet Architecture – An Applet Skeleton – Simple Applet Display Methods – Requesting Repainting – Using the status window - The HTML Applet tag – Passing parameters to applets.

EVENT HANDLING : The event handling mechanisms – The delegation event model – Event classes – Sources of events – Events listener interfaces – Using the delegation event model – Adapter classes – Inner classes.

SWING – JApplet : Icons and Labels – Text Fields – Buttons – Combo Boxes – Tabbed Panes – Tables.

UNIT–V **(7 Hours)**

JDBC CONNECTIVITY: JDBC Package – Types of JDBC Drivers – JavaSoft Framework – Driver Interface and Driver Manager Class – The Essential JDBC program – Using Prepared Statement Object.

TEXT BOOK:

1. Herbert Schildt "The Complete Reference JAVA ™ 2", Mc-Graw Hill Limited, Fifth Edition. (Unit I,II,III & IV)
2. Kogent Learning Solutions, "Java 6 Programming Black Book", Dreamtech Press 6th Edition (Unit V)

REFERENCE BOOK:

1. Patrick Naughton, Herbert Schildt, "Java 2: The Complete Reference", Mc Graw Hill Limited.

14CMU12 RELATIONAL DATABASE MANAGEMENT SYSTEM

SEMESTER – III

OBJECTIVES: **Total Hours: 45**

To impart the knowledge of:

- Basics about the Databases and their structures.
- Various Constraints that can be applied to various Databases.
- Structured Query Language
- Relational databases, Oracle Databases, Stored Functions, Stored Procedures & Triggers.

UNIT- I **(8 Hours)**

INTRODUCTION: Purpose of Database System - View of Data - Database Languages - Relational Databases – Database Design – Data Storage and Querying - Transaction Management - Database Architecture – Data Mining and Information Retrieval – Specialty Databases – Database Users and Administrators.

UNIT-II **(10 Hours)**

RELATIONAL DATABASES: Structure of Relational Databases – Database Schema – Keys – Relational Query Languages – Relational Operations.

FORMAL RELATIONAL QUERY LANGUAGES: The Relational Algebra.

DATABASE DESIGN AND THE E-R MODEL: The Entity-Relationship Model – Constraints – Entity-Relationship Diagrams.

RELATIONAL DATABASE DESIGN: Atomic Domains and First Normal Form – Decomposition Using Functional Dependencies.

UNIT-III **(9 Hours)**

INTERACTIVE SQL: Invoking SQL * plus- Data manipulation in Database Management Systems – Oracle Data Types – Two Dimension Matrix Creation- Insertion of data into tables- Updating the contents of a table – Deletion operations – The many faces of the Select command- Modifying the structure of the table – Removing/Deleting/Dropping tables – Data constraints – Computations in expression lists used to select data – Logical operations – Range searching – Pattern matching – Oracle functions – Grouping data from tables in SQL – Manipulating dates in SQL – Joins – Sub queries.

UNIT-IV **(9 Hours)**

Using the Union, Intersect and Minus clause - Indexes – Views – Sequences- Granting permissions- Revoking the permissions given – Creation of reports in SQL* plus

PL/SQL: Introduction – Execution – PL/SQL syntax, Oracle transaction locks – Cursors.

STORED PROCEDURES: Introduction - Creating Stored Procedures – An application using a Procedure - Deleting a Stored Procedure.

UNIT-V **(9 Hours)**

STORED FUNCTIONS: Introduction – Advantages of Functions – Creating a Stored Function – An application using a Function – Deleting a Stored Function

DATABASE TRIGGERS: Types of Triggers – Creating Triggers – Deleting Triggers.

TEXT BOOKS:

1. Silberschatz A, Korth H F, S.Sudarshan "Database System Concepts",McGraw-Hill, Sixth Edition ,2011 (Unit I & II)
2. Ivan BayRoss, "Commercial Application Development Using ORACLE Developer 2000", BPB Publication, New Delhi, 2007 (Unit III, IV & V)

REFERENCE BOOK:

1. Ramez Elmasri, Shamkant B.Navathe, "Fundamentals of Database Systems", Pearson Education, Fifth Edition, 2008.
2. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", Mc Graw Education, 2003.

14CMU13 SYSTEM ANALYSIS AND DESIGN SEMESTER – III

OBJECTIVES: Total Hours: 45

To impart the knowledge of:

- System Development Life Cycle
- System Analysis, Design and Implementation

UNIT-I (9 Hours)

SYSTEMS CONCEPTS: The system concept – The elements of system – Types of Systems.

System Development Life Cycle – The role of system analyst.

UNIT-II (9 Hours)

SYSTEMS ANALYSIS: Information gathering tools – The tools of Structured Analysis – Feasibility Study – Cost/Benefit Analysis.

UNIT-III (9 Hours)

SYSTEM DESIGN: Input/Output and Forms Design – File Organization and database design.

UNIT-IV (9 Hours)

SYSTEM IMPLEMENTATION: System Testing and Quality Assurance – Implementation and Software Maintenance –Primary Activities of a Maintenance Procedure-Reducing Maintenance costs.

UNIT-V (9 Hours)

Hardware/Software Selection and the computer contract – Project Scheduling and Software.

TEXT BOOK:

Elias M.Awad, "Systems Analysis and Design", Galgotia Publications Pvt Ltd., 2010

REFERENCE BOOK:

Alan Dennis,Barbara Haley Wixom, Roberta M.Roth,"Systems Analysis and Design", John Wiley & Sons, 4th Edition, 2010.

14CMU14 MICROPROCESSOR AND ALP SEMESTER – III

Total Hours: 45

OBJECTIVES:

- Familiarize students with microprocessor-based circuit design. The course deals with the Applications, Organization, Architecture and Design of microprocessor systems.
- Types of addressing modes, bus structures, memory and I/O, Interfacing, interrupt mechanisms, and related techniques of the hardware and assembly language levels.

UNIT – I (9 Hours)

MICROCOMPUTER SYSTEM: Microprocessor architecture and its operations – Microprocessor initiated operations and 8085 bus organization- internal data operations and the 8085 registers-peripheral initiated operations –memory classifications.

UNIT – II (9 Hours)

MICROPROCESSOR ARCHITECTURE AND MEMORY INTERFACING: The 8085 microprocessor-microprocessor communications and bus timing-demultiplexing the bus-generating control signals- the 8085 MPU and its architecture-memory interfacing-memory structure and its requirements-basic concepts in memory interfacing-address decoding and memory addresses.

UNIT –III (9 Hours)

INTRODUCTION TO BASIC INSTRUCTION AND PROGRAMMING TECHNIQUES: Data transfer (copy) instruction – arithmetic operations – logic operations – branch operations –programming techniques – looping, counting and indexing - additional data transfer and 16 bit arithmetic instruction – arithmetic operations related to memory – rotate logic operations – compare.

UNIT – IV (9 Hours)

SOFTWARE DEVELOPMENT: Addition of two 8/16 bit numbers-subtraction of two 8/16 bit numbers-find ones complement of 8/16 bit numbers- masking of least significant/most significant bits of an 8 bit data – to find largest number in an array- to find smallest number in an array –ascending order and descending order-sum of series of 8-bit numbers-multiplication of two -8-bit data- division of two -8-bit data-block data transfer.

UNIT –V (9 Hours)

APPLICATIONS: 8255 PPI – block diagram – control word – I/O mode operation-design of binary/ring counter- water level indicator – block diagram of ADC 0809 – temperature measurement- display of motor speed.

TEXT BOOKS:

1. Ramesh S Gaonkar, "Microprocessor Architecture, Programming and Applications with 8085", V Edition, Prentice Hall 2002. (Unit - I, II, III & IV).

2. B.Ram, “Fundamentals of Microprocessor and Microcomputers”, V Edition, Dhanpat Rai Publications, 2003. (Unit - IV & V).

REFERENCE BOOK:

1. A.P. Mathur, “Introduction to Microprocessors”III Edition, TMH, 2011.

14CMU15 BUSINESS ACCOUNTING - (ALLIED) Semester III

Learning Objective: To provide knowledge in the basic concepts of Accounting.

	Hours
UNIT I - Double Entry Book Keeping Double Entry Book Keeping – Meaning – Accounting - Objectives Of Accounting, Uses And Limitations Of Accounting - Principles , Conventions And Concepts Of Accounting - Journal	**8**
UNIT II - Ledger & Trial Balance Ledger- Trial Balance – Preparation Of Trial Balance.	**10**
UNIT III - Subsidiary Books Subsidiary Books: Sales Book – Purchases Book, Sales Return Book - Purchase Return Book..	**10**
UNIT IV - Final Accounts Final Accounts with adjustments – Preparation Of Trading And Profit And Loss Account – Balance Sheet.(simple problems only)	**10**
UNIT V - Cost Accounting Cost Accounting – Meaning – Scope, Objectives – Advantages And Limitations Of Cost Accounting. Difference Between Cost Accounting And Financial Accounting – Elements Of Cost Sheet – Preparation Of Cost Sheet.	**10**

Distribution of Marks: 80% Problems and 20% Theory .

Text Books

1. Grewal .T.S., “Double Entry Book keeping”, S.Chand & Co.Ltd, New Delhi .
2. Jain & Narang., “Cost Accounting”, Kalyani Publishers, New Delhi .

Reference Books

1. Gupta R.L., “Advanced Accountancy”, Sultan Chand & Son’s, New Delhi
2. Jain.S.P., Narang.K.L., “Advanced Accountancy”, Kalyani Publishers, New Delhi

14CMU16 Lab-V (JAVA PROGRAMMING LAB) SEMESTER – III

1. Calculate students mark sheet and display the grade sheet along with the best student detail.
2. Perform String operation using string and String Buffer Class.
3. Implement inheritance concept.
4. Prepare an employee pay slip for the employees and throw exceptions when
    (a) Basic pay<5000 and >30,000
    (b) Differences between Date of joining and Date of Birth is greater than 25
    (c) Invalid date
5. Implement File operations.
6. Design an Applet for Multithreading.
7. Design an Applet to display the welcome message.
8. Design a Registration Form using Swing Classes.
9. Create a user defined package in java which consists of the following classes:
    a) Random Number generation
    b) Calculation of Area for various geometrical figures
    c) Import this package into another class that requires these operations and use these classes.
10. Design a login form with username and password and validate it .

14CMU17 LAB-VI (RDBMS LAB) SEMESTER – III

1. Creation of tables using the SQL statement with constraints and do the following Operations:
    a. Insert
    b. Delete
    c. Alter
    d. Drop
2. Generate queries using the following statements
    a. Select
    b. Update
    c. Insert from already existing table
3. Generate queries using the following:
    a. Sub queries
    b. Joins
    c. Nested Queries
4. Generate queries using the following:
    a. Date functions
    b. Library functions
5. Generate queries using the following:
    a. Group by statement
    b. Order by statement
6. Creation of Report for Mark Sheet Preparation.

PL/SQL

7. Calculate total and percentage of marks of the students in four subjects.
8. Create a Row trigger to insert the existing values of the salary table into a new table when the salary table is updated.
9. Create a Stored function that accepts the department number and returns the total Salary of the department to the calling program and display it.
10. Create a cursor for manipulating Employee details.

14CMU18 VB.Net PROGRAMMING SEMESTER-IV

OBJECTIVES: Total Hours: 45

- Introducing the Graphical User Interface environment for programming.
- Introducing the basics of Visual Basic.Net.
- Imparting the basics of Visual Basic.Net toolbars, controls & Menu system.

UNIT -I (7 Hours)

INTRODUCTION: Understanding Visual Basic.Net –What is .Net - Programming in .Net frame work - The .NET Languages-Command line compilation.

UNIT- II (9 Hours)

INTRODUCING PROJECTS, FORMS, AND BUTTONS: Types of projects- Starting and configuring Visual Studio.Net - Adding Windows forms- Running a project-Adding a form Controls- Using If Statements-Using Form Properties-Setting Background and foreground Colors – Understanding Event-Driven Programming-Monitoring Events.

UNIT- III (9 Hours)

WORKING WITH FORMS, METHODS AND MODULES: Using form methods-Working with forms –Working with Graphics Object-Working with the Toolbox-Adding Picture Box Controls-Adding Checkbox Controls-Using For..Next Statements-Using Arrays in VB.Net-Working with Combo Boxes, List Boxes and checked List Boxes.

UNIT –IV (10 Hours)

ADDING STATUS BARS, TOOL BARS, TOOL TIPS, TABBED DIALOGS: Working with Status Bars-Working with Toolbars-Adding ToolTips-Using Common Dialog Controls-Using the SaveFileDialog and OpenFileDialog Controls-Working with the Timer Component-Using the MainMenuControl-Creating Menus Interactively.

UNIT- V (10 Hours)

ERRORS, EXCEPTION AND DEBUGGING: Understanding the Errors and Exceptions-Syntax errors - Runtime Errors - Logical Errors- Exceptions

WORKING WITH DATA AND ADO.NET: Reviewing Database Basics-Using the data Components-Creating a Dataset with Data Components-Building Controls to data

TEXT BOOK:

1. Harold Davis," Visual Basic .NET Programming" BPB Publication, 2006 Edition

REFERENCE BOOKS:

1. Shrish chavan, "Visual Basic .NET Programming" BPB Publication, 2009 Edition.
2. Jeffrey R. Shapiro, "The Complete Reference-Visual Basic.NET " Tata Mc Graw-Hill Edition 2002.

14CMU19 COMPUTER GRAPHICS SEMESTER – IV

OBJECTIVES: Total Hours: 45

- To know the basics of computer graphics
- Input/output graphical devices, Two dimensional Transformations
- To explore the 3D display methods and color models

UNIT-I (9 Hours)

OVERVIEW OF GRAPHICS SYSTEM: Video display devices – Refresh Cathode Ray Tubes – Raster Scan Displays – Random Scan Displays – Color CRT Monitors – DVST – Flat Panel Displays - Input devices - Hard copy devices - Graphics software.

OUTPUT PRIMITIVES: Line drawing algorithms - Circle Generating algorithms.

UNIT-II (9 Hours)

ATTRIBUTES OF OUTPUT PRIMITIVES: Line attributes – Curve attributes - Color and Grayscale levels - Area fill attributes - Character attributes - Inquiry functions.

TWO DIMENSIONAL GEOMETRIC TRANSFORMATIONS: Basic transformations - Matrix representations - Composite transformations - Other transformations.

UNIT-III (9 Hours)

TWO DIMENSIONAL VIEWING: Window-to-Viewport Co-ordinate Transformation - Clipping Operations-Point Clipping – Line Clipping – Cohen Sutherland Line Clipping – Polygon Clipping – Sutherland-Hodgeman Polygon Clipping – Curve Clipping – Text Clipping.

UNIT-IV (9 Hours)

THREE -DIMENSIONAL CONCEPTS : Three dimensional display methods – Projections - Depth Cueing - Visible line and surface identification – Surface Rendering – Three-Dimensional and Stereoscopic Views.

THREE-DIMENSIONAL OBJECT REPRESENTATIONS: Bezier Curves – B-Spline Curves.

UNIT-V (9 Hours)

THREE DIMENSIONAL VIEWING: Viewing pipeline – Parallel Projections – Perspective Projections.

COLOR MODELS: Properties of Light – RGB Color Model – YIQ Color Model – CMY Color Model – HSV Color Model – Conversion between HSV and RGB Models – HLS Color Model – Color Selection and Applications.

TEXT BOOK:

1. Donald D Hearn , M. Pauline Baker, "Computer Graphics C Version", Pearson Education, Second Edition, 2011.

REFERENCE BOOK:

1. Amarendra N.Sinha, Arun D Udai, " Computer Graphics", Tata McGraw Hill Publishing Company, 2007.

14CMU20 COMPUTER NETWORKS SEMESTER IV

OBJECTIVES: Total Hours: 45

- To have the basic knowledge about different types of networks.
- To inculcate the knowledge about transmission of data.
- To impart the basic concepts like routers, switching & TCP/IP Protocol Suite.

UNIT-I (8 Hours)

INTRODUCTION: Why study Data Communication – Data Communication – Networks – Protocols and Standards – Standards Organizations.

BASIC CONCEPTS: Line Configuration – Topology – Transmission mode – Categories of networks – Internet works.

THE OSI MODEL: The model – Functions of the layers – TCP/IP protocol suite

UNIT-II (9 Hours)

TRANSMISSION OF DIGITAL DATA: Interfaces and Modems: Digital Data Transmission-DTE-DCE Interface –Modems.

TRANSMISSION MEDIAS: Guided media – Unguided media – Transmission impairment– Performance wavelength – Shannon capacity – Media comparison.

MULTIPLEXING: Many to one/one to many – Frequency-Division Multiplexing (FDM)- Wave-Division Multiplexing (WDM) – Time-Division Multiplexing (TDM).

UNIT-III (9 Hours)

ERROR DETECTION AND CORRECTION: Types of errors – Detection –Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) – Checksum.

DATA LINK CONTROL: Line Discipline –Flow control – Error control.

LOCAL AREA NETWORK: Ethernet – Token bus – Token Ring – FDDI.

UNIT-IV (9 Hours)

SWITCHING: Circuit switching – Packet switching –Message switching.

NETWORKING AND INTERNETWORKING DEVICES: Repeaters – Bridges – Routers – Gateways – Routing algorithms – Distance vector routing – Link state routing.

TRANSPORT LAYER: Duties of the transport layer.

UPPER OSI LAYERS: Session layer – Presentation layer –Application layer.

UNIT-V (10 Hours)

TCP/IP PROTOCOL SUITE: Overview of TCP/IP – Network layer – Addressing – Sub netting – Other protocols in the network layer – Transport layer.

TCP/IP PROTOCOL SUITE: Application Layer: Client server model - BOOTP and DHCP - DNS – TELNET – FTP – TFTP – SMTP – SNMP – HTTP – WWW.

TEXT BOOK:

1. Behrouz A. Forouzan**.,** **"**Data Communications and Networking", Tata McGraw-Hill Edition, 2nd Edition (update),19th reprint 2007.

REFERENCE BOOK:

1. Andrew S. Tanenbaum, " Computer Networks", 5th Edition, 2010 Prentice Hall of India Pvt. Ltd.

14CMU21 INDUSTRIALAND ORGANIZATIONAL PSYCHOLOGY

Objectives: To enable the students to understand…

- The importance of Psychology in industry and organization and the use of various psychological tests,
- The methods of training and ways to develop inter/intrapersonal skills,
- The various methods involved in Performance Appraisal and its uses,
- The nature and structure of organization and team,
- The concept of motivation, importance of leadership styles and the ways to identify and manage stress.

UNIT – I INTRODUCTION AND PERSONNEL SELECTION (12 Hours)

Industrial / Organizational Psychology: Definition – Fields – Job Analysis – Job Evaluation – Job Performance Criteria. **Personnel Selection:** Recruitment – **Methods of Personnel Selection:** Interviews – Assessment Centers – Work Sample – Biographical Information – Psychological Tests – Graphology – Polygraph

(*Classroom Learning Exercises Only: Personality Test (BIG 5, MBTI), Aptitude Test (CAPS, General Mental Ability Test)

UNIT – II TRAINIG AND MANAGEMENT DEVELOPMENT (10 Hours)

Training: Meaning – **Methods**: Computer based training – Non-Computer based training:- Role Play – Behaviour Modeling – Business Games – **Management Development:** Meaning – Management Development Issues - Developing Interpersonal and Intrapersonal Skills – Mentoring – Executive Coaching

(*Classroom Learning Exercises Only: Emotional Intelligence Test, Role Play, Communication and Presentation Skills)

UNIT – III PERFORMANCE MANAGEMENT (10 Hours)

Performance Management: Meaning – **Performance Appraisal:** Meaning – **Methods:** Rating Scales - Employee Comparison method – Behavioural Checklist and Rating Scales; **Rating Errors:** Halo error – Leniency error – Central Tendency error; Self and Peer Assessment – 360 Degree Feedback. Feedback to Employees – Uses of Performance Appraisals

(*Classroom Learning Exercises Only: Performance Appraisal, Feedback – Giving Constructive Criticism)

UNIT – IV ORGANIZATIONAL CHANGE AND TEAMS (12 Hours)

Organization: Meaning – Structure – **Components of Social Systems:** Roles – Norms – Culture. **Organizational Change:** Meaning – Resistance to Change – Managing Resistance to Change. **Teams:** Meaning – Types – Principles – Team Process – Virtual Teams.

(*Classroom Learning Exercises Only: Organizational Citizenship Behaviour Scale, Team Effectiveness Scale)

UNIT – V WORK MOTIVATION, LEADERSHIP AND STRESS (12 Hours)

Motivation: Meaning – **Theories:** Need Hierarchy theory – Equity theory – Expectancy theory – Reinforcement theory. **Leadership:** Meaning – Styles. **Stress:** Meaning – Causes – Consequences – Coping with stress – Management of Stress.

(*Classroom Learning Exercises Only: Achievement Motivation Inventory, Leadership Questionnaire, Perceived Stress Scale)

*** - Not for Question Paper Setting**

TEXT BOOK:

- Muchinsky, P. M. (2007): Psychology Applied to Work. New Delhi: Thompson Wadsworth

REFERENCES:

1. Christine E. Doyle (2012): Work and Organizational Psychology (1st Edition). New Delhi, India: Nutech Photolithographers.
2. John Hayes, (2012): Interpersonal Skills at Work (2nd Edition). New Delhi, India: Nutech Photolithographers.

14CMU22

STATISTICS AND OPERATIONS RESEARCH

Objective:
To study about the fundamentals of statistics and operations research concepts.

UNIT I: (12 Hours)
Statistics – its applications in computers – Methods of collecting primary and secondary data and preparation of questionnaire – Classification and Tabulation of data – Diagrammatic and graphical representation of data- Bar, Pie, Histogram, Frequency polygon, Frequency curve and Ogives.

UNIT II: (12 Hours)
Measures of Central Tendency: Mean, Median, Mode – definition, Calculation for ungrouped and grouped data – merits and demerits – Absolute & Relative Measures of Dispersion: Range, QD, MD and SD- calculation for ungrouped and grouped data – merits and demerits – simple problems.

UNIT III: (12 Hours)
Time Series: Concept – estimation of trend by moving average method & method of least squares – Measuring seasonal variations by method of simple average & ratio – to – moving average method - simple problems.

UNIT IV: (12 Hours)
Linear Programming Problem: Definition, Canonical Form, Standard Form & Formation of LPP – Methods of solving LPP – Graphical method and Simplex Methods – simple problems.

UNIT V: (12 Hours)
Transportation Problem: Attaining IBFS using NWC Rule and Vogel's Approximation Methods (VAM).
Network Analysis – Construction of Networks – Concepts and problems in CPM & PERT models – simple problems.
Note: Proof and derivation are excluded. Theory carries 30 marks and problems carries 45 marks.

TEXT BOOKS:

1. "Business Statistics '' by S,P.Gupta & M.P.Gupta, SultanChand & Sons, New Delhi for Units I, II & III
2. Statistical methods: SP Gupta, Sultan Chand & Sons.
3. "Operations Research'', by Kanitswarup, P.K.Gupta & Manmohan, SultanChand & Sons, New Delhi for Units IV & V.

14CMU23 LAB-VII (VB .Net PROGRAMMING LAB) SEMESTER– IV

1. Generate the Temperature Conversion Application (Celsius to Fahrenheit, Fahrenheit to Celsius).
2. Implement scientific calculator using button controls.
3. Select image from list and display it in the picture box using Image control
4. Create a File Menu with Menu items New, Open, Save, Print and Exit & Edit Menu with Menu items Cut, Copy, Paste and Find and Undo using Menu Editor.
5. Add a Textbox entry to a Combo Box using button controls.
6. Create Digital Clock using Timer control.
7. Create an Application for Employee details to read and display the data using ADO. Net
8. Implement a Library Information System using ADO. Net.
9. Create an application for College Admission and test user input at the field level to determine if it is valid, and display messages to help the user to correct invalid data using ADO. Net.
10. Create a status bar to provide users with feedback about an application using text editor and validation control.

14CMU24 LAB-VIII (COMPUTER GRAPHICS AND ANIMATION LAB)

SEMESTER – IV

GRAPHICS

1. Implement DDA algorithm to draw a line.
2. Implement Bresenham's algorithm to draw a line
3. Implement Midpoint Circle drawing algorithm.
4. Transform the given object using all basic 2D Transformation Techniques.

ADOBE PHOTOSHOP

5. Create a webpage using Photoshop with your own creativity for any Cosmetic Product Marketing.
6. Create Realistic Stone Structure using Photoshop.
7. Convert Black and White to Color Photo using Photoshop.

MACROMEDIA FLASH

8. Create an Animation using flash for the Natural scenery.
9. Create an Animation using masking for a Human face.
10. Develop an E-content on any of the concepts of your own.

14CMU25 **WEB SCIENCE** **SEMESTER –V**

OBJECTIVES: **Total Hours*:* 45**

To make the students proficient in

- HTML tools for Internet programming.
- Learn scripting languages – Java Script, VB Script.

UNIT - I **(11 Hours)**

INTRODUCTION TO WEB TECHNOLOGY: Features required for enabling e-commerce – WebPages – types and issues - Tiers – the concept of a Tier – a comparison of Microsoft and java technologies.

INTRODUCTION: HTML Browsers-–HTML Command tags-Basic tags-Ordered and Unordered lists – creating a Link – Inserting Graphics – Scaling an image – Image Alignment .More on HTML-Creating Table – Putting background image – working with forms – working with frames.

UNIT - II **(8 Hours)**

CASCADING STYLE SHEETS: Font attributes-Color and Background attributes-Text attributes – border attributes-Margin attributes –Related attributes-List attributes.

CLASS: Using the <SPAN> tag-External Style Sheets-Working with Java Script Style Sheets [JSSS]-Using the <DIV> tag-Layers-To move forward.

UNIT - III **(8 Hours)**

XML: Introduction – Features of XML – XML Support and Usage – Compatibility of XML with others – Structure of a XML Document – Common Errors – Structures in XML – Creating Document Type Declarations – Flow objects – length – working with Text and Font – Color and Background properties.

UNIT- IV **(8 Hours)**

VB SCRIPT : Introduction – Adding VB Script code to HTML-Adding a Script to your documents-Data type of VB –Getting the Message Across.

UNIT -V **(10 Hours)**

JAVASCRIPT : Introduction – Operators – Assignments – Comparisons – Reserved Word – Reserved by Java – Words to be avoided - Browsers to use – Software Requirement – Starting with JavaScript – Using Quotes – Using Alert – Functions – Eval function – Using Statements in JavaScript – Working with Objects – Properties – Browser Objects – Date Object – Math Object – String Object – Defining Objects – Handling events in JavaScript – Window events – Listing of program to create form – Event object –Event simulation – Working with Forms – Form elements – User Actions – Windows and Frames – Window object – Frame object – Document Object – Navigator Object – Screen Object - Math Object – JavaScript Objects.

TEXT BOOKS:

1. Ramesh Bangia, “Web Technology”, Firewall Media, First Edition, 2008. (Unit I, III, IV & V).

2. Ivan Bayross, “Web Enabled Commercial Application Development”, BPB Publications, Third Edition. (Unit II).

REFERENCE BOOK:

1. Steven Holzner, “HTML Black Book”, Dreamtech Press, Reprint Edition 2007, New Delhi.

14CMU26 **C# PROGRAMMING** **SEMESTER: V**

OBJECTIVES: **Total Hours: 45**

- On learning C#, one can develop Console applications.
- To study specific C# concepts such as Enumerations, overriding methods, Delegates, console Input/output, Exception for debugging.

UNIT - I **(9 Hours)**

INTRODUCTION: Introducing C# - Understanding .Net: The C# environment – Overview of C# - Literals, variables and Data Types – Operators and Expressions - Decision Making and Branching - Decision Making and Looping.

UNIT – II **(9 Hours)**

METHODS IN C#: Declaring methods – The main method, invoking methods, nesting methods, method parameters, pass by value and pass by reference, output parameters, and variable argument list – Overloading methods.

ARRAYS: Creating an array, variable size array, array list class – Manipulating Strings – Structures, nested structures – Enumerations, Initialization, base types and type conversion.

UNIT - III **(9 Hours)**

CLASSES AND OBJECTS: Defining Classes and Objects - Constructors and destructors, Nesting classes - Overloaded Constructors - Inheritance and Polymorphism – Classical, Multilevel, Hierarchical Inheritances – Subclass - Subclass Constructors - Overriding methods - Abstract classes and methods - Interfaces - Interfaces and Inheritance – Operator overloading.

UNIT - IV **(9 Hours)**

DELEGATES: Declaration methods – Initialization and invocation, Multicast delegates.

CONSOLE I/O OPERATIONS: Console Input/output, Formatting – Managing Errors and Exceptions.

UNIT - V **(9 Hours)**

MULTITHREADING IN C#: Understanding the System - Threading Namespace – Creating and Starting a Thread – Scheduling a Thread – Synchronizing Threads – Thread Pooling.

WINDOWS AND WEB – BASED APPLICATION DEVELOPMENT ON .NET: Understanding Microsoft Visual Studio 2005 – Creating and Running a SampleWinApp Windows Applications – Web based Application on .Net.

TEXT BOOK:

E.Balagurusamy, "Programming in C#", 3rd Edition Tata Mcgraw-Hill, New Delhi, 2010.

REFERENCE BOOK:

Joel Murach, Anne Boehm, " C# 2012", Murach

14CMU27 SOFTWARE ENGINEERING SEMESTER – V

OBJECTIVES: Total Hours: 45

- To know the development phases of a software life cycle.
- To have the depth knowledge about a software project.

UNIT - I (8 Hours)

INTRODUCTION TO SOFTWARE ENGINEERING: Some definitions – size factors - Quality and productivity factors - Managerial issues.

UNIT - II (9 Hours)

PLANNING A SOFTWARE PROJECT: Introduction – Defining the problem - planning the development process - The phased life cycle model - cost model - The prototype life cycle model - planning an organizational structure.

UNIT - III (9 Hours)

SOFTWARE COST ESTIMATION: Introduction - Software cost factors, software cost estimation techniques - Software requirements definition- Software requirement specification - Formal specification techniques - Language and processor for requirements specification.

UNIT - IV (10 Hours)

SOFTWARE DESIGN: Introduction - fundamental design concepts - modules and modularization criteria - Design notations - design techniques - Implementation issues - Structured coding techniques.

UNIT - V (9 Hours)

VERIFICATION AND VALIDATION TECHNIQUES: Quality assurance - walkthroughs and inspections - static analysis symbolic execution - system testing.

SOFTWARE MAINTENANCE: Managerial aspects of software maintenance - other maintenance tools and techniques.

TEXT BOOK:

1. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill, 38th reprint,2012

REFERENCE BOOKS:

1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", McGraw-Hill International Edition, 6th reprint, 2012.

14CMU28 SYSTEM PROGRAMMING AND OPERATING SYSTEM
SEMESTER –V

OBJECTIVES: **Total Hours: 45**

To understand

- Introduction to Language Processors, Assembler, Compiler, Interpreter, Linker.
- The basics of operating system and its structure.
- Process management, deadlock management strategies.
- Memory management techniques & virtual memory concepts

UNIT – I **(8 Hours)**

LANGUAGE PROCESSORS: Introduction – Language Processing Activities – Fundamentals of Language Processing – Fundamentals of Language Specification – Language Processor Tool.

UNIT – II **(10 Hours)**

DATA STRUCTURES FOR LANGUAGE PROCESSING: Search Data Structures – Allocation Data Structures.

SCANNING AND PARSING: Scanning – Parsing.

ASSEMBLERS: Elements of Assembly Language Programming – A Simple Assembly Scheme – Design of a Two Pass Assembler.

UNIT – III **(9 Hours)**

MACRO AND MACRO PROCESSORS: Macro Definition and Call – Macro Expansion – Nested Macro Calls.

COMPILERS AND INTERPRETERS: Aspects of Compilation – Memory Allocation – Code Optimization.

LINKERS: Design of a linker – Self Relocating Programs.

UNIT - IV **(9 Hours)**

INTRODUCTION TO OPERATING SYSTEMS: computer system structures - operating system structures.

PROCESSES: CPU scheduling – types of scheduling - scheduling algorithms -scheduling criteria - FIFO, round robin, shortest process next, priority scheduling, multi level queue scheduling, multilevel feedback queue scheduling.

DEADLOCKS: prevention – detection – avoidance - recovery from deadlock.

UNIT – V **(9 Hours)**

MEMORY MANAGEMENT: requirements – paging - fixed, dynamic partitioning - segmentation - segmentation with paging.

VIRTUAL MEMORY: demand paging - placement and replacement algorithms –thrashing - demand segmentation.
STORAGE MANAGEMENT: I/O system – Secondary Storage Structure – Disk Scheduling – Disk Management.

TEXT BOOKS:

1. Dhamdhere D M, "Systems Programming and Operating Systems", Tata McGraw-Hill, New Delhi, Second Revised Edition, 2008.(I,II,III Units)
2. Silberschatz Galvin, "Operating System" Prentice Hall Of India, Sixth Edition, 2008 (IV,V Units)

14CMU29A CORE ELECTIVE-I :CRYPTOGRAPHY AND NETWORK SECURITY

SEMESTER – V

OBJECTIVES: **Total Hours: 45**

To make the students proficient in:

- The principles and practice of Cryptography and Network security
- Implementing practical Applications

UNIT - I **(9 Hours)**

OVERVIEW: Computer Security Concepts-Security Attacks-Security Services-Security Mechanisms-A Model for Network Security.

BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD: The Data Encryption Standard (DES)-A DES Example-The Strength of DES

UNIT - II **(9 Hours)**

BLOCK CIPHER OPERATION: Multiple Encryption and Triple DES-Electronic Code Book-Cipher Block Chaining Mode-Cipher Feedback Mode-Output Feedback Mode.

PUBLIC-KEY CRYPTOGRAPHY AND RSA: Principles of Public-Key cryptosystems-The RSA Algorithm.

OTHR PUBLIC KEY CRYPTO SYSTEMS: Diffie-Hellman Key Exchange.

UNIT - III **(9 Hours)**

CRYPTOGRAHIC HASH FUNCTIONS: Applications of Cryptographic Hash Functions-Two Simple Hash Functions- Secure Hash Algorithm (SHA)-SHA-3.

MESSAGE AUTHENDICATION CODES: Message Authenticating Requirements-MACs Based on Hash Functions: HMAC.

UNIT - IV **(9 Hours)**

DIGITAL SIGNATURES: Digital Signatures

KEY MANAGEMENT AND DISTRIBUTION: Symmetric Key Distribution Using Symmetric Encryption- Symmetric Key Distribution Using Asymmetric Encryption-Distribution of Public Keys-X.509 Certificates.

UNIT - V **(9 Hours)**

IP SECURITY: IP Security Overview-IP Security Policy-Encapsulating Security Payload-Combining Security Associations-Internet Key Exchange.

TEXT BOOK:

1. William Stallings, “Cryptography and Network Security-Principles and Practice”, Fifth Edition, Pearson, 2011.

REFERENCE BOOKS:

1.Behrouz A. Forouzan,Debdeep Mukhopadhyay, “Cryptography and Network Security”, Second Edition, Tata McGraw-Hill Education Pvt. Ltd., 2010

2. V.S. Bagad,I.A.Dhotre, “Cryptography and Network Security”Second Edition, Technical Publications Pune, 2008.

14CMU29B CORE ELECTIVE-I :MOBILE COMPUTING
SEMESTER - V

OBJECTIVES: Total Hours: 45

- To provide an in depth understanding in the field of mobile computing and mobile communication technology and application.
- Learn networking concepts relevant to modern wireless systems.
- Learn emerging mobile computing ideas and best practices.

UNIT-I (9 Hours)

INTRODUCTION : Wireless the Beginning- Mobile Computing – Dialogue Control – Networks – Middleware and Gateways – Application and services.

MOBILE COMPUTING ARCHITECTURE : Architecture for mobile computing – Mobile computing through Internet.

UNIT-II (9 Hours)

WAP:MMS-MMS architecture-MMS Transaction Flows.

WIRELESS LAN : Advantages – Applications – Mobility in Wireless LAN - Mobile Ad Hoc Networks and Sensor Networks-Wifi Versus 3G.

UNIT-III (9 Hours)

GSM : GSM Architecture – Call routing in GSM – GSM Addresses and Identifiers – Network aspects in GSM – GSM Frequency allocations – SMS Architecture – SMMT – SMMO.

UNIT-IV (9 Hours)

GPRS:GPRS and packet data network – GPRS network architecture – GPRS network operations – Application for GPRS- Limitations of GPRS.

UNIT-V (9 Hours)

MOBILE COMPUTING THROUGH TELEPHONY : Mobile Computing through telephone – Developing an IVR Application – TAPI.

EMERGING TECHNOLOGIES: Blue Tooth – Radio Frequency Identification (RFid) – Java Card.

TEXT BOOK:

1. Asoke K Talukder, Roopa R Yavagal, “Mobile Computing”, Tata McGraw Hill, 2005.

REFERENCE BOOKS:

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, “Handbook of Wireless Networks and Mobile Computing”, Wiley, 2002.

14CMU30 LAB-IX (WEB SCIENCE LAB) SEMESTER – V

1. Design a web page using any 20 HTML tags.
2. Design a form using frames and insert pictures into the frames (provide hyperlinks to the pictures).
3. Design a registration form using DHTML for participating in a symposium.
4. Design a HTML web page, which makes use of INPUT, META, SCRIPT, FORM, APPLET, BGSOUND, MAP.
5. Design a form to accept student information and validate the following using VBScript,
    a) check for the student name

(Not to accept numbers and special characters except '.')

    b) check for the date of birth

(Difference between dob & current date should be greater than 16)

6. Design a form for employee details and calculate the following (use JavaScript),
    a) Accept basic pay from the user.
    b) Calculate net pay.

7. Design a web page for an automobile showroom.
8. Design a webpage for a traveling agency.
9. Using JavaScript create a multiplication table .

10 .Using Java Script's Window and document objects and their properties and various methods like alert (), evaI (), Parselnt () etc. methods to give the dynamic functionality to HTML web pages.

14CMU31 LAB – X (C# PROGRAMMING LAB) SEMESTER: V

1. Implement the concept of boxing and unboxing.
2. Find the number of and sum of all integers greater than 100 and less than 200 that are divisible by 7.
3. Using a for loop, Accept five values in US dollars, one at a time, and converts each value to its Indian rupees equivalent before the next value is required.
4. Implement a bank account details using constructors.
5. Implement the concept overriding methods using Inheritance.
6. Implement the concept of interface.
7. Implement the concept of console I/O operations.
8. Implement a program that throws an exception of type “array index out of bounds” and then handles it appropriately.
9. Implement the concept of Multithreading.
10. Design a simple Windows and web based Application.

14CMU33 PHP PROGRAMMING SEMESTER – VI

OBJECTIVES: TOTAL HOURS: 45

By the end of this course you should be able to:

- The learner would be able to develop interactive web pages using PHP
- Understand different Web controls
- Understand connecting Web pages with DB.

UNIT – I (9 HOURS)

INTRODUCTION TO PHP: A brief history of PHP – Installing PHP – Lexical structures – Data types – variables – Expressions and Operators – Flow control statements – Embedding PHP in Web pages.

UNIT – II (9 HOURS)

FUNCTIONS: Calling a function – Defining a Function - Variable Scope - Function Parameters - Return Values - Variable Functions - Anonymous Functions

STRINGS: Quoting String Constants - Printing Strings - Accessing Individual Characters - Cleaning Strings - Encoding and Escaping - Comparing Strings - Manipulating and Searching Strings - Regular Expressions - POSIX-Style Regular Expressions - Perl-Compatible Regular Expressions

UNIT – III (9 HOURS)

ARRAYS: Identifying Elements of an Array - Storing Data in Arrays - Multidimensional Arrays - Extracting Multiple Values - Converting Between Arrays and Variables - Traversing Arrays – Sorting - Acting on Entire Arrays - Using Arrays

OBJECTS: Terminology - Creating an Object - Accessing Properties and Methods - Declaring a Class - Introspection – Serialization

UNIT – IV (9 HOURS)

DATABASES : Using PHP to Access a Database - Relational Databases and SQL - PEAR DB Basics - Advanced Database Techniques - Sample Application

GRAPHICS: Embedding an Image in a Page - The GD Extension - Basic Graphics Concepts - Creating and Drawing Images - Images with Text - Dynamically Generated Buttons - Scaling Images - Color Handling.

UNIT – V (9 HOURS)

XML: Generating XML - Parsing XML - Transforming XML with XSLT - Web Services

SECURITY: Global Variables and Form Data - Filenames - File Uploads - File Permissions - Concealing PHP Libraries - PHP Code - Shell Commands - Security Redux

TEXT BOOK:

1. Kevin Tatroe, Peter MacIntyre, Rasmus Lerdorf , “Programming PHP - Creating Dynamic Web Pages”, 3rd Edition, O'Reilly Media, February 2013.

REFERENCE BOOKS:

1. Don Gosselin, Diana Kokoska, Robert Easterbrooks, " PHP Programming with MySQL: The Web Technologies Series" Second Edition, Cengage Technology,
2. Vikram Vashwani, "PHP Programming Solutions", McGraw hill, 2012.

14CMU34 DATAMINING SEMESTER - VI

OBJECTIVES: **Total Hours: 45**

- To find the needles hidden in the haystacks of data.
- To learn how to use advanced Mining techniques to meet the business objectives.

UNIT - I **(9 Hours)**

DATA WAREHOUSING: Introduction – Data Warehouse – Definition – Multidimensional Data Model – OLAP Operations – Warehouse Schema – Data Warehousing Architecture – Warehouse Server – Metadata – OLAP Engine – Data Warehouse Backend Process.

UNIT - II **(9 Hours)**

DATAMINING: Introduction – What is Data mining – Definition – KDD vs Data mining – DBMS vs DM – Other related areas – DM techniques – Other Mining Problems – DM application areas – DM applications – Case study.

ASSOCIATION RULE: Introduction – Methods of discover association rules – A priory algorithm – Pincer Search Algorithm

UNIT - III **(9 Hours)**

CLUSTERING TECHNIQUES: Introduction – Clustering paradigms – Partitioning Algorithm – k-medoid Algorithm – CLARA – CLARANS – Hierarchical Clustering – DBSCAN.

DECISION TREES: Introduction – Tree Construction Principle – Decision Tree Construction Algorithm.

UNIT - IV **(9 Hours)**

ROUGH SET THEORY: Introduction – Definition – Reduct – Propositional Reasoning and PIAP to Compute Reducts – Types of Reducts – Rule Extraction – Decision Tree – Rough Set and Fuzzy Set – Granular Computing.

UNIT - V **(9 Hours)**

WEBMINING: Introduction – Web mining – Web Content mining – Web Structure mining – Web Usage mining – Text mining – Unstructured Text – Episode Rule Discovery for Texts – Hierarchy of Categories – Text Clustering.

TEMPORAL AND SPATIAL DATA MINING: Introduction – Temporal Data Mining – Temporal Association Rules – Sequence Mining – The GSP Algorithm – SPADE.

TEXT BOOK:

1. Arun K Pujari , "DATAMINING TECHNIQUES" Second Edition, Universities Press, First Reprint 2011.

REFERENCE BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pei, "Data Minng- Concepts and Techniques" Third Edition, Elsevier Publishers, 2012.
2. Margaret H. Dunham, "Data Mining-Introductory and Advanced Topics" Pearson Education, Fourth Impression 2010.

14CMU35A CORE ELECTIVE-II : NEURAL NETWORKS AND FUZZY LOGIC

SEMESTER – VI

OBJECTIVES: **Total Hours: 45**

- Learn the basics of neural networks and its applications
- Able to solve design optimization problems
- Study the basic concepts of Fuzzy sets

UNIT - I **(9 Hours)**

INTRODUCTION: Basic properties of neurons-Artificial neural networks

LEARNING-learning and training-learning rules-unsupervised learning laws-supervised learning laws

UNIT - II **(9 Hours)**

TYPES OF NEURAL NETWORKS-Hop field model-cellular neural networks-perceptron-Other Associative models.-Bi-directional Associative memory-Fuzzy Associative memory-Brain-state-in-a-box-Boltzmann Machine

UNIT - III **(9 Hours)**

APPLICATION OF NEURAL NETWORKS-Design and optimization of systems-Truss design using ANN Strategy-Design of 4-bar Mechanism-Nonlinear Optimization- Inverse design problems-System identification and monitoring-Nonlinear dynamic systems-model updating-Monitoring of structures and IC Engines

UNIT - IV **(9 Hours)**

FUZZY SETS AND CLASSICAL SETS-Basic definitions- Classical sets-Representation of a fuzzy set-fuzzy measures-Cardinality of fuzzy set- special alpha-cuts of a fuzzy set

UNIT - V **(9 Hours)**

FUZZY RELATIONS AND CLASSICAL RELATIONS-Cartesian product-crisp relations-operation on Crisp relations –composition operator-fuzzy relations-operations in fuzzy relations

TEXT BOOKS:

1.M.Ananda Rao,J.Srinivas, "Neural Networks Algorithms and Applications". Narosa Publishing House, Third Reprint 2007

2. M.Amirthavalli, "Fuzzy logic and Neural networks", Scitech Publications, June 2007.

REFERENCE BOOK:

Rajasekran S, Vijaylakshmi Pai GA, "Neural Networks, Fuzzy logic and Genetic Algorithms: Synthesis and Applications, Prentice Hall of India, 2006

14CMU35B CORE ELECTIVE-II : CLOUD COMPUTING SEMESTER – VI

OBJECTIVES: Total Hours: 45

This subject has been designed with the following objectives:

- Understand the fundamental concepts in the study of cloud computing and its creation, acquisition and representation.
- Know the core concepts, methods and usage of cloud computing services.
- Understand various evaluation techniques and exploring cloud computing in various applications.

UNIT – I INTRODUCTION (9 hours)

Cloud Computing: Introduction - From Collaboration to cloud - Working of cloud Computing - pros and cons – benefits - developing cloud computing services – Cloud service development - discovering cloud services.

UNIT – II CLOUD COMPUTING FOR EVERYONE (9 hours)

Centralizing email communications - cloud computing for community - collaborating on schedules - collaborating on group projects and events – cloud computing for corporation – managing schedules - managing projects – presenting on road.

UNIT – III USING CLOUD SERVICES (9 hours)

Collaborating on calendars - Schedules and task management - exploring on line scheduling and planning - collaborating on event management - collaborating on contact management - collaborating on project management - collaborating on word processing – spreadsheets and databases.

UNIT – IV STORING AND SHARING (9 hours)

Understanding cloud storage - evaluating on line file storage - exploring on line book marking services - exploring on line photo editing applications – exploring photo sharing communities - controlling it with web based desktops.

UNIT – V OUTSIDE THE CLOUD (9 hours)

Evaluating web mail services, Evaluating instant messaging - Evaluating web conference tools - creating groups on social networks - Evaluating online groupware - collaborating via blogs and wikis

TEXT BOOK

1. Michael Miller, “Cloud Computing”, Pearson Education, New Delhi, 2009.

REFERENCES

1. Toby Velte, Anthony Velte, Toby J. Velte , “Cloud Computing - A Practical Approach”, McGraw-Hill, 2009.

14CMU36 LAB XI – (PHP PROGRAMMING LAB) SEMESTER – VI

1. Develop a PHP script for printing Fibonacci series and Prime numbers.
2. Create a simple form in PHP with session variables and display it.
3. Design a Simple calculator using HTML and PHP.
4. Create a form in PHP to create a Cookie with validity of 15 Days and retrieve the Cookie values.
5. Generate Electricity bill using Control Structures in PHP.
6. Check whether a given string is Palindrome or not using array concept in PHP.
7. Design a form using PHP to upload a file to your server
8. Develop a PHP script for File Handling Operations.
9. Create a simple form with session in PHP and store the form data in MySQL.
10. Create a Simple online library using PHP and MySQL.

14EDCCMU NON-MAJOR ELECTIVE - EXTRA DEPARTMENTAL COURSE

INTERNET TECHNOLOGIES

CLUSTER-IV **SEMESTER - VI**

Total hours: 20

UNIT – I (7 Hours)

INTRODUCTION: Internet communication protocols – internet hosts – servers and clients – Domain name systems and DNS servers – Types of internet connections – Registering a domain name

EMAIL CONCEPTS: Receiving and sending messages – ways of accessing Email – Email addressing – Downloading email – deleting messages from the server – Attachments – Advantages of filtering email – Deleting spam - Email mailing list – web-based chat – Instant messaging-Online conferencing – News Groups – Creating a Group mail – Google Drive.

UNIT – II (6 Hours)

HTML: Basic concepts – Introduction common HTML – Linking in HTML – HTML image basics – Fonts – Colors – Backgrounds – Layout with tables - Frames – Layers – Style sheet basics – Style sheet properties – Positioning with style sheet – The <Form> element – Form controls.

UNIT –III (7 Hours)

JAVASCRIPT - Introduction – Data types – Variables – Operators – Expression – Looping – Branching – Simple Webpage Designing.

TEXT BOOK:

1. Margaret Levine Young, "Internet: The Complete Reference", Second Edition, TMH, 2007. (for UNITS I, II)

2. Ramesh Bangia, "Web Technology", Firewall Media, First Edition, 2006. (for UNITS III, IV & V).