DAV UNIVERSITY JALANDHAR

FACULTY OF SCIENCE

SYLLABI

FOR

MASTER OF COMPUTER APPLICATIONS
(THREE YEARS COURSE)
(SEMESTER: I-VI)

Batch 2013

DAV UNIVERSITY JALANDHAR

Semester 1

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1	CSA501	Discrete Mathematical Structures	4	0	0	4	25	25	25	25	**100**
2	CSA502	Computer Fundamentals and Programming in C	4	0	0	4	25	25	25	25	**100**
3	CSA503	Computer System Organization and Architecture	4	0	0	4	25	25	25	25	**100**
4	CSA504	Advances in Operating Systems	4	0	0	4	25	25	25	25	**100**
5	CSA505	Database Management System	4	0	0	4	25	25	25	25	**50**
6	CSA506	Programming in C Laboratory	0	0	4	2	20	-	-	80	**50**
7	CSA507	Database Management Systems Laboratory	0	0	4	2	20	-	-	80	**50**
			20	**0**	**8**	**24**					**600**

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Semester 2

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1	CSA508	Data Structures and File Processing using C	4	0	0	4	25	25	25	25	**100**
2	CSA509	Object Oriented Programming using C++	4	0	0	4	25	25	25	25	**100**
3	COM502	Financial Statement Analysis	4	1	0	4	25	25	25	25	**100**
4	CSA510	Computer Networks and Data Communication	4	0	0	4	25	25	25	25	**100**
5	CSA511	Computer Oriented Numerical and Statistical Methods	4	0	0	4	25	25	25	25	**100**
6	CSA512	Data Structures and File Processing using C Laboratory	0	0	4	2	20	-	-	80	**50**
7	CSA513	Object Oriented Programming using C++ Laboratory	0	0	4	2	20	-	-	80	**50**
			20	**0**	**8**	**24**					**600**

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Semester 3

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1	CSA601	Design and Analysis of Algorithms	4	0	0	4	25	25	25	25	**100**
2	CSA602	Computer Based Optimization Techniques	4	0	0	4	25	25	25	25	**100**
3	CSA603	Computer Graphics	4	0	0	4	25	25	25	25	**100**
4	CSA604	JAVA Programming	4	0	0	4	25	25	25	25	**100**
5	*	Elective-I	4	0	0	4	25	25	25	25	**100**
6	CSA610	Computer Graphics Laboratory	0	0	4	2	20	-	-	80	**50**
7	CSA611	JAVA Programming Laboratory	0	0	4	2	20	-	-	80	**50**
			20	**0**	**8**	**24**					**600**

Elective-I	
CSA605	Data Mining and Data Warehousing
CSA606	Mobile Computing
CSA607	Emerging Trends in Information Technology
CSA608	Distributed and Parallel Processing
CSA609	Information Systems

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Semester 4

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1	CSA612	Theory of Computer Science	4	0	0	4	25	25	25	25	**100**
2	CSA613	Microprocessor and Interfaces	4	0	0	4	25	25	25	25	**100**
3	CSA614	Advanced Web Technology	4	0	0	4	25	25	25	25	**100**
4	CSA615	Advanced JAVA & Network Programming	4	0	0	4	25	25	25	25	**100**
5	*	Elective-II	4	0	0	4	25	25	25	25	**100**
6	CSA621	Advanced Web Technology Laboratory	0	0	4	2	20	-	-	80	**50**
7	CSA622	Advanced JAVA & Network Programming Laboratory	0	0	4	2	20	-	-	80	**50**
			20	**0**	**8**	**24**					**600**

Elective-II	
CSA616	System Simulation and Modelling
CSA617	Embedded Systems
CSA618	Software Testing and Quality Assurance
CSA619	Advanced Software Engineering
CSA620	Compiler Design

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Semester 5

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1	CSA701	Digital Image Processing	4	0	0	4	25	25	25	25	**100**
2	CSA702	Artificial Intelligence	4	0	0	4	25	25	25	25	**100**
3	CSA703	System Programming	4	0	0	4	25	25	25	25	**100**
4	*	Elective-III	4	0	0	4	25	25	25	25	**100**
5	*	Elective-IV	4	0	0	4	25	25	25	25	**100**
6	CSA714	Digital Image Processing Laboratory	0	0	4	2	20	-	-	80	**50**
7	*	Elective-V Laboratory	0	0	4	2	20	-	-	80	**50**
			20	**0**	**8**	**24**					**600**

Elective-III	
CSA704	Soft Computing
CSA705	Cloud Computing
CSA706	Cryptography & Network Security
CSA707	Network Protocols
CSA708	Multimedia Technology

Elective-IV	
CSA709	Linux and Shell Programming
CSA710	.NET Framework and C#
CSA711	Visual C++ Programming
CSA712	Symbolic Logic and Programming in PROLOG
CSA713	Windows Programming using C#

Elective-V	
CSA715	Linux and Shell Programming Laboratory
CSA716	.NET Framework and C# Laboratory
CSA717	Visual C++ Programming Laboratory
CSA718	Symbolic Logic and Programming in PROLOG Laboratory
CSA719	Windows Programming using C# Laboratory

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Semester 6

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1	CSA720	Industrial Training	**0**	**0**	**48**	**24**	**20**	**-**	**-**	**80**	**600**
			0	**0**	**48**	**24**					**600**

The Industrial Training will be of 20 to 24 weeks duration. It will include the development of application/system software in industries, commercial or scientific environment. For evaluation, 20% weightage will be given to the synopsis of the project and 80% weightage will be given to the Viva, Project Execution, and Project Report.

DAV UNIVERSITY JALANDHAR

Course Title: Discrete Mathematical Structures
Course Code: CSA501
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective:To provide basic knowledge about mathematical structures viz. sets, groups, binary trees, graphs, propositions, functions, recurrence relations, etc required for the implementation of various computer science courses.

UNIT – A **18Hours**

Set Theory

- Elements of a Set, Methods of Describing a Set,
- Types of Sets
- Operations on Sets Union, Intersection and Difference of Sets
- Venn Diagrams, Statement Problems
- Associative Laws, Distributive Laws
- Demorgan's Laws
- Duality, Partitioning of a Set

Groups and Subgroups

- Group Axioms, Permutation Groups, Subgroups, Cosets
- Normal Subgroups, Semigroups, Free Semigroups, Modular Arithmetic

UNIT – B **12 Hours**

Binary Trees

- Binary Trees, Complete and Extended Binary Trees,
- Representing Binary Trees in Memory
- Traversing Binary Trees, Binary Search Trees
- Priority Queues
- Heaps

Graph Theory

- Graphs and Multi-Graphs
- Subgraphs, Isomorphic and Homeomorphic Graphs
- Paths, Connectivity
- Labeled and Weighted Graphs
- Complete, Regular, and Bipartite Graphs
- Tree Graphs
- Planar Graphs
- Representing Graphs in Memory
- Eulerian and Hamiltonian Paths

UNIT – C **18 Hours**

Logic and Propositional Calculus

- Introduction, Propositions and Compound Statements
- Basic Logical Operations, Proposition and Truth Tables, Tautology and Contradictions
- Conditionals and Bi-Conditionals Statements, Well Formed Formula, Propositional Functions
- Quantifiers, Negation of Quantified Statements, Normal Forms

Functions and Algorithms

- Introduction, Functions
- One to One, Onto, and Invertible Functions
- Mathematical Functions, Exponential and Logarithmic Functions
- Recursively Defined Functions
- Cardinality
- Algorithm of Functions, Complexity of Algorithms

UNIT – D **12 Hours**

Boolean Algebra

- Boolean Functions
- Representing Boolean Functions
- Basic Theorems
- Duality
- Sum of Products Form for Boolean Algebra
- Logic Gates and Circuits
- Truth Tables

Introduction to Theory of Computations

- DFA, NDFA
- Context Free Grammars, Derivation Trees, Ambiguity
- Regular Expressions
- Turing Machines, Representation

Reference Books:

1. DoerrAlan and LevaseurKenneth, *Applied Discrete Structures for Computer Science*, New Delhi:Galgotia Publications Pvt. Ltd, 2005.
2. LipschutzSeymour and Lipson Marc Lars, *Discrete Mathematics*, New York: McGraw Hill International Editions, Schaum's Series, 2008.
3. Trambley, J.P. and Manohar,R, *Discrete Mathematical Structures with Applications to Computer Science*, McGraw-Hill Companies, 2004.
4. KolmanBernard and Busby Robert C., *Discrete Mathematical Structures for Computer Science*, New Delhi: Prentice Hall of India Pvt. Ltd, 1994.
5. Rosen Kenneth G., *Discrete Mathematics and Its Applications*, New York: McGraw Hill International Editions, Mathematics Series, 1999.

DAV UNIVERSITY JALANDHAR

Course Title: Computer Fundamentals and Programming in C
Course Code: CSA502
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The objective of this course is to familiarize students with concepts of fundamentals of information technology along with developing the logic for solving a given problem using the procedure oriented language C for construction of code.

UNIT– A **18Hours**

Computer Fundamentals

- Definition, Block Diagram Along With Computer Components, Characteristics of Computers
- Classification of Computers, Hardware & Software, Types of Software, Firmware.

Planning the Computer Program

- Concept of Problem Solving, Problem Definition
- Program Design, Debugging
- Types of Errors In Programming, Documentation, Algorithms, Flowchart
- Decision Table, Structured Programming Concepts, Programming Methodologies Viz. Top Down and Bottom Up Programming

UNIT – B **13 Hours**

Overview of C

- History of C, Importance of C, Structure of a C Program

Elements of C

- C Character Set, Identifiers and Keywords,
- Data Types
- Constants and Variables. Operators: Arithmetic,
- Relational, Logical, Bitwise
- Unary, Assignment, Conditional Operators and Their Hierarchy & Associativity

UNIT – C **15 Hours**

Input/Output

- Unformatted & Formatted I/O Function in C

Control Statements

- Sequencing, Selection: if and switch statement; alternation,
- Repetition: for, while, and do while loop
- break, continue, goto

Functions

- Definition, Prototype, Passing Parameters, Types of Functions
- Recursion

Storage Classes in C

- Auto, extern, register and static storage classes, their scope
- Storage and Lifetime

UNIT – D **15 Hours**

Arrays

- Definition, Types, Initialization, Processing an Array, Passing Arrays to Functions, Strings

Pointers

- Declaration, Operations on Pointers, Pointers and Arrays
- Dynamic Memory Allocation, Pointers and Functions, Pointers and Strings.

Structure & Union

- Definition, Processing, Structure
- Pointers
- Passing Structures To Function

Data files

- Opening and Closing a File, I/O Operations on Files
- Error Handling During I/O Operation
- Random Access to Files

Reference Books:

1. Gottfried and Byron S.,*Programming with C*, New Delhi:Tata McGraw Hill, 1992.
2. E. Balagurusamy, *Programming in ANSI C*, New Delhi: McGrawHill, 2011.
3. HanlyR. Jeri andKoffman Elliot P., *Problem Solving and Program Design in C*, India: Addison Wesley, 2011.
4. KanetkerYashwant, *Let us C*, New Delhi:BPB Publications, 2011.

DAV UNIVERSITY JALANDHAR

Course Title: Computer System Organization and Architecture
Course Code: CSA503
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The objective of the course is to provide students with a solid foundation in computer design. Examine the operation of the major building blocks of a computer system Syllabus includes machine language, instruction set architecture, control design, memory hierarchy, input/output and communication.

UNIT– A **18Hours**

Information Representation

- Number Systems: Binary, Octal, Decimal, Hexadecimal Numbers and Their Inter Conversions
- Complements(r-1)'s,(r')s, Subtraction of Unsigned Numbers
- Fixed-point and Floating-point representation of numbers
- Binary Codes: Gray Code, Decimal Code and Alphanumeric Codes
- Error Detection and Correction codes: Parity Check
- CRC and Hamming Code.

Binary Logic

- Logic gates, Boolean algebra, Boolean functions
- Truth tables, simplification of Boolean functions
- K-maps for 2, 3 and 4 variables

UNIT – B **15 Hours**

Basic Building Blocks

- Combinational logic design:
  - half-adder, full adder
  - Encoder, Decoder
  - Multiplexer, De-Multiplexer

Sequential Circuits

- Concept, flip-flops (D, RS, JK, T, and Master-Slave)
- Registers:
  - Register with parallel load
  - Buffer, Bidirectional Shift Register with parallel load and Controlled shift registers
- Counters: Binary, Ripple, Ring, Johnsan Counter

UNIT – C **15 Hours**

Computer Organization

- Microcomputer Organization; Microprocessor Organization, Instruction codes
- Memory Reference, Register Reference and Input-Output Reference Instructions
- Instruction cycle, Instruction formats

- Processing UNIT Design: one, two and three bus Organization.
- Addressing Mode, CISC, RISC

Memory Organization

- Memory Hierarchy, Types of Memory: RAM and ROM Chips,
- Associative Memory, Cache Memory, Auxiliary Memory, Virtual Memory
- Memory Address Map, Memory Connection to CPU.

UNIT – D **12 Hours**

Input Output Organization

- Input output Interface, Memory Mapped I/O; Interrupt
- Asynchronous Data Transfer: Strobe Control, Handshaking
- Priority Interrupts: Daisy-Chaining, Parallel Interrupt, Priority Encoder
- Interrupt Cycle, Types of Interrupt: Program interrupt
- Priority Interrupts, Direct Memory Access (DMA).
- Introduction to Assembly Language.

Reference Books:

1. Mano M.M.,*Computer System Architecture*, New Delhi: Prentice Hall of India, 2000.
2. Mano M.M., *Digital Logic and Computer Design*, New Delhi: Prentice Hall of India, 2008.
3. Hayes,*Computer Architecture and Organization*, New Delhi: McGrawHill International Edition, 1998.
4. TannenbaumA.S., *Structured Computer Organization*, New Delhi: Prentice Hall of India, 2012.
5. BreyB., *The Intel Microprocessors*, New Jersy: Pearson Education, 2009.
6. Sloan M.E., *Computer Hardware and Organization*, 2nd Edition, New Delhi: Galgotia, Pvt. Ltd, 1995.

DAV UNIVERSITY JALANDHAR

Course Title: Advances in Operating Systems
Course Code: CSA504
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To understand and learn the fundamentals of Operating System including dealing with memory management, process management, CPU scheduling, deadlocks and file management.

UNIT– A **15Hours**

Introduction to Operating System

- OS, History of OS, Types of OS
- Functions/operations of OS, User services/jobs, system calls
- Traps, architectures for operating systems

CPU Scheduling

- Process states, virtual processors
- interrupt mechanism, scheduling algorithms
- Preemptive scheduling & Non-Preemptive scheduling

UNIT – B **18 Hours**

Process Management

- Process overview, process states and state transition
- Levels of schedulers and scheduling algorithms
- Process Synchronization Critical section and mutual exclusion problem
- Classical synchronization problems, deadlock prevention. Multithreading.

System Deadlock

- Deadlock characterization, Deadlock prevention and avoidance
- Deadlock detection and recovery, practical considerations

UNIT– C **15 Hours**

Storage Management

- Storage allocation methods: Single contiguous allocation
- Multiple contiguous allocation

Memory Management

- Paging, Segmentation combination of Paging and Segmentation
- Virtual memory concepts, Demand Paging, Page replacement Algorithms
- Thrashing. Address Protection, segmentation, virtual memory, paging
- Page replacement algorithms
- Cache memory, hierarchy of memory types, associative memory.

File Management

- Overview of File Management System
- Disk Space Management, Directory Structures
- Protection Domains, Access Control Lists, Protection Models

Device Management

- Goals of I/O software, Design of device drivers, Device scheduling policies

UNIT – D

12 Hours

Multiprogramming System

- Queue management, File and directory systems, disk scheduling: FCFS, SSTF, SCAN, CSCAN, LOOK, CLOOK

Case Studies

- Comparative study of DOS, WINDOW, UNIX & LINUX system and case study of ANDROID

Reference Books:

1. Galvin and Silberschatz A., *Operating System Concepts*, Eigth Addition, New York: J. Wiley & Sons, 2009.
2. Crowley, *Operating Systems: A Design Oriented Approach*, New Delhi: Tata McGraw Hill, 2008.
3. Donovan J.J, *Systems Programming*, New York: McGraw Hill, 1972.
4. Dhamdhere. D.M, *System Programming and Operating Systems*, New Delhi: Tata McGraw Hill, 1999.
5. Madnick and Donovan, *Operating System*, New York: McGraw Hill, 1978.
6. Beck Leland L., *System Software*, Delhi: Pearson Education, 2000.
7. Henson P.B., *Operating System Principles*, Delhi: Prentice Hall
8. Tenenbaum A.S., *Operating System: Design and Implementation*, New Delhi: PHI, 2013.

DAV UNIVERSITY JALANDHAR

Course Title: Database Management System
Course Code: CSA505
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The concepts related to database, database design techniques, transaction management, SQL, PL/SQL and database operations are introduced in this subject. This creates strong foundation for data base creation

UNIT– A **15Hours**

Data Base Concepts

- Data base vs. file oriented approach, Data Independence
- Data Base Models
- General Architecture of a Data Base Management Software, Components of a DBMS
- Advantages and Disadvantages of DBMS

Introduction to Data Models

- Entity Relationship model, hierarchical model
- from network to hierarchical, relational model
- object oriented database, object relational database
- Comparison of OOD & ORD, comparison of network, hierarchical and relational models.

UNIT – B **15 Hours**

Data Base Design

- Entities, Attributes, ER Diagrams
- Functional dependencies; Normalization
- Multivalued dependencies, decomposition
- Relational algebra and calculus
- The relational calculus query processor and optimizer, Storage organization for relations.

Data Base Protection

- Concurrency, recovery
- Integrity, Protection, essentials of security
- authorization, types of database security

UNIT – C **15 Hours**

Relational Query Language

- SQL, client/server architecture
- Technical introduction to Oracle.

Software Development using SQL

- SQL data types, Querying database tables
- Conditional retrieval of rows, working with Null values, matching a pattern from the table

- querying multiple tables: Equi joins, Cartesian joins, Outer joins, Self joins;
- Set operator: Union, Intersect, Minus, Nested queries

UNIT – D **15 Hours**

Introduction to PL/SQL

- The PL/SQL block structure, PL/SQL data types
- Variables and constants, assignment and expressions
- Writing PL/SQL code, cursor management in PL/SQL
- Concept of stored packages
- Database triggers, types of triggers, Dropping triggers, storage of triggers
- Program Design & Development for Inventory, Personnel and Financial Management using Oracle

Reference Books:

1. Desai. B.C., *An Introduction to Database Systems*, New Delhi: Galgotia Publ. Private Ltd, 2000.
2. Date. C.J, *Data Base Systems*, Vols. I & II, New Delhi: Narosa Publishers, 2002.
3. Silberscatz, Korth and Sudarshan, *Database System Concepts*, Third Ed., New York: McGraw Hill International Editions, Computer Science Series, 2010.
4. Peter Rob Carlos Coronel, *Data Base Systems* (3rd Edition), New Delhi: Galgotia Publications (P) Ltd, 2001.

DAV UNIVERSITY JALANDHAR

Course Title: Programming in C Laboratory
Course Code: CSA506

L	T	P	Credits	Marks
0	0	4	2	50

Implementation of C programs: Control Structures, Arrays, Strings, Pointers, Structures, Union, Files, etc.

Course Title: Database Management System Laboratory
Course Code: CSA507

L	T	P	Credits	Marks
0	0	4	2	50

Implementation of SQL: DDL, DML, DCL, TCL
Practice of PL/SQL.

DAV UNIVERSITY JALANDHAR

Course Title: Data Structures and File Processing using C
Course Code: CSA508
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The emphasis of this course is on the organization of information, the implementation of common data structures such as lists, stacks, queues, trees, and graphs.

UNIT– A **15Hours**

Preliminaries

- Introduction to Data Structures: Primitive and Composite, Various data structures
- Common operations on data structures, algorithm complexity
- big O notation, timespace tradeoff between algorithms
- Complexity of Algorithms, Records and Pointers.

Arrays

- Arrays defined, representing arrays in memory, various operations on linear arrays
- Multi dimensional arrays, Records, Matrices, Sparse Matrices
- Linear Search, Binary Search
- Insertion Sort, Selection Sort, Bubble Sort
- Merge Sort, Radix Sort
- String, Representation and Manipulation

UNIT – B **15 Hours**

Linked Lists

- Types of linked lists, representing linked lists in memory
- Advantage of using linked lists over arrays
- Various operation on linked lists

Stacks

- Description of stack structure, implementation of stack using arrays and linked lists
- Applications of stacks converting arithmetic expression from infix notation to polish and their subsequent evaluation
- Quicksort technique to sort an array, parenthesis checker.

Queues

- Implementation of queue using arrays and linked lists
- Deques, Priority Queues and their implementation, applications of queues.

UNIT – C **13 Hours**

Trees

- Description of tree structure and its terminology, binary search tree
- Implementing binary search tree using linked lists
- Various operations on binary search trees, AVL Trees
- Threaded Binary Trees, BTrees, B+ trees

Heaps

- Description of heap structure, implementing heaps using arrays
- Various operations on heaps, Applications of heaps
- Heapsort technique to sort an array

UNIT – D **18 Hours**

Graphs

- Representation of Graphs and Applications: Adjacency Matrix, Path Matrix
- Warshall's Algorithm, Linked Representation of a Graph
- Traversing a Graph, DFS and BFS.

Hash Tables

- Direct address tables, hash tables
- Collision resolution by chaining, hash functions
- Open addressing – linear probing, quadratic probing, double hashing

Files

- Operations on files, Types of files
- File Organizations: Sequential files, Indexed Sequential file, Directed files and multikey files
- File performance criteria and terms.

Reference Books:

1. Lipschutz Seymour, *Theory and Problems of Data Structures*, Schaum Outline Series, New Delhi: Tata McGrawHill Book Company, 2001.
2. Mark Allen Weiss, *Data Structures and Algorithm Analysis In C* , Mexico City:Addison Wesley, (An Imprint of Pearson Education),.New Delhi: Prentice Hall of India Pvt. Ltd, 1993.
3. Esakov Jeffery, Weiss Tom, *Data Structures: An Advanced Approach Using C*, New Delhi: Prentice Hall International, Inc, 2007.
4. Trembley and Sorenson,*An Introduction to Data Structures with Application*, New York : McGraw Hill Company, 1984.
5. Tanenbaum, *Data Structures using C,* New Delhi: Pearson Education*, 2009*.

DAV UNIVERSITY JALANDHAR

Course Title: Object Oriented Programming using C++
Course Code: CSA509
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course will expose you to the features in C++, which help you design software using the object oriented programming concepts such as inheritance, encapsulation, polymorphism, exception and file handling.

UNIT– A **18Hours**

Introduction

- Evolution of OOP, OOP features of C++
- Characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading
- Comparison of C with C++.

Class Concepts

- Class and Objects, Inline functions, Static data members and member functions
- ReadOnly objects, Pointers, Dynamic memory allocation and deallocation
- Constructors and Destructors
- Dynamic objects, array of pointers to object, Pass by value vs. Pass by Reference
- Local and Global class, nested and empty class, preprocessor directives, namespace.

Console I/O

- Hierarchy of console stream classes
- Unformatted and formatted I/O operations, Manipulators

UNIT – B **12 Hours**

Operator Overloading

- Overloadable operators, overloading unary and binary arithmetic and relational operators
- Overloading subscript, array, insertion, extraction, new and delete operators.

Friend Function and Type Conversion

- Friend function, Function overloading, overloading operators through friend function
- Basic type conversion, conversion between Objects and Basic Types
- Conversion between objects of different classes

UNIT – C **15 Hours**

Inheritance

- Derivation Rules, Different forms of inheritance

- Roles of constructors and destructors in inheritance.

Virtual Functions

- Virtual functions and their needs, Pure virtual function
- Virtual destructor, virtual derivation, abstract class.

UNIT – D **15 Hours**

Generic Programming & Exception Handling

- Template functions, Template class
- Exception handling features of C++

File Handling

- Hierarchy of File Stream classes, Opening and Closing files
- File modes, testing for errors
- File pointers and their manipulations, ASCII & Binary files
- Sequential and Random access files

Reference Books:

1. Stroustrup Bjarne, *The C++ Programming Language*, New Delhi: Pearson Ed., 2013.
2. Robert Lafore, *Object Oriented Programming in C++*, Sams Publishing, 2005.
3. Balaguruswami, *Object Oriented Programming In C++*, New Delhi: Tata McGrawHill, 2007.
4. Lippman and Weiss Tom, *C++ Primer*, 3/e, AddisonWesley, 2012.
5. Scildt Herbert, *C++ The Complete Reference*, New Delhi:Tata McGrawHill, 2003.

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	1	0	4	100

Course Title: Financial Statement Analysis
Course Code: COM502
Course Duration: 45-60 Hours

Course Objective: Students will learn the skill of analysing the financial statements by applying various tools of financial analysis.

Learning Outcomes: After studying this course, students will be able to draw meaningful conclusions from the financial statements, based on which strategic decisions may be taken.

Unit – A (Financial Statement Information) **12 Hours**

- The Demand for financial statement information
- The supply of financial statement information
- Meaning and Advantages of Financial Statement Analysis
- Some empirical issues and evidence of Financial Statement Analysis

Unit- B (Financial Statement Numbers) **17 Hours**

- Financial statement numbers- Introductory Techniques
- Financial statement numbers and alternative accounting methods
- Time series analysis of financial statement information
- Forecasting financial statement information

Unit- C (Financial Statement Analysis of Capital markets) **15 Hours**

- Capital markets and information efficiency
- Asset pricing and financial statement information
- Capital markets and corporate information releases

Unit- D (Financial Statement Analysis of Equity Information and other Long Term Decisions) **18 Hours**

- Equity securities and financial statement information
- Corporate restructuring and financial information
- Debt rating, debt securities and financial information
- Distress analysis and financial information
- Loan decisions and financial information

Reference books:

1. Foster, G. *Financial Statement Analysis,* Delhi:Pearson Education, 2nd Edition, 2007.
2. Bhattacharyya, D. *Financial Statement Analysis,* New Delhi*:* Pearson Education, 2011.
3. Gibson Charles H, *Financial Statement Analysis*, Cengage Learning, 12th Edition, 2012.

DAV UNIVERSITY JALANDHAR

Course Title: Computer Networks and Data Communication
Course Code: CSA510
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: As part of this course, students will be introduced to computer networks and data communication paradigms, about network models and standards, network protocols and their use, wireless technologies.

UNIT – A **18 Hours**

Introduction to Data Communication

- Components of Data Communication, Data Representation
- Transmission Impairments, Switching, Modulation, Multiplexing

Review of Network Hardware

- LAN, MAN, WAN
- Wireless networks, Internetworks

Review of Network Software

- Layer, Protocols, Interfaces and Services

Review of Reference Models

- OSI, TCP/IP and their comparison

Physical Layer

- Transmission Media**:** Twisted pair, Coaxial cable, Fiber optics
- Wireless transmission (Radio, Microwave, Infrared)
- Introduction to ATM, ISDN
- Cellular Radio and Communication Satellites

UNIT – B **15 Hours**

Data Link Layer

- Framing, Error control, Sliding window protocols (one bit, Go back n, selective repeat)
- Examples of DLL Protocols–HDLC, PPP

Medium Access Sub layer

- Channel Allocation, MAC protocols – ALOHA, CSMA protocols
- Collision free protocols, Limited Contention Protocols
- Wireless LAN protocols
- IEEE 802.3, 802.4, 802.5 standards and their comparison

Bridges

- Transparent, source routing, remote

UNIT – C **15 Hours**

Network Layer

- Design Issues, Routing Algorithms (Shortest Path, Flooding, Distance Vector, Hierarchical, Broadcast, Multicast
- Internetworking, IP Protocol, ARP, RARP.

Network Trouble Shooting

- Using Ping, Traceroute, IP config, Netstat, nsloopup etc.

UNIT – D **12 Hours**

Transport Layer

- Addressing, Establishing and Releasing Connection
- Flow Control, Buffering
- Internet Transport Protocol (TCP and UDP).
- Congestion Control Algorithms (Leaky bucket, Token bucket, Load shedding)

Application Layer

- Domain name system, Email, File transfer protocol
- HTTP, HTTPS, World Wide Web.

Reference Books:

1. Tanenbaum. Andrew S. , *Computer Networks*, 4th Edition, New Delhi: PHI, 2013.
2. Forouzan B. A., *Data Communications and Networking*, Fourth Edition, New Delhi: Tata McGraw Hill, 2003.
3. Stallings William, *Data Computer Communications*, (8th Edition), New Delhi: PHI, 2008.
4. Bary Nance, *Introduction to Networking*, 4th Edition, New Delhi: PHI, 1997.

DAV UNIVERSITY JALANDHAR

Course Title: Computer Oriented Numerical and Statistical Methods
Course Code: CSA511
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The course aims at discussing various significant and fundamental concepts to inculcate in the students an adequate understanding of the application of Numerical Algorithms and Statistical Methods.

UNIT– A **18Hours**

Errors and Sources of Propagation for Errors

- Floating point representation of numbers
- Arithmetic operations with normalized floating point numbers and their consequences
- Error in number representation pitfalls in computing

Iterative Methods

- Zeros of a single transcendental equation and zeros of polynomial using Bisection
- False position, Newton Raphson, convergence of solution
- Simultaneous Linear Equations, Solution of simultaneous Linear equation
- Gauss elimination method and pivoting, ILL conditioned equations and refinement of solutions
- Gauss Siedel iterative methods

UNIT – B **12 Hours**

Numeric Differentiation and Integration

- Numerical differentiation using interpolation method
- numerical integration, Trapezoidal rule
- Simpson's 1/8 rule, Simpson 3/8 rule.

Numerical Solution of Ordinary Differential equations

- Euler method, RungaKutta method, Predictor corrector method.

UNIT – C **15 Hours**

Interpolation Curve Fitting and Cubic Splines

- Difference tables, Finite Differences, Backward, Forward, Lagrange's interpolation
- Inverse Interpolations, Least square, curve fitting procedures
- Fitting a straight line, nonlinear curve fitting, Data fitting with cubic splines
- Approximation of functions by Taylor series and Chebyshev polynomials.

Average

- Requisites of a good average, Various method of central tendency
- selection and limitations of an average

Dispersion

- Meaning, Characteristics for an ideal measure of dispersion
- Measures of dispersion (Mean deviation, Standard Deviation and variance.)

UNIT – D **15 Hours**

StatisticalMethods

- Sample distributions, Test of Significance: ChiSquare Test, t and F test.

Analysis of Variance

- Definition, Assumptions, Cochran's Theorem (only statement)
- Oneway classification, ANOVA Table
- Twoway classification (with one observation per cell).

Reference Books:

1. Rajaraman. V., *Computer Oriented Numerical Methods*, New Delhi: Prentice Hall, 2006.
2. Gupta S.C., *Fundamental of Statistics*, Himalayas Publication House, 1992.
3. Gupta & Kapoor, *Applied Statistics*, Sultan Chand & Sons, 1996.
4. Gupta S.P., *Statistical Method*, Sultan Chand & Sons, 2011.

Course Title: Data Structures and File Processing using C Laboratory
Course Code: CSA512

L	T	P	Credits	Marks
0	0	4	2	50

Implementation of Data Structures using C: Arrays Linked List, Stack, Queues, Trees, etc.

Course Title: Object Oriented Programming using C++ Laboratory
Course Code: CSA513

L	T	P	Credits	Marks
0	0	4	2	50

- Implementation of OOP concepts using C++
- Write program in 'C++' language
- Using input and output statements
- Using control statements.
- Using functions.
- Using array
- Using Classes and implementation of Constructor and Destructor.
- Using files.
- Using OOP's Concepts (Inheritance, Polymorphism, Encapsulation, Friend and Static Functions, Exception Handling)

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Design and Analysis of Algorithms
Course Code: CSA601
Course Duration: 45-60 Hours

Course Objective: The objective of the module is to create skills in students to design and analysis of algorithms.

UNIT – A **15 Hours**

Algorithms and Analysis

- Introduction
- Algorithms specification
- Recursive algorithms
- Space and Time Complexity
- Asymptotic Notation (O, Θ and Ω) practical complexities, Best, average and worst case performance of algorithms
- Introduction to recurrence relations

Divide and Conquer

- General method
- Binary Search, Merge sort, Quick sort, Selection sort,
- Analysis of these problems

UNIT – B **15 Hours**

String Processing

- KMP
- Boyre-Moore
- Robin Karp algorithms

Introduction to randomized algorithms

- Random numbers
- randomized Qsort
- Randomly Built BST

UNIT – C **15 Hours**

Greedy Method

- General Method, Knapsack problem
- Job sequencing with deadlines
- Minimum spanning Trees
- Single Source Shortcut paths and analysis of these problems

Dynamic Programming

- General method, Optimal Binary Search Trees
- 0/1 Knapsack
- The Travelling Salesperson Problem

UNIT – D **15 Hours**

Back Tracking

- General method, 8 queen's problem
- Graph Coloring
- Hamiltonian Cycles
- Analysis of these Problems.

Introduction to Complexity Theory

- NP-Hard and NP-Complete Problem
- Basic concepts, Cook's theorem, examples of NP-Hard problems
- Approximation Algorithms

Reference Books:

1. Horowitz, Ellis and Sahni, *Fundamentals of Computer Algorithms*, New Delhi: Galgotia Publications, 2nd Edition, 2008
2. Aho, A.V., Hopcroft, J.E., Ullman, J.D., *The Design and Analysis of Computer Algorithms*, Addison-Wesley, First Edition, 2003.
3. Bentley, J.L., *Writing Efficient Programs*, New Delhi: Prentice-Hall India, Eastern Economy Edition, 2009.
4. Goodman, S.E. &Hedetniemi, *Introduction to the Design and Analysis of Algorithms*, New Delhi: Tata McGraw-Hill Book Comp, 2004.

DAV UNIVERSITY JALANDHAR

Course Title: Computer Based Optimization Techniques
Course Code: CSA602
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To introduce linear programming, dynamic programming and related Optimization Theories to solve real life / simulated problems.

UNIT – A **15 Hours**

Introduction

- The Historical development
- Nature, Meaning and Management Application of Operations Research Modelling
- Its Principal and Approximation of O.R.Models
- Main Characteristic and Phases
- General Methods of solving models
- Scientific Methods, Scope, Role on Decision Making
- Development of Operation Research in India

UNIT – B **18 Hours**

Linear Programming

- Mathematical formulation of linear programming problems
- Canonical and standard forms of linear programming problems
- Solution by Graphical & Simplex method
- Revised simplex method
- Two phase & Big-M method, Duality, Primal-Dual Relationship
- Simplex Method
- Economic Interpretation of Optimal simplex Solution

Special Types of Linear Programming Problems

- Transportation
- Assignment Problems

UNIT – C **15 Hours**

Integer & Dynamic Programming

- Integer programming problem
- Branch and Bound Techniques
- Characteristics
- Deterministic DP Problems, Recursive Approach and Tabular method

PERT / CPM

- Project Planning
- Scheduling
- Activity Cost

- Network Diagram Representation
- Difference between CPM and PERT
- Floats and Slack Times

UNIT-D **12 Hours**

Queuing Models

- Introduction, Applications
- Characteristic, Waiting and Ideal time costs
- Transient and Steady states
- Kendall's Notations
- M/M/1, M/M/C, M/Ek/1 and Deterministic Models

Reference Books:

1. Hiller, F.S. & Liberman, G.J., *Introduction to Operations Research*, 2nd Edn. London Holden Day Inc., 1974.
2. Tara, H.A., *Operations Research*, 3rd Edn., New Delhi:PHI, 2004.
3. Beightler, C.S. & Phillips, D.T., *Foundations of Optimisation*, 2nd.Edn. New Delhi: Prentice-Hall, 1979.
4. McMillan Claude Jr., *Mathematical Programming*, 2nd. Edn., J. Wiley Series, 1975.
5. Srinath, L.S., *Linear Programming*, New Delhi: East-West, 1975.
6. Churchman, C.W. &Arnchoff, E.L., *Introduction to Operations Research*, New York: John Wiley and Sons, 1988.

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Computer Graphics
Course Code: CSA603
Course Duration: 45-60 Hours

Course Objective: The aim is to introduce the students to key concepts of Computer Graphics likedisplay devices, co-ordinate system, transformations, line and circle drawing, pointing, positioning, projections, etc.

UNIT – A **18 Hours**

Display Devices

- Line and point plotting systems
- Raster, vector, pixel and point plotters
- Continual Refresh and storage displays
- Digital frame buffer
- Plasma panel displays, Display processors
- Character generators
- Color-display techniques : shadow mask and penetration CRT, Color look-up tables

Elementary Drawing Algorithms

- Line drawing using direct method, simple DDA, integer DDA
- Incremental method, and Bresenham's algorithm
- Circle drawing using incremental method,Bresenham's and MidPoint algorithm
- drawing arcs, sectors
- Flood Fill Algorithms, Boundary Fill Algorithms

UNIT – B **15 Hours**

Geometric Transformations.

- Two Dimensional Translation, rotation, scaling, reflection and shear
- Concept of homogenous coordinates
- Building composite transformations

Viewing Transformations

- Concept of Windows & Viewport
- Window-To-Viewport Mapping
- Clipping Operations - Point Clipping
- Line Clipping Algorithms (Cohen - Sutherland, Mid-Point, Subdivision, Cyrus - Beck),
- Sutherland - Hodgeman Polygon Clipping Algorithm

UNIT – C **15 Hours**

Three-dimensional concepts

- 3-D representations and transformations
- perspective and parallel projections
- spline curves and surfaces

- Quadtree and Octree data structures

Hidden line/surface Removal

- Back Face Removal
- Z-Buffer Algorithm
- Painters (Depth Sort) Algorithm
- Subdivision Algorithms - Warnock's Algorithm
- Scan Line Algorithms - Scan Line

UNIT – D **12 Hours**

Rendering

- Introduction, a simple illumination model
- Shading - Gouraud shading &Phong Shading
- Ray Tracing, Shadows, Textures

Open GL

- Primitives of the language and interface with C/C++

Reference Books:

1. D. Hearn and M.P. Baker, *Computer Graphics*(2nd ed.), New Delhi: Prentice–Hall of India, 2004.
2. Foley. J.D., Dam A van, FeinerS.K. andHughes J.F., *Computer Graphics: Principals and Practices*(2nd ed.), Addison-Wesley, MA, 1990.
3. Rogers D.F., *Procedural Elements in Computer Graphics (2nd ed.),* New Delhi: McGraw Hill Book Company, 2001.
4. Plastock Roy A., Kalley Gordon,*Computer Graphics*, New Delhi: McGraw Hill Book Company, 1996,

DAV UNIVERSITY JALANDHAR

Course Title: JAVA Programming
Course Code: CSA604
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The objective of this course is to get insight of the subject and after completion of this course, students will be able to:

- Use the advanced features of Java Technology
- Develop good program to handle exceptions and errors in program.
- Work with collection API and develop fast programs.
- Use the java.io package in detail.
- Use the serialization concepts of java technology.
- Develop good multithreaded programs

UNIT – A **15 Hours**

Introduction

- Features of Java
- Data Types, Operators & Expressions
- Control Structures, Arrays,
- Class, Objects & Methods, Constructors
- Garbage Collection, Access Qualifiers, String Handling – String Operations
- Packages and Interfaces
- Inheritance, static Classes, Abstract Classes, Final Classes
- Wrapper Classes: Autoboxing and Unboxing, Garbage Collection & Finalize method
- Enumerated Types and Annotations, Handling String and String Buffer Classes, Method Overloading and Overriding
- Nesting of Methods and Methods with Varargs.

UNIT-B **15 Hours**

Packages and Interface

- Packages, Access Protection
- Importing Packages, Interfaces
- Defining, Implementing
- Applying Interfaces
- Extending Interfaces

Exception Handling

- Exception Types
- Uncaught Exceptions
- Multiple Catch Clauses
- Nested Try Statements Built-in Exceptions
- Creating Your Own Exceptions.
- Multithreading: Java Thread Model, Creating Multiple Threads, Thread Priorities

- Synchronization, Interthread Communication
- Suspending, Resuming and Stopping Threads

UNIT – C **15 Hours**

Applets

- Local & Remote Applets
- Applet Architecture
- Passing Parameters to Applets
- I/O Streams: Console I/O
- Reading Console Input, Writing Console Output
- Files I/O – Byte Streams, Character Streams
- Collection Interfaces & Classes
- Delegation Event Model

UNIT – D **15 Hours**

AWT Classes

- Window Fundamentals
- Working With Graphics
- Working With Color& Fonts
- AWT Controls
- Layout Managers & Menus
- Swing Classes, Java Beans
- Servlet Classes & Life Cycle

Introduction to Graphic Programming

Applying 2-D transformations on Objects
Event Handling , Layouts, Frames
Panels, Menu's, Pop up Menus, Swings, JDBC.

Reference Books:

1. Liang. Y. Daniel, *Introduction to Java Programming*, Comprehensive Version, New Delhi: Pearson, 9/E, 2012.
2. Petric Noughton and Herbet Schildt,*Java 2 The Complete Reference*, New Delhi: McGraw Hill Professional, 1999.
3. Seirra Kethyand Bates Bert, *Head First java*, Kindle Edition, 2005.
4. SchildtHerbert, *The Complete Reference Java 2*, Fourth Edition, New Delhi: Tata McGraw Hill, 2001.
5. Balaguruswami, *Programming with Java*, Second Edition, New Delhi: Tata McGraw Hill, 1998.
6. Mughal K. A., Rasmussen R. W., *A Programmer's Guide to Java Certification*, Addison-Wesley, 2000.

DAV UNIVERSITY JALANDHAR

Course Title: Data Mining and Data Warehousing
Course Code: CSA605
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To introduce the concepts and techniques of data mining and data warehousing, including concept, principle, architecture, design, implementation, applications of data warehousing and data mining.

UNIT-A **15 Hours**

Introduction

- Basic Systems Concepts, Elements (Components) of System, Characteristics of System, Types of Systems, System Approach.
- Information Systems: Definition & Characteristics, Types of Information, Role of Information in Decision - Making, Levels of Management.
- Introduction to different kinds of Information Systems: ESS, EIS, DSS, MIS, KWS, TPS, OAS and EDP

Data Warehousing Architecture

- Design and Construction of Data-Warehouses, Three-Tier Data Warehouse Architecture
- Data content, metadata, distribution of data
- Tools for Data Warehousing, Crucial decisions in Designing a Data Warehouse

UNIT-B **12 Hours**

Data Mart

- Types of Data Marts, Loading a Data Mart, Metadata for a data Mart
- Data Model for a Data Mart, Maintenance of a Data Mart
- Software components for a Data Mart, Tables in Data Mart, External Data, Performance issues
- Monitoring requirements for a Data Mart, Security in Data Mart.

UNIT-C **15 Hours**

OLTP and OLAP Systems

- Data Modelling, Star Schema for multidimensional view, multi fact star schema
- Types of OLAP Servers: ROLAP, MOLAP, HOLAP
- Efficient Computation of Data Cubes, Indexing OLAP Data
- Efficient Processing of OLAP Queries, Categories of OLAP tools
- Metadata Repository, Data Warehouse Back-End Tools and Utilities

UNIT-D **18 Hours**

Data Mining

- Basic Concepts; From Data Warehouse to Data Mining
- Steps of Data Mining Process, Types of Data Mining Tasks
- Data Mining Techniques: Predictive Modeling, Database Segmentation, Link Analysis, Deviation Detection in details
- Data Mining Algorithms Viz. Classification
- Association Rules and Clustering, Database Segmentation
- Data Mining Query Languages, Applications and Trends in Data Mining

Reference Books

1. Inmon W. H., *Building the Data Warehouse*, New York: John Wiley 2002.
2. Inmon W. H., *Data Warehousing and Knowledge Management*, ork: New YJohn Wiley 1996.
3. Romez Elmasri, Shamkant B.Navathe, *Fundamentals of Database Systems,* New Delhi: Pearson Education, 2009.
4. Han, Kamber, Morgan Kaufmann, *Data Mining: Concepts and Techniques*, 2nd Edition, Elsevier, 2012.
5. Inmon, W.H., C. L. Gassey, *Managing the Data Warehouse*, New York:John Wiley 1999.
6. Fayyad, Usama M., *Advances in Knowledge Discovery and Data Mining*, MIT Press, 1996.
7. Silberschatz, Korth and Sudershan, *Database System Concepts*, New Delhi: McGraw Hill, 4th Edition, 2010.

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Mobile Computing
Course Code: CSA606
Course Duration: 45-60 Hours

Course Objective: To familiarize students with wireless technology, wireless networking, WAP architecture, WAP applications, database management issues like data replications in mobile computers, data delivery models, mobile agent computing, security in wireless and mobile systems.

UNIT-A **15 Hours**

Introduction

- Issues in Mobile Computing
- Overview of Wireless Telephony: cellular concepts, GSM, Channel structure.
- Location Management: HLR-VLR, handoffs, channel allocation in cellular systems, CDMA, GPRS
- Impacts of mobility and portability in computational model and algorithms for mobile environment.
- Analysis of algorithms and termination detection.

UNIT-B **15 Hours**

Wireless Networking

- Wireless Networking
- Wireless LAN Overview: MAC Issues, IEEE802.11, Bluetooth, Wireless multiple access protocol, TCP over wireless
- Wireless applications, Data broadcasting, Mobile IP
- WAP Architecture: Protocol Stack, Application Environment, Applications

UNIT-C **15 Hours**

Data Management Issues

- Data Replication for mobile computers
- Adaptive Clustering for wireless networks, File System, Disconnected operations

Data delivery models

- Push and pull. Data dissemination in wireless channels
- Broadcast disks. Effects of caching

UNIT-D **15 Hours**

Mobile Agent Computing

- Transaction processing in Mobile Computing Environment

Security in Wireless and Mobile Systems

- Security and fault tolerance, Threats, Vulnerabilities, Attacks, Integrity, Confidentiality, Policy and relevant definitions
- Authentication – Different techniques
- Cryptography – Symmetric Key Cryptography, Asymmetric key Cryptography, Key management, Digital signatures, Certificate
- Wireless and Mobile system security – Strategies, Routing security, Different schemes for MANET

Reference Books

1. Adelstein Frank, Gupta S.K.S., Richard G.III and SchiwebertLoren, *Fundamentals of Mobile and Pervasive Computing*, New Delhi: McGraw-Hill Professional, 2005.
2. T. Rappaport, *Wireless Communication: Principles and Practice*, New Delhi: Pearson Education, 2002.
3. Reza B'Far (Ed), *Mobile Computing Principles*, New York: Cambridge University Press, 2005.
4. Bellavista Paolo and Corradi Antonio (Eds.), *Handbook of Mobile Middleware*, Auerbach Publication, 2006.
5. Schiller J., *Mobile Communications*, New Delhi: Addison Wesley, 2008.
6. Perkins Charles, *Mobile IP*, New Delhi: Addison Wesley, 2008.
7. Upadhyaya, *Mobile Computing*, Implementing Pervasive Information and communications Technologies Springer, 2002.

DAV UNIVERSITY JALANDHAR

Course Title: Emerging Trends in Information Technology
Course Code: CSA607
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides understanding of emerging trends in multimedia, lossless and lossy compression techniques, wireless delivery techniques, software intelligent agent and familiarize students with emerging technologies such as Multimedia, Parallel Computing, Mobile Computing and intelligent Agent Technologies

UNIT-A **15 Hours**

Introduction to Information Technology

- Latest development in Computer hardware :RISC V/S CISC architecture,
- Intel V/S, Motorola chips, Computer peripherals.
- Programming Paradigms, Software Agents, Interoperable objects

Multimedia Systems

- Architecture and Subsystems of Multimedia Computer Systems
- Multimedia applications, multimedia building blocks (text, hypertext, image, audio, video, animation)
- Multimedia Authoring- Introduction, methodologies (Frame Based, Time based, Icon Based)

UNIT-B **15 Hours**

Compression Technologies of Multimedia

- Introduction and Need of Compression
- Compression Basics, Lossless Compression Techniques
- Lossy Compression Techniques

Audio and Video Conferencing

- Technology & Applications
- Application to information technology to various function areas such as education, banking, communication etc.

UNIT-C **15 Hours**

Data Management technologies

- Data Ware Housing and Data Mining
- Data Marts and Conceptual Foundation of ERP

Networking Technologies

- Computer Networks, LAN, WAN, MAN, topologies.
- Internet, ISDN, PSDN, Wireless Networks

- Internet Telephony, Virtual learning environment, Mobile communications.
- IP Addressing

UNIT-D **15 Hours**

Mobile Computing

- Mobile connectivity-Cells, Framework, wireless delivery technology and switching methods
- Mobile information access devices, mobile data internetworking standards
- Cellular data communication protocols, mobile computing applications
- Mobile databases-protocols, scope, tools and technology, M-Business

Intelligent Agent Technology

- Introduction to agents, intelligent software systems
- Attributes, intelligent architectures, components of intelligent agent based distributed systems
- Agent communication protocols, Internetworking applications of intelligent Agents.

Reference Books

1. Jeffcoate and Judith, *Multimedia in Practice*, Technology & Practice, New Delhi: PHI, 2003.
2. Multiagent Systems, *A Modern Approach to Distributed Artificial Intelligence*, London: Edited by Gerhard Weiss, The MIT Press, 1999.
3. Vaughan and Tay, *Multimedia Making It Work*, TMH, 7th Edition, 2008.
4. Bannerjee and Rahul, *Internetworking Technologies: An Engineering Perspective*, New Delhi: PHI, 2003.

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Distributed and Parallel Processing
Course Code: CSA608
Course Duration: 45-60 Hours

Course Objective: The objective of this course is to introduce students to the fundamentals and techniques of distributed computing, distributed operating systems and provides them with the basic skills of how to write distributed programs. Topics to be covered include: distributed computing, parallel processing, parallel processing architecture, concurrency, inter-process communications, distributed objects, application programming interfaces (RMI, RPC).

UNIT-A **15 Hours**

Introduction

- Definition, Characteristics, Goals and applications of Distributed Computing,
- Basic design issues and user requirements

Inter-process Communication

- Client Server Communication, Group Communication
- IPC in UNIX. Remote Procedure Calls
- Design issues and implementation

UNIT-B **15 Hours**

Distributed Operating Systems

- Introduction, The Kernel, Process and Threads, Communication.
- Simple distributed transactions and Nested transactions, Atomic Commit protocols
- Concurrency control, N distributed transaction,
- Distributed deadlocks
- Transactions with replicated data.

Parallel Processing

- Introduction, Need for Computational speed; Applications of parallel computers in various fields including Mathematics, Physics, Chemistry and Computer Science

UNIT-C **15 Hours**

Parallel Processing Architectures

- Parallelismin Sequential Machines, Abstract model of parallel computer
- Multiprocessor architecture, programmability issues

Data Dependency Analysis

- Types of Dependencies, Loop and Array Dependence

- Loop Dependence Analysis, Solving Diophantine Equations.

Thread Based Implementation

- ThreadManagement, Thread Implementation

UNIT-D **15 Hours**

Recovery and Fault Tolerance

- Transaction recovery, Fault tolerance, Hierarchical and group masking of faults.

Algorithms for Parallel Machines

- Speedup, Complexity and Cost, Parallel Reduction
- Quadrature Problem, Matrix Multiplication
- Parallel Sorting Algorithms and Solving Linear System

Reference Books

1. Sasikumar. M., Shikhara, Dinesh and Prakash Ravi, *Introduction to Parallel Processing*, New Delhi: PHI, 2000.
2. Coulouris George, Dollimore Jean, Kindberg Tim, *Distributed Systems: Concepts and Design*, New Delhi: Pearson Education 4th edition, 2009.
3. Madnick and Donovan, *Operating System*, New delhi: McGraw Hill, 1997
4. Wilkinson and Barry, *Parallel Programming Techniques & Applications*, New Delhi: Pearson Education, 2007.
5. Crichlow and Joel M., *An Introduction to Distributed and Parallel Computing*, New delhi: PHI, 1997.
6. RajaramanV., *Elements of Parallel Computing*, New Delhi:PHI, 1990
7. A.S. Tenenbaum, *Operating System: Design and Implementation*, New Delhi:PHI, 1989

DAV UNIVERSITY JALANDHAR

Course Title: Information Systems
Course Code: CSA609
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides a comprehensive understanding of the information systems, types of systems, subsystems, management information systems, decision support systems, expert systems, enterprise information systems and decision making and analysis.

UNIT-A **15 Hours**

System and Information Concepts

- General Model, Types of systems, Subsystems
- Attributes of Information, Evolution of Information Systems, categories of Information Systems, Building and Maintaining Information Systems
- Feedback Control, Systems approach to organization, Law of requisite variety, Control by exception
- Information Concepts, Types of Information, Quality of Information, Value of Information

Management Information System

- Definitions, Role of MIS, MIS in Academics
- Structure of MIS based on management activity and functions System and Information concepts to MIS

UNIT-B **15 Hours**

Decision Support Systems

- Conceptual Foundations of DSS, Concepts of DSS
- DSS Software, Strategies for DSS, GDSS, and Executive Support System (ESS),
- Fundamentals of Knowledge Management systems, Knowledge Based Decision Support
- DSS Application, Case Study

UNIT-C **15 Hours**

Expert System

- Basic concepts of Expert System, Structure of Expert System, How Expert System works
- Expert System Application, Comparison of Conventional & Expert System
- Case Study

Executive Information and Support Systems

- Enterprise & Executive Information System, Concept and Definition

- Information needs of Executives, Characteristics and benefits of EIS
- Comparing and Integrating EIS and DSS.

UNIT-D **15 Hours**

Decision Making Systems, Modelling and Analysis

- Decision Making Definition and Concept, Phases of Decision Making Process
- Modelling Process, Static and Dynamic Models
- Sensitivity Analysis
- Heuristic programming, Simulation

Reference Books

1. Murdick Robert, Joel E. Ross, *Information Systems for Modern Management*, New Delhi: PHI, 3rd Ed.
2. Turban Efraim, *Decision Support & Intelligent System*, New Delhi: Pearson Education, 8th Ed, 1998.
3. Laudon C. Kenneth & Laudon P. Janes, *Management Information Systems*, Pearson Education, 2002.
4. Bellavista Paolo and Corradi Antonio (Eds.), *Handbook of Mobile Middleware*, Auerbach Publication, 2006.
5. Steven Alter, *Information Systems* , 3rd Edition, Pearson Education, 2000
6. McNurlin C.Barbara & Spargue H. Ralph, *Information Systems Management in Practice*, fifth Edition,Pearson Education, 2003
7. V.Rajaraman, *Analysis and Design of Information System*,PHI,2nd Ed, 2006.

DAV UNIVERSITY JALANDHAR

Course Title: Computer Graphics Laboratory
Course Code: CSA610

L	T	P	Credits	Marks
0	0	4	2	50

- Implementation of line drawing algorithms, Circle Drawing Algorithms, Ellipse, etc.
- Implementation of 2D transformations.

DAV UNIVERSITY JALANDHAR

Course Title: JAVA Programming Laboratory
Course Code: CSA611

L	T	P	Credits	Marks
0	0	4	2	50

- Implementation of OOP concepts using JAVA
- Packages and Interfaces
- Exception Handling
- Applets
- AWT classes

DAV UNIVERSITY JALANDHAR

Course Title: Theory of Computer Science
Course Code: CSA612
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective Understanding and development of theoretical models of computations and their analysis. The models of computations include (i) Finite Automata (and Regular Languages), (ii) Push Down Automata (and Context-free Languages), (iii) Turing Machine (and their Languages).

UNIT – A **15 Hours**

Automata Theory

- Deterministic Finite Automata, Moves
- Non Deterministic Finite Automata
- Moore and Mealy Machines
- Minimization Algorithm

Regular Languages

- Regular Sets
- Regular Expressions
- Pumping Lemma for Regular Sets

UNIT – B **15 Hours**

Context Free Grammars

- Context free grammars (CFG)
- Derivation Graphs
- Ambiguities in Grammars and Languages
- Properties of Context Free Languages
- Normal Forms
- Pumping Lemma for CFL
- Closure Properties

Pushdown Automaton

- Pushdown Automaton (PDA)
- Deterministic Pushdown Automaton (DPDA)
- Non-equivalence of PDA and DPDA
- Language Accepted by PDA

UNIT – C, **15 Hours**

Linear Bounded Automata (LBA)

- Power of LBA
- Closure properties

Turing Machines

- Turing Machine as A Model of Computation
- Programming with a Turing Machine
- Variants of Turing Machine and Their Equivalence
- Turing Machines and Languages

UNIT – D **15 Hours**

Undecidability

- **Chomsky Hierarchy of Languages**
- Recursive and Recursive-Enumerable Languages
- Halting Problem, Undecidable Problems about Turing machines
- Rice theorem
- The Equivalence of the Automata and the appropriate grammars

Reference Books:

1. G.E. Reevsz, *Introduction to Formal Languages*, New Delhi: McGraw Hill 1983.
2. Hopcroft J. E., MotwaniR., and Ullman J. D., *Introduction to Automata Theory, languages, and computation*(2nd ed.), New Delhi: Addison-Wesley, 2001
3. Lewis H.R., Papadimitriou C.H., *Elements of the Theory of Computation* (2nd ed.), NJ:Prentice-Hall,1997.
4. Anderson J.A., *Automata Theory with Modern Applications*, New York: Cambridge University
Press, 2006.

DAV UNIVERSITY JALANDHAR

Course Title: Microprocessors and Interfaces
Course Code: CSA613
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The purpose of this course is to teach students the fundamentals of microprocessor and to introduce students to features and technology of microprocessor systems. The students studying the subject are supposed to learn the architecture of a typical microprocessor and also get general information about microprocessor based control systems.

UNIT – A **15 Hours**

Introduction

- Introduction to Microprocessor
- Microcontroller and Microcomputer

Microcomputer structure

- Processor, memory and I/O; Bit slices and 8/16/32- bit microprocessors
- Micro processor architecture (registers, index and stack pointers, addressing modes)
- I/O interface adapters (parallel and serial) interface devices, system clock, clock phaseand bit rates

Architecture of 8086/ 8088 Microprocessor

- Description of various pins
- Configuring the 8086/8088 microprocessor for minimum and maximum mode systems description of system mode interfaces
- Internal architecture of the 8086 / 8088 microprocessor, system clock, Bus cycle, instruction execution sequence.

UNIT – B **15 Hours**

Memory Interface

- Memory Devices
- Address Decoding, 8-bit, 16-bit, 32-bit and 64-bit memory interfaces
- Dynamic RAM

Basic I/O Interface

- I/O Port Address Decoding
- Programmable Peripheral Interface
- 8279 Programmable Keyboard/Display Interface
- 8254 Programmable Interval Timer
- 16550 Programmable Communication Interface
- RS232C
- SCSI adapter

UNIT – C **15 hours**

Interrupts

- Basic Interrupt Processing
- Hardware Interrupts
- Expanding the Interrupt Structure
- 8259A Programmable Interrupt Controller

Direct Memory Access (DMA)

- Basic DMA Operations
- 8237 DMA Controller
- Shared Bus Operations

UNIT – D **15Hours**

Bus Interface

- ISA, EISA
- VESA Buses, PCI, USB Bus

Pentium Pro Microprocessors and Pentium IV

- Register Configuration & Memory Management
- Introduction to Core 2 Duo &Quadcore Processors

Reference Books:

1. Barry B. Brey, *The Intel Microprocessors 8086/8088, 80186/80188,80286, 80386, 80486, Pentium, Pentium Pro Processors, Pentium II, Pentium III, Pentium 4 and Core2 with 64-bit Extensions: Architecture, Programming and Interfacing*, 8th Edition, New Delhi: Pearson Education-2009.
2. Khambata J., *Microprocessor and Microcomputer*, New York: John Wiley and Sons, 1985.
3. Liu, Y., Gibson, and G.A., *Microcomputer Systems: The 8086/8088 Family*, New Delhi: Prentice Hall, 2nd Edition, 1986.
4. Tribel Walter, *The 80386, 80486, and Pentium Processors: Hardware, Software, and Interfacing*, New Delhi: Prentice Hall, ISBN #0-13-533225-7, 1998.
5. Douglas V. Hall, *Microprocessors and Interfacing - Programming and Hardware*, New Delhi :TataMcGraw Hill Publishing Company Ltd, 2006.

DAV UNIVERSITY JALANDHAR

Course Title: Advanced Web Technology
Course Code: CSA614
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective:

- To build web applications using ASP and client side script technologies use with Microsoft's IIS.
- To build XML applications with DTD and style sheets that span multiple domains ranging from finance to vector graphics to genealogy for use with legacy browsers.

UNIT—A **15Hours**

Introduction to Three-Tier Architecture

- Overview of .NET Framework , Common Language Runtime (CLR)
- The .NET Framework Class Library, familiarization with visual studio .NET IDE, Design Window, Code Window, Server.
- Explorer, Toolbox, Docking Windows, Properties Explorer, Solution Explorer, Object Browser, Dynamic Help, Task List Explorer.
- Features of VS.NET, XML Editor, Creating a Project, Add Reference, Build the Project, Debugging a Project.

UNIT—B **15 Hours**

Introducing C# Programming

- Introduction, Basic Language Constructs, Types (Reference and Value, Relations Between Types)
- Delegates, Generics, Collections
- Strings , Exceptions, Threads , Networking

UNIT—C **15 Hours**

Windows Forms, Adding Controls

- Adding An Event Handler, Adding Controls at Runtime
- Attaching An Event Handler at Runtime, Writing a Simple Text Editor, Creating a Menu Adding a New Form,
- Creating a Multiple Document Interface, Creating a Dialog Form Using form Inheritance, Adding a Tab-Control, Anchoring Controls,
- Changing the Start up Form, Connecting The Dialog, Using List view and Tree view Controls,
- Building an Image list and add Them To The List view, Using Details inside The List view,
- Attaching A Context Menu, Adding a Tree view, Implementing Drag And Drop, Creating Controls at Run Time, Creating a User Control, Adding a Property, Adding Functionality,
- Writing a Custom Control, Testing the Control.

UNIT—D **15 Hours**

ADO.NET Architecture

- Understanding the Connectionobject
- Building the Connection String, Understanding the Commandobject,
- Understanding Datareaders, Understanding Datasets and Dataadapters, Datatable, Datacolumn, Datarow
- Differences between Datareader Model and Dataset Model, Understanding the Dataviewobject, Working with System.Data.Oledb
- Using Datareaders, Using Datasets, Working with SQL.NET, Using Stored Procedures, Working With Odbc.NET, Using DSN Connection

Introducing The ASP.NET Architecture

- ASP.NET Server Controls, Working with User, Controls, Custom Controls, Understanding the Web.Config File, Using the Global.asax Page

Reference Books

1. Paul J. Deitel and Harvey M. Deitel, *C# 2010 for Programmers*, Forth Edition New Delhi: Pearson 2010.
2. Imar Spaanjaars, *Beginning ASP.NET 4: in C# and VB (Wrox)*, Paperback Edition, 2010.
3. George Shepherd, *Microsoft ASP.NET 4 Step by Step (Microsoft)*, Paperback Edition, 2010.
4. Scott Mitchell, *Teach Yourself ASP.NET 4 in 24 Hours*, Complete Starter Kit.
5. Shukla Charul, *Asp.Net 2.0 Black book*, Paraglyph Press, 2006.

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Advanced JAVA and Network Programming
Course Code: CSA615
Course Duration: 45-60 Hours

Course Objective: To introduce Advanced JAVA concepts to the students with the design of network protocols.

UNIT – A **15Hours**

Abstract Window Toolkit

- Review of Java Basic Features
- Applets
- AWT Controls
- Event Handling
- Multithreading, I/O Files

Swing

- Features, Components, Swing Vs AWT, Swing Containers, Controls, Using Dialogs,
- Sliders, Progress Bars, Tables, Creating User Interface using Swing

UNIT – B **15 Hours**

Java Database Connectivity

- Connectivity model, Java. SQL package, JDBC Exception
- classes
- Database connectivity
- Data manipulation and navigation
- Creating Database Applications

Java RMI

- Distributed object technologies
- RMI architecture
- Creating RMI applications.

UNIT – C **15 Hours**

TCP Connection

- TCP Connection establishment & Termination
- Port Numbers and Concurrent Servers
- Protocol Usage by common Internet Applications

UDP Connection

- UDP Communication Semantics
- UDP Echo Server
- Echo Client working
- Protocol Usage by Common Internet Applications

UNIT-D **15 Hours**

Networking

- Networking basics
- Client/server model
- Java and the Net, TCP/IP client sockets
- TCP/IP server sockets
- Inet Address, URL
- Data grams, creating networking applications

Socket Programming

- Sockets Address Structures
- Byte ordering & Manipulation Functions
- TCP Socket System Calls

Reference Books:

1. Stevens W. Richard, *Networking Programming*, New Delhi: Pearson Education, 2007.
2. Stevens W. Richard, *Advanced Programming in UNIX Environment*, New York: Addison Wesley Professional, 2013
3. Cornell, Gary and Horstmann Cay S, *Core Java*, Vol I and Vol II, CA: Sun Microsystems Press, 2008.
4. Bayross Ivan, *Web Enabled Commercial Application Development using Java 2.0*, New Delhi: BPB, 2000.
5. Schildt Herbert, *The Complete Reference Java 2*, New Delhi: TMH, 2005.

DAV UNIVERSITY JALANDHAR

Course Title: System Simulation and Modelling
Course Code: CSA616
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: In this course, students will analyze specified systems such as inventory system, queuing models and environmental dynamics. They introduce with how to simulate system, simulation techniques, statistical models, random number generations, design and analysis of simulation.

UNIT-A **15 Hours**

Systems and environment

- Concept of model and model building
- Model classification and representation, Use of simulation as a tool, steps in simulation study.

System simulation

- Why & when to simulate, nature and techniques of simulation, comparison of simulation and analytical methods
- Types of system simulation, real time simulation, hybrid simulation
- Simulation of pure-pursuit problem, single-server queuing system and an inventory problem
- Monte-Carlo simulation, Distributed Lag models, Cobweb model

UNIT-B **15 Hours**

Continuous-time and Discrete time Systems

- Laplace transform, Transfer functions, state-space models
- Order of Systems, z-transform, feedback systems, Stability, observability, controllability
- Statistical Models in Simulation: Common Discrete and Continuous Distribution, Poisson process empirical distribution

UNIT-C **15 Hours**

Random Numbers

- Properties of random numbers, generation of pseudo random numbers
- Techniques of random number generations, tests for randomness
- Random variate generation using inverse transformation
- Direct transformation, convolution method, acceptance-rejection

Design and Analysis of Simulation Experiments

- Data collection, identifying distributions with data, parameter estimation
- Goodness of fit tests, selecting input models without data

- Multivariate on time series input models, static and dynamic simulation output analysis
- Steady state simulation, terminating simulation confidence interval estimation, output analysis for steady state stimulation, variance reduction techniques

UNIT-D **15 Hours**

Queuing Models

- Characteristics of queuing systems, notation, transient and steady-state behaviour performance, network of queue

Large Scale System

- Model reduction, hierarchical control
- Decentralized control structural properties of large scale systems

Reference Books

1. Law Averill, *System Simulation Modeling and Analysis*, New Delhi: Tata McGraw-Hill, 2007.
2. GordanG., *System Simulation*, New Delhi: Pearson Education, 2nd Ed. 2007
3. DeoNarsingh, *System Simulation with Digital Computer*, New Delhi: Prentice Hall of India, 1999
4. Banks J., Garson J.S., Nelson B.L., *Discrete Event System Simulation*, New Delhi: Prentice Hall of India, 4th Ed. 2004
5. Seila A.F., Ceric V. and TadikamallaP., *Applied Simulation Modeling*, Thomsan Learning, International Student Edition, 2004
6. Banks Jerry, *Handbook of Simulation: Principles, Methodology, Advances, Application and Practice*, New York: Wiley Inter Science, 1998

DAV UNIVERSITY JALANDHAR

Course Title: Embedded Systems
Course Code: CSA617
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides the knowledge of embedded systems, their applications like Industrial and control applications, networking and telecom applications, common architectures, programming for embedded systems,programming for microcontrollers, Interfacing, and Simulation of PERT Networks.

UNIT-A **15 Hours**

Introduction to Embedded Systems

- Overview of embedded systems, features, requirements and applications of embedded systems
- Recent trends in the embedded system design, common architectures for the ES design
- Embedded software design issues, communication software
- Introduction to development and testing tools
- Architecture of Embedded Systems - Hardware Architecture, Software Architecture, Communication Software, Development/Testing Tools

Programming for Embedded Systems

- The Process of Embedded System Development - Design Trade-offs, Hardware Software co-design, Implementation, Integration and Testing

UNIT-B **15 Hours**

Embedded System Architecture

- Basics of 8 – bit RISC microcontroller (PIC), block diagram
- Addressing modes, instruction set, timers, counters, stack operation, programming using PIC controller
- Basics of 32 – bit microprocessor (ARM), processor and memory organization, data operations, flow of control, pipelining in ARM, ARM bus (AMBA)

Embedded Software

- Programming for microcontrollers such as Intel 8051 and PIC
- Overview of Java 2 micro edition (J2ME), concept of a MIDLET, applications of J2ME in mobile communication.

UNIT-C **15 Hours**

Interfacing and Communication Links

- Serial interfacing, real time clock, SPI / micro wire bus, I2C bus, CAN bus
- PC parallel port, IRDA data link, PCI bus architecture

Operating Systems for Embedded Systems

- OS Fundamentals, processes and threads, context switching, scheduling issues, inter task communication
- Introduction to memory management, evaluating OS performance, real time operating systems, popular RTOS and their applications.

UNIT-D **15 Hours**

Applications of Embedded Systems

- Industrial and control applications, networking and telecom applications
- DSP and multimedia applications, applications in the area of consumer appliances, concept of smart home

Simulation of PERT Networks

- Critical path computation, uncertainties in activity duration, resource allocation and consideration
- Simulation languages and software, general purpose vs. application - oriented simulation packages

Reference Books

1. Dreamtech Software team, *Programming for Embedded Systems*, New York: Willey – dreamtech, 2002.
2. Lewis Daniel W., *Fundamentals of Embedded Software, where C and assembly meet*, New Delhi: Pearson Education, 2001.
3. Peatman John B., *Design with PIC Microcontrollers*, New Delhi: Pearson Education, 1997.
4. Yuan Michael Juntao, *Enterprise J2ME – Developing Mobile Java Applications*, New Delhi: Pearson Education, 2003.
5. Reese Robert B., *Microprocessors: From assembly language to C using PIC18Fxx2*, Shroff Publishers and Distributors Pvt Ltd. 2005
6. Andrew N. Sloss, Dominic Symes, Chris Wright, *ARM System Developer's Guide – Designing and Optimizing System Software*, Elsevier Publications, 2007
7. SilberschatzA., Galvin P.B. and Gagne G., *Operating SystemConcepts*, New York: John Wiley & Sons, Inc., 6th 2001

DAV UNIVERSITY JALANDHAR

Course Title: Software Testing and Quality Assurance
Course Code: CSA618
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The students will gain the knowledge about software testing techniques**,** STEP methodology, software testing strategies, software metrics, software quality assurance tools and techniques, quality management, quality models and system configuration management.

UNIT-A

Introduction **15 Hours**

- Software Testing, Objectives of Software Testing, Software Testing Process, Static and Dynamic Analysis
- STEP Methodology, Elements of STEP and STEP Architecture

Software Testing Techniques

- BBT & its Technique, Boundary Value Analysis, Cause-Effect Graph, White-Box Testing and its Techniques
- Domain and Boundary Testing, Logic Based Testing, Data Flow Testing

UNIT-B **15 Hours**

Software Testing Strategies

- Characteristics, Integration Testing, Functional Testing
- Object Oriented Testing, Alpha and Beta Testing, Overview of Testing Tools
- Test planning, functional testing, stability testing and debugging techniques

Metrics for Software

- Importance of Metrics to Software Project, Software Quality Metrics
- Software Metrics: Product Metrics: Software Size Metrics, Control Complexity Metrics, Object-Oriented Metrics, Software Quality Metrics

UNIT-C

Quality Assurance **15 Hours**

- Concept of Software quality, product and process quality, software quality metrics, quality control and total quality management,
- Quality tools and techniques, quality standards, Software Quality Attributes, Factors Affecting Software Quality
- Building software quality assurance plan, Components of SQAP

Quality Management & Quality Models

- Software Quality System, Quality Management Principles, Essence of International Standards

- ISO 9000 Quality Standard, SEI Capability Maturity Model

Designing software quality assurance system

- Statistical methods in quality assurance, fundamentals of statistical process control, process capability, Six-sigma quality

UNIT-D **15 Hours**

Reliability

- Basic concepts, reliability measurements, predictions and management
- Factors affecting software reliability, Software reliability vs hardware reliability, Software reliability metrics

System Configuration Management (SCM)

- Basic requirements for SCM System, SCM principles, Planning and organizing for SCM
- Benefits of SCM, Change Management, Version and Release Management

Reference Books

1. SchulmeyerG.G. and McManus J. (eds.), *Handbook of Software Quality Assurance* New Delhi: Prentice Hall, 3rd Ed. 1999
2. Deutsch, Wills and Hall, *Software Quality Engineering: A Total Technique and Management Approach*, New Delhi: PHI, 1993.
3. FutrellRobert T., SnaferDonald F., Shafter Linda I., *Quality Software Project Management*, New Delhi: Pearson, 2002.
4. Perry, William E., *Effective Methods for Software Testing*, New York: Wiley, 1995
5. Hutcheson, *Software Testing Fundamentals*, Wiley India Pvt. Ltd, 2007.
6. Gill Nasib Singh, *Software Engineering: Software Reliability, Testing and Quality Assurance*, Khanna Book Publishing, 2009.
7. Galin Daniel, *Quality Assurance: From theory to implementation*, New Delhi: Pearson Education Ltd., 2004
8. Kan S.H., *Metrics and Models in Software Quality Engineering*, New Delhi: Pearson, 2nd Ed, 2003.
9. Myers Glenford J., *The Art of Software Testing*, New York: John Wiley, 2nd Ed. 2004.

DAV UNIVERSITY JALANDHAR

Course Title: Advanced Software Engineering
Course Code: CSA619
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides the understanding of software project planning, various software process models, system design analysis, various testing techniques and software engineering tools.

UNIT-A **15 Hours**

Introduction

- Software Engineering goals, Characteristics, Components Applications
- Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques
- Concepts of Project Management, Role of Metrics And Measurement
- Software requirements, Definition, Software requirements specifications (SRS), Components of SRS.
- Software engineering features (data abstraction exception handling and concurrency mechanism).

Software Project Planning

- Objectives, Decomposition Techniques: Software Sizing, Problem Based Estimation
- Process Based Estimation, Cost Estimation Models: COCOMO Model, The Software Equation

UNIT-B **15Hours**

System Analysis

- Principles of Structured Analysis, Requirement Analysis
- DFD, Entity Relationship Diagram, Data Dictionary

Software Design

- Objectives, Principles, Concepts
- Design Mythologies: Data Design, Architecture Design
- Procedural Design, Object–Oriented Concepts

UNIT-C **15 Hours**

System Administration and Training

- User manual, Implementation Documentation, Operation plan and maintenance

Hardware and Software Selection

- Hardware acquisition, Benchmarking, Vendor selection, Software selection, Performance and acceptance criteria, Site preparation

UNIT-D **15 Hours**

Testing Fundamentals

- Objectives, Principles, Testability
- Test Cases:White Box &blackbox Testing
- Testing Strategies:Verification& Validation
- UNITTest, Integration Testing, Validation Testing, System Testing
- Software documentation procedures, Software reliability and quality assurance. Quality Matrics and software models
- Software maintenance and configuration management

Software engineering tools and environment

- International software engineering standards and their relevance
- Case studies in software engineering

Reference Books

1. Fairley, R.E., *Software Engineering Concepts*, New Delhi: McGraw Hill, 1997.
2. Lewis, T.G., *Software Engineering*, New Delhi: McGraw Hill, 1982.
3. Ochoa Sergio and Roman Gruia-Catalin, *Advanced Software Engineering,* Spinger, 2006.
4. Pressman, *Software Engineering*, New Delhi: Tata McGraw Hill, 2002.
5. Meyers, G., *The Art of Software Testing*, NJ: Wiley-Inter-Science, 2004.
6. Sommerville, Ian, *Software Engineering*, Addison Wesley, 9th Ed, 2010.

DAV UNIVERSITY JALANDHAR

Course Title: Compiler Design
Course Code: CSA620
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides a comprehensive understanding of phases of compiler, finite automata, regular expressions, syntax-directed translation & implementation, code generation and run time environment.

UNIT-A **15 Hours**

The Structure of A Compiler

- Phase of a Compiler, Compiler Tools, Finite Automata, Regular Expressions
- Conversion From Regular Expression To Finite Automata

Syntax Analysis

- Context Free Grammars, Top Down & Bottom Up Parsing Techniques
- Parsing Table Construction, LR, SLR & LALR Parsers.

UNIT-B **15 Hours**

Syntax Directed Translation

- Syntax-directed translation & implementation, Intermediate Code, Postfix translation
- Phase Trees, Syntax Trees

UNIT-C

Run Time Environment **15 Hours**

- Storage Organization Allocation Strategies, Parameter Passing
- Symbol Tables, Code Generation, Problem In Code Generation

UNIT-D

Code Generation & Code Optimization **15 Hours**

- Principle Sources, Loop Optimization, DAG Representation

Reference Books

1. Aho, Alfred V. and Ullman Jeffery D., *Principles of Compiler Design*, Addison-Wesley, 1977.
2. Barrett ,*Compiler Construction*, Prentice Hall
3. Trembley, Jean-Paul & Paul G. Sorenson, *The Theory and Practice of Compiler Writing*, New York: McGraw Hill, 1985.
4. Keith Cooper and Linda Torczon, *Engineering a Compile*, Morgan Kaufmann Publishers, 2011
5. Dhamdhere D.M, *Compiler Construction—Principles and Practice*, Macmillan India, 2008
6. Gaddis. David,*Starting out with Modern Compiler Design*, New Delhi: Wiley India Pvt. Ltd, 2005.

DAV UNIVERSITY JALANDHAR

Course Title: Advanced Web Technology Laboratory
Course Code: CSA621

L	T	P	Credits	Marks
0	0	4	2	50

- Implementation of ASP.NET classes and Tools
- Connectivity with database

DAV UNIVERSITY JALANDHAR

Course Title: Advanced JAVA & Network Programming Laboratory
Course Code: CSA622

L	T	P	Credits	Marks
0	0	4	2	50

Implementation of network protocol design, socket programming using JAVA

DAV UNIVERSITY JALANDHAR

Course Title: Digital Image Processing
Course Code: CSA701
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To introduce basic image processing techniques, sptial and frequency domain, linear programming, color image processing, image compression, etc.

UNIT – A **15 Hours**

Introduction

- Fundamental Steps in Image Processing
- Element of Visual Perception
- A simple image model, sampling and quantization
- Some Basic Relationships Between Pixel
- Image Geometry in 2D
- Image enhancement in the Spatial Domain

Image Processing Techniques

- Image Enhancement
- Image Restoration
- Image Feature Extraction
- Image Data Compression And Statistical Pattern Recognition
- Hardware Architecture For Image Processing: Distributed Processing of Image Data
- Role of Array Processing
- Standard Image Processor Chips

UNIT – B **15 Hours**

Introduction to Spatial and Frequency Methods

- Basic Gray Level Transformations
- Histogram Equalization
- Local Enhancement
- Image Subtraction, Image Averaging, Basic Spatial, Filtering
- Smoothing Spatial Filters, Sharpening Spatial Filters

Introduction to the Fourier Transformation

- Discrete Fourier Transformation
- Fast Fourier Transformation
- Sharpening frequency domain
- Filters
- Filtering in the frequency domain
- Correspondence between filtering in the
- Spatial and Frequency Domain Smoothing Frequency-Domain Filters
- Dilation and Erosion, Opening and Closing
- Hit-or-Miss Transformation

UNIT – C **15Hours**

Techniques of Color Image Processing

- Color image signal representation
- Color System Transformations
- Extension of Processing Techniques to Color Domain

Applications of Image Processing

- Picture Data Archival
- Machine Vision
- Medical Image Processing

UNIT-D **15 Hours**

Introduction to Image Compression

- JPEG, MPEG, Wavelets, Operating System Issues in Multimedia
- Real Time OS Issues
- Network Management Issues Like QOS Guarantee
- Security Issues Like Digital Watermarking
- Partial Encryption Schemes For Video Stream Encryption

Reference Books:

1. Gonzalez Rafael C. and Woods Richard E., *Digital Image Processing*, New Delhi: Prentice–Hall of India, 2002.
2. Pratt William K., *Digital Image Processing: PIKS Inside*(3rd ed.), New Jersy: John Wiley & Sons,
   Inc., 2001.
3. Bernd Jahne, *Digital Image Processing*, (5th revised and extended edition), Springer, 2002
4. AnnaduraiS. and ShanmugalakshmiR., *Fundamentals of Digital Image Processing*, New Delhi: Pearson Education, 2007
5. Joshi M.A., *Digital Image Processing: An Algorithmic Approach*, New Delhi: Prentice-Hall of India, 2006

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Artificial Intelligence
Course Code: CSA702
Course Duration: 45-60 Hours

Course Objective The objective of this course is to familiarize students with concepts of AI, its tools & technologies.

UNIT – A **15 Hours**

Introduction

- Background and History
- Overview of AI applications Areas

The Predicate Calculus

- Syntax and Semantic for Propositional Logic and FOPL
- Clausal Form, Inference Rules
- Resolution and Unification

Knowledge Representation

- Network Representation-Associative Network & Conceptual Graphs
- Structured Representation- Frames & Scripts

UNIT – B **15 Hours**

Search Strategies

- Strategies For State Space Search-Data Driven And Goal Driven Search
- Search Algorithms- Uninformed Search (Depth First, Breadth First, Depth First With Iterative Deepening) And Informed Search (Hill Climbing, Best First, A* Algorithm, Mini-Max Etc.)
- Computational Complexity
- Properties of Search Algorithms-Admissibility
- Monotonicity, Optimality, Dominance

Expert Systems

- Introduction, Examples
- Characteristics Architecture, People Involved and Their Role in Building an Expert Systems
- Case Studies of Expert Systems, MYCIN And DENDRAL; Features of Knowledge Acquisition Systems : MOLE And SALT

UNIT – C **15 Hours**

Predicate Calculus

- First Order Predicate Calculus
- Resolution, Unification, Natural Deduction System
- Refutation, Logic Programming
- PROLOG, Semantic Networks, Frame System,
- Value Inheritance, Conceptual Dependency, Ontologies

Planning

- Basic Representation for Planning
- Symbolic-Centralized Vs. Reactive-Distributed
- Partial Order Planning Algorithm

UNIT-D **15 Hours**

Natural Language Processing

- Component Steps of Communication
- Contrast Between Formal and Natural Languages in the Context of Grammar
- Parsing and Semantics

Pattern Recognition

- Introduction
- Recognition & Classification Process
- Clustering

Reference Books:

1. Elaine Rich, Kevin Knight and Nair Shiva Shankar B,*Artificial Intelligence*, Third Edition, New Delhi: Tata-McGraw Hill, 2008.
2. Winston, P.H. and Horn, B.K.P, *LISP*, Pearson, 1993.
3. Rajasekharan, S. and Vijayalakshmi Pai, G. A., *Neural Networks, Fuzzy Logic and Genetic Algorithms*, New Delhi: Prentice Hall of India, 2003.
4. Luger George F., *Artificial Intelligence*, 5th edition, Pearson Education.
5. Patterson Dan W., *Introduction to Artificial Intelligence and Expert syste,* New Delhi: PHI, 2005.
6. Bharti & Chaitany, *Natural Language Processing*, New Delhi: PHI, 2006.

DAV UNIVERSITY JALANDHAR

Course Title: System Programming
Course Code: CSA703
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course demonstrates an in-depth understanding system software loader, linker, assembler, compiler, and parsing techniques.

UNIT – A **15 Hours**

System Software

- Definition, Evolution of System Software

Assemblers

- Elements of Assembly Language Programming
- Overview of Assembly Process
- Design Options- One Pass Assembler & Multi Pass Assembler
- Macro Processors: Basic Functions
- Design Options-Recursive Macro Expansion
- General Purpose Macro Processors
- Macro Processing Within Language Translators

UNIT-B

Loaders & Linkage Editors **15 Hours**

- Loading, Linking & Relocation
- Program Relocatibility
- Overview of Linkage Editing
- linking for Program Overlays

Compilers

- Phases of Compilation Process
- Logical Analysis
- Parsing, Storage Management Optimisation
- Incremental Compilers
- Cross Compilers
- P Code Compilers

UNIT – C **15 Hours**

Compilers

- Phases And Passes
- Analysis-Synthesis Model of Translation

Compiler Construction Tools

- Lexical Analysis
- Process of Lexical Analysis
- Finite State Automata, DFA And NFA
- Recognition of Regular Expressions, LEX

UNIT – D **15 Hours**

Parsing Techniques

- Top Down & Bottom-Up Parsing
- Shift Reduce Parsing, Operator Precedence Parsing
- Predictive Parsers Automatic Construction Of Efficient Parsers
- LR Parsers
- The Canonical Collection Of LR(0) Items
- Constructing SLR Parsing Tables
- Constructing Canonical LR Parsing Tables, Constructing LALR Parsing Tables

Reference Books:

1. Beck Leland L., *System Software, An introduction to system programming*, New Delhi: Addison Wesley, 2009.
2. Dhamdhere D.M., *Introduction to System Software*, New Delhi: Tata McGraw Hill, 1990.
3. Dhamdhere D.M., *System Software and Operating System*, New Delhi: Tata McGraw Hill, 1992
4. Alfred V Aho and Ullman Jeffery D, *Principles of Compiler Design*, New Delhi: Narosa/Addison Wesley, 1986.
5. Donovan J. John, *System Programming*, New Delhi: Tata McGraw Hill, 1999.

DAV UNIVERSITY JALANDHAR

Course Title: Soft Computing
Course Code: CSA704
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To introduce the concepts of artificial neural networks, fuzzy sets, fuzzy logics, various search techniques, genetic algorithms, artificial applications, supervised and unsupervised learning, neuro-fuzzy systems and their applications

UNIT-A **15 Hours**

Introduction

- Introduction to soft computing; introduction to biological and artificial neural network
- Introduction to fuzzy sets and fuzzy logic systems

AI Problems and Search

- AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis.
- Approaches to Knowledge Representation- Using Predicate Logic and Rules
- Introduction to Genetic Algorithm, Genetic Operators and Parameters, Genetic Algorithms in Problem Solving, Theoretical Foundations of Genetic Algorithms, Implementation Issues.

UNIT-B **15 Hours**

Artificial Neural Networks and Applications

- Introduction, Basic models of ANN, Important terminologies, Supervised Learning Networks, Perception Networks, Adaptive Linear Neuron
- Backpropogation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks
- Neural network applications in control systems. Neural Nets and applications of Neural Network.

Unsupervised Learning Network

- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps
- Learning Vector Quantization, Counter Propogation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks

UNIT-C **15 Hours**

Fuzzy systems and applications

- Introduction to Classical Sets (crisp Sets)and Fuzzy Sets- operations and Fuzzy sets

- Fuzzy reasoning; fuzzy inference systems; fuzzy control; fuzzy clustering
- Membership functions- Features, Fuzzification, membership value assignments, Defuzzification, applications of fuzzy systems
- Neuro-fuzzy systems : neuro-fuzzy modeling; neuro-fuzzy control

UNIT-D **15 Hours**

Applications

- Pattern Recognitions, Image Processing, Biological Sequence Alignment and Drug Design
- Robotics and Sensors, Information Retrieval System, Share Market Analysis, Natural Language Processing

Reference Books

1. Sivanandam S N and Deepa S N, *Principles of Soft Computing*, New Delhi: Wiley India, 2007
2. KarrayFakhreddine O,Silva Clarence D, *Soft Computing and Intelligent System Design*, New Delhi: Pearson Edition, 2004
3. Mitchell M., *An Introduction to Genetic Algorithms*, New Delhi: Prentice-Hall
4. Jang J.S.R., Sun C.T. and MizutaniE., *Neuro-Fuzzy and Soft Computing*, New Delhi: PHI, Pearson Education, 2004.
5. Rich Elaine and Knight Kevin, *Artificial Intelligence*, New Delhi: TMH, 2008
6. Ross Timothy J., *Fuzzy Logic with Engineering Applications*, New Jersy: Wiley, 2004.
7. Rajasekaran S. and Pai G.A.V., *Neural Networks, Fuzzy Logic and Genetic Algorithms*, PHI, 2012.
8. Goldberg Davis E., *Genetic Alorithms, Search, Optimization and Machine Learning*, Addison Wesley, 1989.
9. Jang J.S.R., Sun C.T., MizutaniE, *Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence*, Prentice Hall, 1997.
10. Melanie Mitchell, *An Introduction to Genetic Algorithms*, London: MIT press, 1999.

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Cloud Computing
Course Code: CSA705
Course Duration: 45-60 Hours

Course Objective:

- To understand the emerging area of "cloud computing" and how it relates to traditional models of computing.
- To gain competence in Map Reduce as a programming model for distributed processing of large datasets. Specifically:
  - To understand and be able to articulate key concepts behind MapReduce, including its functional abstraction, the use of distributed storage, and the scheduling of data-local jobs.
  - To understand how well-known algorithms such as PageRank and inverted index construction can be expressed in the MapReduce framework.

UNIT—A **15 Hours**

Overview of Computing Paradigm

- Recent trends in Computing
- Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing

Evolution of cloud computing

- Business driver for adopting cloud computing
- Introduction to Cloud Computing
- Cloud Computing (NIST Model)
- Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers
- Properties, Characteristics & Disadvantages
- Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing
- Role of Open Standards

UNIT—B **15Hours**

Infrastructure as a Service(IaaS)

- Introduction to IaaS
- IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM)
- Resource Virtualization
- Server
- Storage
- Network
- Virtual Machine(resource) provisioning and manageability,

storage as a service, Data storage in cloud computing(storage as a service)

UNIT—C **15 Hours**

Platform as a Service(PaaS)

- Introduction to PaaS
- What is PaaS, Service Oriented Architecture (SOA)
- Cloud Platform and Management
    - Computation
    - Storage

Software as a Service(PaaS)

- Introduction to SaaS
- Web services
- Web 2.0
- Web OS
- Case Study on SaaS

- Service Management in Cloud Computing
    - Service Level Agreements(SLAs)
    - Billing & Accounting
    - Comparing Scaling Hardware: Traditional vs. Cloud
    - Economics of scaling: Benefitting enormously
    - Managing Data
        - Looking at Data, Scalability & Cloud Services
        - Database & Data Stores in Cloud
        - Large Scale Data Processing

UNIT—D **15 Hours**

Cloud Security

- Infrastructure Security
- Network level security, Host level security, Application level security
- Data security and Storage
- Data privacy and security Issues, Jurisdictional issues raised by Data location
    - Identity & Access Management
    - Access Control
    - Trust, Reputation, Risk
    - Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations

Case Study on Open Source & Commercial Clouds

- Eucalyptus
- Microsoft Azure
- Amazon EC2

Reference Books

1. Barrie Sosinsky, *Cloud Computing Bible*, New Delhi: Wiley-India, 2010
2. BuyyaRajkumar , BrobergJames , Goscinski Andrzej M., *Cloud Computing: Principles and Paradigms*, Wiley, 2011
3. Antonopoulos Nikos, GillamLee, Cloud Computing: Principles, Systems and Applications, Springer, 2012
4. KrutzRonald L, Vines Russell Dean,*Cloud Security: A Comprehensive Guide to Secure Cloud Computing,* New Delhi: Wiley-India, 2010

DAV UNIVERSITY JALANDHAR

Course Title: Cryptography and Network Security
Course Code: CSA706
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective:

- Appreciate the core techniques of cryptography and how they can be applied to meet various security objectives
- Understand both the importance of cryptographic key management, and the different key management requirements and practices associated with the use of different security techniques
- Appreciate how the techniques described are employed in practice in a variety of security applications, from SSL enabled websites through to disk encryption

UNIT—A **15 hours**

Introduction

- Classical cryptography
- Secret Key Encryption
- Perfect Secrecy - One time pads
- Stream ciphers and the Data Encryption Standard (DES)
- The Advanced Encryption Standard (AES) - adopted September 2000
- Public Key Encryption
- Factoring and the RSA encryption
- Discrete log. Diffie-Hellman Key Exchange

UNIT—B **15 Hours**

Digital Signatures

- One-time signatures.
- Rabin and ElGamal signatures schemes.
- Digital Signature Standard (DSS).

Hashing

- Motivation and applications. Cryptographically Secure Hashing.
- Message Authentication Codes (MAC). HMAC.

UNIT—C **15 Hours**

Network Security

- Authentication requirement
- Authentication functions
- Authentication functions
- Hash Functions
- Message Authentication Codes
- Hash Functions
- Security of Hash Functions and MACs – MD5 message Digest algorithm
- Secure Hash Algorithm – HMAC, Digital Signatures – Authentication

Protocols – Digital Signature Standard

UNIT—D **15 Hours**

Authentication Applications

- Kerberos
- X.509, Authentication Service – Electronic Mail Security
- Electronic Mail Security – PGP – S/MIME - IP Security
- Web Security, Intrusion detection – password management

Viruses and related Threats

- Virus Counter measures – Firewall Design Principles – Trusted Systems

Reference books

1. Stalling William, *Cryptography and Network Security*, Fourth Ed., New York: Prentice Hall, 2010.
2. Frouzen, *Cryptography and Network Security*, Fourth Ed., New York: Prentice Hall, 2008.

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DAV UNIVERSITY JALANDHAR

Course Title: Network Protocols
Course Code: CSA707
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: Learn various protocol use in communications

UNIT—A **15 Hours**

Introduction to Frame Relay And ISDN

- Frame relay protocol architecture
- Call control
- Data transfer
- Overview of ISDN

Overview of ISDN Channels

- User access
- Protocols

UNIT—B **15 Hours**

ATM And BISDN

- ATM Protocol Architecture
- Transmission Of ATM Cells
- ATM Adaptation Layer
- Congestion Control
- Broadband ISDN

UNIT—C **15 Hours**

Internetwork Protocols

- Basic Protocol Function
- Internet Protocol Operation
- Internet Protocol- IP V4 -
- IPV6

Routing Protocols

- Internet Application Protocols
- Voice Over IP And Multimedia Support – SIP – RTP

UNIT—D **15 Hours**

Network Management Fundamentals

- Network management requirements
- Network monitoring
- Network control
- SNMP
- Concepts, MIBs – Implementation issues
- NETWORK MANAGEMENT PROTOCOLS
- SNMP V2 system architecture – Protocols – SNMP V3 – RMON – CMIP

Reference Books

1. Stallings William, *Data and Computer Communications*, 5th Edition, New Delhi: PHI, 1997.
2. Stallings William, *SNMP, SNMPV2, SNMPV3 and RMON1 and 2*, 3rdEdition, Addison Wesley, 1999.
3. Subramanian Mani, *Network Management–Principles and Practices*, New Delhi: Addison Wesley, 2000.
4. Stallings William, *Cryptography and Network Security*, New Delhi: PHI, 2000.

DAV UNIVERSITY JALANDHAR

Course Title: Multimedia Technology
Course Code: CSA708
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective:

- Discuss the technical details of common multimedia data formats, protocols, and compression techniques of digital images, video and audio content.
- Describe and understand the technical details of JPEG and MPEG families of standards.
- Discuss the significance of "Quality of Service" in multimedia networking.

UNIT—A **15 Hours**

Introduction to Multimedia Systems

- Architecture and Subsytems of Multimedia
- Multimedia applications
- Multimedia Building Blocks(text, hypertext, image, audio, video, animation, multimedia networks)

Multimedia Hardware

- Input device- Keyboard, Mouse, Touch Screen, Graphics Table, Scanner, Microphone, Digital Camera
- Output devices- Monitor, Projector, Sound Sytstem, Video System Memory and Storage Devices – RAM, Magnetic Media CD , DVD.

UNIT—B **15 Hours**

Multimedia Files

- Image and Sound File Formats
- Compression Standards and Compression Techniques

PhotoShop

- Photoshop workspace
- Image Editing Tools
- Specifying and Adjusting Colours
- Using Gradient Tools
- Selection and Move Tools
- Transforming
- Path Drawing and Editing Tools
- Filters and Actions

UNIT—C **15 Hours**

Flash

- Exploring Interface
- Using Selection and Pen Tools
- Working With Drawing and Painting Tools
- Applying Color
- Viewing and Manipulating Timeline
- Animating
- Guiding Layers
- Making, Importing and Editing sound and video clip in flash

- Working with 3D graphics, Using Action Script

UNIT—D **15 Hours**

Director

- Exploring interface
- Score Editor
- Cast Editor
- Toolbars, Library, Palette, Inspector, Menu bar
- Painting techniques
- Importing Images
- Working with stage, sprites and score
- Using sound, digital video and behaviors inspector

Virtual Reality

- Basics, Hardware and Software requirements applications

Reference Books

1. Vaughan Tay, *Multimedia Making It work*,3rd Edition, New Delhi: Tata McGraw Hill, 2008.
2. Reinhardt and Lentz, *Flash 5 Bible*, New Delhi: Wiley India Pvt. Ltd, 2001.

DAV UNIVERSITY JALANDHAR

Course Title: Linux and Shell Programming
Course Code: CSA709
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides an introduction to programming with utilities and shell scripting languages in a Linux environment. This course covers the essential aspects of shell programming including similarities and differences among the three most popular shells: the Bourne shell, the C shell, and the Korn shell. Students will learn features including, command line argument processing, debugging techniques.

Learning Outcomes:

UNIT—A **15 Hours**

- Introduction --The GNU – Linux Connection, the heritage of Linux
- UNIX, What is so good about Linux ?
  Overview of Linux, Additional features of Linux
- The Linux Operating System
  Getting started, logging in, working with the shell
- Curbing Your Power: Super user Access, Getting the Facts: Where to find documentation.
- Command Line Utilities
- Special Characters, Basic Utilities, Working with files, (Pipe): Communicates between process, Compressing and Archiving Files, Locating Commands, Obtaining user and system information, communicating with other users, email.

UNIT—B **15 Hours**

- The Linux File system
- The Hierarchical File System
- Directory And Ordinary Files
- Working With Directories
- Access Permissions
- The Shell
- Command Line
- Standard Input And Standard Output
- Running A Program In The Background, Filename Generation / Pathname Expansion.

UNIT—C **15Hours**

- The Editors
- The Vim Editor, History, Creating And Editing A File With Vim,
- The Compatible Parameter, Vim Features
- Command Mode: Moving The Cursor, Input Mode, Command Mode: Deleting And Changing Text, Searching And Substituting, Yank Put And Delete Commands, Reading And Writing Files, Setting Parameters, Advanced Editing Techniques, UNITs Of Measure.
- The Emacs Editor: History, Getting Started With Emacs, Basic Editing Commands,

- Advanced Editing, Language – Sensitive Editing, Customizing Emacs.

UNIT—D **15 Hours**

- The Bourne Shell: Background, Shell Basics, Parameters and variables, process, History, Aliases, Functions
- Controlling Bash Features and Option, Processing the command line.

Reference Books

1. Sobell Mark G., *A Practical Guide to Linux Command and Shell Programming*, New Delhi: Pearson Publishers, India 2012.
2. Robbins, *Linux Programming by Example: The fundamentals*, New Delhi: Pearson Publishers, India 2011.
3. Drew and Mike Harwood, *Linux + Certification Guide*, New Delhi: TataMc-Graw Hill Publishers, 2009.

DAV UNIVERSITY JALANDHAR

Course Title: .NET Framework and C#
Course Code: CSA710
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: Describe the general shape and syntax of the C# language included with Visual Studio.NET.

UNIT—A **15 Hours**

Introducing C#:

- Evolution of C#, Characteristics of C#, Applications of C#, difference between C# and C++, C# and Java.

Overview of C#:

- A simple C# program, namespaces, adding comments,.
- Main Returning A Value Using Aliases For Namespace Classes
- Passing String Objects To Write Line-Method, Command Line Arguments,
- Main With A Class, Providing Interactive Input Using Mathematical Functions
- Multiple Main Methods, Compile Time Errors, Program Structure, Program Coding Style

UNIT—B **15 Hours**

Literals, Variables And Data Types

- Literals, Variables, Data Types
- Value Types, Reference Types, Declaration of Variables
- Initialization Of Variables, Default Values, Constant Variables, Scope of Variables

Boxing And Unboxing

- Operators and Expressions: Arithmetic operators, relational operators, logical operators, assignment operators, increment and decrement operators, conditional operator, bitwise operators.
- Special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, type conversions, operator precedence and associativity, mathematical functions

UNIT—C **15 Hours**

Decision Making and Branching:

- Decision making with if statement, the if-else statement, nesting of if-else statements, the else if ladder, the switch statement, the? : operator Decision Making and Looping: The while statement, the do statement, the for statement. the for each statement, Jumps in loops.

Methods in C# :

- Declaring methods, the main method, invoking methods, nesting of methods, method parameters, pass by value, pass by reference, the output parameters, variable argument lists, methods overloading

Handling Arrays:

- One-dimensional arrays, creating an array, two-dimensional arrays, variable-size arrays, the System.Array class, ArrayList class

Manipulating Strings:

- Creating strings, string methods, inserting strings using system, comparing strings, finding substrings, mutable strings, arrays of strings, regular expressions

Structure and Enumerations:

- Structures, structs with methods, nested structs, differences between classes and structs, enumerations, enumerator initialization, enumerator base types, enumerator type conversion

UNIT—D **15 Hours**

Classes and Objects:

- Basic principles of OOP. defining a class, adding variables, adding methods. member access modifiers, creating objects, accessing class members, constructors, overloaded constructors, static members, static constructors, private constructors, copy constructors, destructors, member initialization, the this reference, nesting of classes, constant members, read only members

Inheritance and Polymorphism:

- Classical inheritance, containment inheritance, defining a subclass, visibility control, defining subclass constructors, multilevel inheritance. hierarchical inheritance, overriding methods, hiding methods, abstract classes. abstract methods. sealed classes, sealed methods polymorphism.

Interfaces: Multiple Inheritance:

- Defining an interface, extending an interface, implementing interfaces interfaces and inheritance, explicit interface implementation, abstract class and interfaces

Operator Overloading:

- Over loadable operators, need for operator overloading, defining operator overloading, overloading unary operators, overloading binary operators, overloading comparison operators

Delegates and Events:

- Delegates, delegate declaration, delegate methods, delegate instantiation delegate invocation, using delegates, multicast delegates, events.

Managing Console I/O Operations:

- Console class, console input, console output, formatted output, numeric formatting, standard numeric format, custom numeric format.

Managing Errors 'and Exceptions:

- Types of errors, exceptions, syntax of exception handling code. multiple catch statements, the exception hierarchy, general catch handler, using finally statement, nested try blocks, throwing our own exceptions, checked and unchecked operators, using exceptions for debugging .

Reference books

1. Balagurusamy, *Programming in C#*, New Delhi: Tata McGraw-Hill Publishing Company Ltd, 2002.
2. MichaelisMark andLippert Eric , *Essential C# 5.0*, 4th Edition New Delhi: Pearson 2012.
3. Deitel Paul, Deitel Harvey and Deitel Abbey ,*C# 2012 for Programmers*, 5th Edition , New Delhi: Pearson 2012.

DAV UNIVERSITY JALANDHAR

Course Title: Visual C++ Programming
Course Code: CSA711
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective:
To introduce the concepts of windows programming.
To introduce GUI programming using Microsoft Foundation Classes.
To enable the students to develop programs and simple applications using Visual C++

UNIT – A **15 Hours**

Introduction to Developer Studio, its working and debugging support

- Installing and Exploring Developer Studio
- Developer Studio wizards, Using App Wizard
- Creating a basic application
- Resource editors, The Gallery and the Info Viewer,
- The debugging environment,
- Using Developer Studio debugger
- Adding debugger support

Visual C++ Programming – Introduction

- Application Framework
- Mfc Library, Visual C++ Components
- Event Handling – Mapping Modes
- Colors – Fonts – Modal And Modeless Dialog
- Windows Common Controls – Bitmaps

UNIT-B **15 Hours**

The Document And View Architecture

- Menus – Keyboard Accelerators – Rich Edit Control – Toolbars – Status Bars
- Reusable Frame Window Base Class
- Separating Document From Its View
- Reading And Writing SDI And MDI Documents
- Splitter Window And Multiple Views
- Creating DLLs
- Dialog Based Applications

UNIT – C **15 Hours**

Activex And Object Linking And Embedding (OLE)

- Activex Controls Vs. Ordinary Windows Controls
- Installing Activex Controls
- Calendar Control
- Activex Control Container Programming
- Create Activex Control at Runtime

- Component Object Model (COM)
- Containment And Aggregation Vs. Inheritance – OLE Drag and Drop – OLE Embedded Component and Containers – Sample Applications

UNIT – D **15 Hours**

Advanced Concepts

- Database Management With Microsoft ODBC
- Structured Query Language
- MFC Odbc Classes
- Sample Database Applications
- Filter And Sort Strings
- DAO Concepts
- Displaying Database Records In Scrolling View – Threading –
- VC++ Networking Issues
- Winsock – Wininet – Building A Web Client
- Internet Information Server
- Isapi Server Extension – Chat Application
- Playing And Multimedia (Sound And Video) Files

Reference Books:

1. Petzold Charles, *Windows Programming*, Microsoft press, 1996
2. KruglinskiDavid J., ShepherdGeorge and Wingo Scot, *Programming Visual C++*, Microsoft press, 1999
3. Holtzner Steve, *Visual C++ 6 Programming*, New Dehi: Wiley Dreamtech India Pvt. Ltd., 2003.

DAV UNIVERSITY JALANDHAR

Course Title: Symbolic Logic and Programming in PROLOG
Course Code: CSA712
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To iintroduce students to the formal structure of the language(s) that we use daily and the arguments that you can construct with it. And to introduce students to logical concepts, such as argument, proof, validity, logical consequence, etc.

UNIT – A **15 Hours**

Prepositional Logic

- Syntax and Semantics
- Validity and Consequence
- Normal Forms
- Representing World Knowledge using Prepositional Logic

First Order Logic

- World Knowledge Representation and The Need for Quantifiers
- Semantics Validity Consequence
- Clause Normal Form

UNIT-B **15 Hours**

Introduction to Prolog

- Syntax of Prolog
- Structured Data Representation
- Execution Model
- Introduction to Programming in Prolog
- Illustrative Examples

SLD Resolution

- Unification and First Order Resolution SLD Resolution
- The Computation and Search Rules
- SLD Trees and Interpretation of Non-Declarative Features of Prolog

UNIT – C **15 Hours**

Horn Clauses

- Interpreting logic programs in terms of Horn clauses
- Deduction from clause form formulas resolution for prepositional logic Ground resolution

Introduction

- Neural Networks
- Fuzzy Logic

UNIT – D **15 Hours**

Advanced Prolog Features

- Programming Techniques
- Structural Induction and Recursion
- Extra Logical Features
- Cut and Negation Case Studies

Reference Books:

1. Gries, *The Science of Programming*, New Delhi: Narosa Publishers, 1985.
2. Stoll, *Set Theory and Logic*, New York: Dover Publishers, 1979.
3. Clocksin, W.F. and Mellish, C.S., *Programming in Prolog 2nd Edition*, Springer - Verlag,1984.
4. O'Keefe, R., *The Craft of Prolog*. London: The MIT Press, 1991.
5. Lloyd, J. W., *Foundation of Logic Programming*, Springer, 1984.

DAV UNIVERSITY JALANDHAR

Course Title: Windows Programming using C#
Course Code: CSA713
Course Duration: 45-60 Hours

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides the knowledge about creating windows forms, namespaces, assemblies, handling exceptions, casting, memory management and pointers. They also learn the concepts of threads and database connectivity.

UNIT-A

Introduction to windows Programming **15 Hours**

- .Net Architecture, The relationship of C# to .net , The Common Language Runtime , Advantages of Managed Code, Use of Attributes, Deployment.
- A Closer Look at Intermediate Language , Support for Object orientation and Interfaces , Distinct Values and Reference types , Strong Data Typing , Error handling and Exceptions
- , Assemblies , Private Assemblies , Shared Assemblies , Reflection , .net framework classes , namespaces , creating .net applications using C# , Creating windows forms , windows controls , windows services
- The role of C# in the .net enterprise architecture, The .net Environment, Working with visual studio 2005 , Assemblies , .net Security , Localization

UNIT-B

C# Fundamentals **15 Hours**

- C# Basics , variables , predefined data types : Value types and reference types , CTS types ,Conditional statements ,loops , jump statements , Enumerations
- Arrays , Using statement , Namespace , Aliases , The Main() Method , Multiple Main Methods , Passing Arguments to main() . More on compiling C# files, console I/O , Using Comments.
- Neural network applications in control systems. Neural Nets and applications of Neural Network.
- The C# preprocessor directives. C# Programming Guidelines. Objects and Type: Classes and Structs, Partial classes , static classes , The object class Inheritance : Types of inheritance, virtual methods, hiding methods, calling base versions of functions.
- Sealed classes and methods , constructors of derived classes , modifiers, interfaces , derived interfaces

UNIT-C **15 Hours**

Operators and Casts

- Operator shortcuts, The ternary operator, The checked and unchecked operators, The is operator, The as operator, The sizeof operator, The type of operator, Nullable types and operators, The Null coalescing

operator , operator precedence

- Type safety, Type conversions, Boxing and unboxing, comparing objects for equality , Operator overloading , User defined casts. Delegates and Events
- Memory management and Pointers , Strings and regular expressions , Collections , Array Lists , The Stack , Queue , Sorted List class, Hash Tables and Dictionaries

UNIT-D **15 Hours**

Generic and Threads

- Generics, Generic collection classes, Error and Exception Handling , Threading , Applications with multiple threads , Manipulating Threads , Creating Threads with Thread pool

Managing data and relationship

- Data Access with .net : Ado.net overview , Using Database Connections , Executing commands , Fast Access , The Data Reade: The Dataset Class , XML schemas , Populating a Dataset , Persisting Dataset Changes , Working with ADO.net , windows forms , viewing .net data

Reference Books

1. Nagel Christian, Evgen Bill and GiynnJay, *Professional C# 2005*, Wrox Publications, 2006
2. Dietel & Dietel , *C# How to Program*, New Delhi: Pearson Education, 2007.
3. Sharp John & Jagger John,*Visual C#.Net*, New Delhi: PHI, New Delhi, 2005.
4. Francisco, *Visual Studio .Net*, Microsoft Publication, 2012.

DAV UNIVERSITY JALANDHAR

L	T	P	Credits	Marks
0	0	4	2	50

Course Title: Digital Image Processing Laboratory
Course Code: CSA714

Implementation of filters, Fourier transforms, and various digital image processing techniques

DAV UNIVERSITY JALANDHAR

Course Title: Elective-V Laboratory
Course Code: *

L	T	P	Credits	Marks
0	0	4	2	50

Implementation of the concepts ofthe course chosen from Elective-IV