DAV UNIVERSITY JALANDHAR

Course Scheme & Syllabus

For

Scheme of Courses B.Tech
Computer Science & Engineering

(Program ID-15)

3rd TO 8th SEMESTER
Examinations 2013–2014 Session Onwards

Syllabi Applicable For Admissions in 2013

DAV UNIVERSITY JALANDHAR

Scheme of Courses B.Tech
Computer Science & Engineering

Semester 3

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	CSE201	Object Oriented Programming	4	-	-	4	25	25	25	25	100
2	CSE203	Data Structure Programming using C	4	-	-	4	25	25	25	25	100
3	ECE201	Digital Electronics	4	-	-	4	25	25	25	25	100
4	MTH254	Discrete Mathematics	4	1	-	4	25	25	25	25	100
5	ENG251	Advanced Communication Skills	4	1	-	4	25	25	25	25	100
6	CSE205	Object Oriented Programming Lab	-	-	4	2	-	-	-	-	50
7	CSE207	Data Structure Programming using C Lab	-	-	4	2	-	-	-	-	50
8	ECE204	Digital Electronics Lab	-	-	2	1	-	-	-	-	25
			20	**2**	**10**	**25**					**625**

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks
L: Lectures T: Tutorial P: Practical Cr: Credits

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Scheme of Courses B.Tech
Computer Science & Engineering

Semester 4

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	CSE202	Computer Architecture & Organization	3	0	0	3	25	25	25	25	75
2	CSE204	System Programming	3	0	0	3	25	25	25	25	75
3	ECE350	Microprocessor & its Applications	4	0	0	4	25	25	25	25	100
4	CSE206	Data Communication	3	0	0	3	25	25	25	25	75
5	MTH252	Engineering Mathematics-III	4	1	0	4	25	25	25	25	100
6	CSE2xx	DE-I	3	0	0	3	25	25	25	25	75
7	CSE218	System Programming Laboratory	0	0	2	1	-	-	-	-	25
8	ECE351	Microprocessor & its Applications Laboratory	0	0	2	1	-	-	-	-	25
9	CSE220	Data Communication Laboratory	0	0	2	1	-	-	-	-	25
10	CSE222	Seminar	0	0	4	2	-	-	-	-	50
			20	**1**	**10**	**25**					**625**

DEPARTMENTAL ELECTIVE (DE)-I

1	CSE208	Web Technologies
2	CSE210	Multimedia Communication
3	CSE212	Principles of Programming Languages
4	CSE214	Management information system
5	CSE216	System Analysis & Design

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks
L: Lectures T: Tutorial P: Practical Cr: Credits

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Scheme of Courses B.Tech
Computer Science & Engineering
Semester 5

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	CSE301	Computer Networks	3	0	0	3	25	25	25	25	75
2	CSE303	Database Management System	3	1	0	3	25	25	25	25	75
3	CSE305	Operating Systems	3	0	0	3	25	25	25	25	75
4	CSE307	Algorithm Design & Analysis	4	0	0	4	25	25	25	25	100
5	CSE3xx	DE-II	3	0	0	3	25	25	25	25	75
6	CSE319	Computer Networks Laboratory	0	0	2	1	-	-	-	-	25
7	CSE321	Database Management System Laboratory	0	0	4	2	-	-	-	-	50
8	CSE323	Operating Systems Laboratory	0	0	4	2	-	-	-	-	50
9	CSE3xx	DE-II Laboratory	0	0	4	2	-	-	-	-	50
10	CSE300	Industrial Practical Training*	0	0	0	4	-	-	-	-	100
			16	**1**	**14**	**27**					**675**

DEPARTMENTAL ELECTIVE (DE)-II

S.No	Course Code	Course Title
1	CSE311	Java Programming
2	CSE313	Symbolic Logic and Logic Programming
3	CSE315	Computer Graphics & Animations
4	CSE317	Dot Net Programming

DEPARTMENTAL ELECTIVE (DE-II) LABORATORY

1	CSE325	Java Programming Lab.
2	CSE327	Symbolic Logic and Logic Programming Lab
3	CSE329	Computer Graphics & Animations Lab
4	CSE331	Dot Net Programming Lab

A: Continuous Assessment: Based on Objective Type Tests
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D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks
L: Lectures T: Tutorial P: Practical Cr: Credits

***** Industrial practical Training for one month will be held during summer vacation after 4th semester.

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Semester 6

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	CSE302	Theory of Computation	4	0	0	4	25	25	25	25	100
2	CSE304	Relational Database Management System	3	1	0	3	25	25	25	25	75
3	CSE306	Software Engineering & Project Management	3	0	0	3	25	25	25	25	75
4	CSE308	Peripheral Devices & Interface	3	0	0	3	25	25	25	25	75
5	CSE3xx	DE- III	3	0	0	3	25	25	25	25	75
6	CSE310	Distributed Systems	3	0	0	3	25	25	25	25	75
7	CSE320	Relational Database Management System-Lab	0	0	4	2	-	-	-	-	50
8	CSE322	Software Engineering & Project Management Lab.	0	0	2	1	-	-	-	-	25
9	CSE3xx	DE-III Lab.	0	0	2	1	-	-	-	-	25
10	CSE332	Seminar	0	0	4	2	-	-	-	-	50
			19	**1**	**12**	**25**					**625**

Departmental Elective (de)-III

S. No	Course Code	Course Title
1	CSE312	Data Mining
2	CSE314	Wireless Networks
3	CSE316	High Performance Communication Networks
4	CSE318	C Shell Programming

Departmental Elective (DE-III) lab

1	CSE324	Data Mining Lab.
2	CSE326	Wireless Networks Lab.
3	CSE328	High Performance Communication Networks Lab.
4	CSE330	C Shell Programming Lab.

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
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E: Total Marks L: Lectures T: Tutorial P: Practical Cr: Credits

Scheme of Courses B.Tech
Computer Science & Engineering
Semester 7

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	CSE401	System Simulation & Modeling	4	1	0	4	25	25	25	25	100
2	CSE403	Compiler Design	4	1	0	4	25	25	25	25	100
3	CSE4xx	DE-IV	3	1	0	3	25	25	25	25	75
4	CSE4xx	DE-V	4	0	0	4	25	25	25	25	100
5	CSE4xx	DE-VI	3	1	0	3	25	25	25	25	75
6	CSE431	System Simulation & Modeling Laboratory	0	0	4	2	-	-	-	-	50
7	CSE433	Minor Project	0	0	4	2	-	-	-	-	50
8	CSE400	Industrial Practical Training*	0	0	0	4	-	-	-	-	100
			18	**4**	**8**	**26**					**650**

DEPARTMENTAL ELECTIVE (DE)-IV

S. No	Paper Code	Course Title
1	CSE407	Mobile Computing
2	CSE409	Internetworking Technologies
3	CSE411	Soft Computing
4	CSE413	High Speed & Broadband Networks

DEPARTMENTAL ELECTIVE (DE)-V

S. No	Paper Code	Course Title
1	CSE415	Natural language processing
2	CSE417	Information Retrieval Systems
3	CSE419	Data Compression
4	CSE421	Neural Network & Fuzzy Logic

DEPARTMENTAL ELECTIVE (DE)-VI

S. No	Paper Code	Course Title
1	CSE423	Virtual Reality
2	CSE425	Optical Network Design and Implementation
3	CSE427	Grid Computing
4	CSE429	Unified Modelling Language

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks

L: Lectures T: Tutorial P: Practical Cr: Credits

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Semester 8

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	CSE402	Information Security Systems	3	0	0	3	25	25	25	25	75
2	CSE404	Image Processing and Pattern Recognition	4	0	0	4	25	25	25	25	100
3	CSE406	Parallel Computing	3	0	0	3	25	25	25	25	75
4	CSE4xx	DE-VII	3	0	0	3	25	25	25	25	75
5	Xxxxxx	OE-1	3	0	0	3	25	25	25	25	75
6	CSE416	Information Security Systems Laboratory	0	0	4	2	-	-	-	-	50
7	CSE418	Major Project	0	0	8	6	-	-	-	-	150
8	CSE420	Seminar	0	0	4	2	-	-	-	-	50
			16	**0**	**16**	**26**					**650**

DEPARTMENTAL ELECTIVE (DE)-VI

S. No	Paper Code	Course Title
1	CSE408	Cyber Laws & IPR
2	CSE410	Modeling and Simulation of Networks
3	CSE412	Database Administration
4	CSE414	Network Management System

OPEN ELECTIVE (OE)-I

S.No	Paper Code	Course Title
1	ELE455	Matlab Programming
2	MGT452	Organisational Behaviour
3	MEC401	Robotics & Automation
4	ICE430	Bio-Medical Engineering

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks
L: Lectures T: Tutorial P: Practical Cr: Credits

Instruction for candidates (Theory Paper)

- The question paper for end-semester examination will have a weightage of 25%. It will consist of 100 objective questions of equal marks. All questions will be compulsory.
- Two preannounced test will be conducted having a weightage of 25% each. Each preannounced test will consist of 20 objective type, 5 short questions/problems on the UGC-NET (objective type) pattern as well as one long answer type question. The student is expected to provide reasoning/solution/working for the answer. The candidates will attempt all question. Choice will be given only in long answer type. The question paper is expected to contain problems to the extent of 40% of total marks.
- Four objective/MCQ type surprise test will be taken. Two best out of four objective/MCQ type surprise test will be considered towards final each of 12.5% weightage to the final. Each surprise test will include 20-25 questions.
- The books indicated as text-book(s) are suggestive However, any other book may be followed.

* Wherever specific instructions are required these are given at the starting of that particular subject/paper

Instruction for candidates (Practical Paper)

- The question paper for end-semester examination will have a weightage of 25%. It will consist of 100 objective questions of equal marks. All questions will be compulsory.
- Two preannounced test will be conducted having a weightage of 25% each. Each preannounced test will consist of 20 objective type, 5 short questions/problems on the UGC-NET (objective type) pattern as well as one long answer type question. The student is expected to provide reasoning/solution/working for the answer. The candidates will attempt all question. Choice will be given only in long answer type. The question paper is expected to contain problems to the extent of 40% of total marks.
- Four objective/MCQ type surprise test will be taken. Two best out of four objective/MCQ type surprise test will be considered towards final each of 12.5% weightage to the final. Each surprise test will include 20-25 questions.
- The books indicated as text-book(s) are suggestive However, any other book may be followed.

* Wherever specific instructions are required these are given at the starting of that particular subject/paper

THIRD SEMESTER

Course Title: Object Oriented Programming
Course Code: CSE201

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To understand the basic concepts of object oriented programming language.

Learning Outcomes: Students will feel comfortable working with computers and will have practical knowledge about Object-Oriented programming language (C++ Language).

PART-A

Object-Oriented Programming Concepts
Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, Basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, Declaring and initializing pointers, accessing data through pointers.

Standard Input/Output
Concept of streams, hierarchy of console stream classes, Input/output using overloaded operators >> and << of I/O stream classes, formatting output, Manipulators.

(**15 Hours)**

PART-B

Functions and Arrays
Defining a function, Actual and Formal Arguments, Local and global variables, Nested functions, recursive functions, Array declaration, character array, multidimensional array, arrays and pointers

Classes and Objects
Specifying a class, creating class objects, accessing class members, Access specifiers, static members, nested classes, local classes, abstract classes, Constructors and Destructors, copy constructor, dynamic constructors, explicit constructors, advantages and disadvantages of constructor and destructor. **(15 Hours)**

PART-C

Operator Overloading and Type Conversion
Overloading operators, rules for overloading operators, Overloading of various operators, Type conversion.

Inheritance
Introduction, defining derived classes, Types of inheritance, virtual base class, Pure virtual functions, overriding member functions.

Polymorphism
Concept of binding - early binding and late binding, Virtual functions, abstract classes, Virtual destructors.

(14 Hours)

PART-D

Exception Handling

Review of traditional error handling, basics of exception handling, Exception handling mechanism, Throwing mechanism, catching mechanism.

Files

File streams, hierarchy of file stream classes, Error handling during file operations, Reading/writing of files, updating files. **(14 Hours)**

Reference Books:-

1. Balagurusamy, E. *Object Oriented Programming with C++*. Tata McGraw Hill.
2. Ravichandran, D. *Programming in C++*.
3. Lafore R. *Object Oriented Programming in C++*. Waite Group.
4. Schildt, Herbert. *The Complete Reference to C++ Language.* Osborne: McGraw Hill.
5. Stroustrup, Bjarne. *The C++ Programming Language.* Addison Wesley.
6. Lippman, F. B. *C++ Primer*. Addison Wesley.

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Course Title: Data Structure Programming using C
Paper Code: CSE203

L	T	P	Credits	Marks
4	0	0	4	100

Objective :-To impart knowledge of Data Structure and How to design algorithms to solve different types Of problems and to differentiate linear and nonlinear data structure.

Learning outcomes:-After reading data structure ,student will be able to explain data structure and its scope in computer science. After completion of data structure, students will be able to find the best solution about specific types logical and mathematical problems.

PART-A

Introduction
Basic terminology, Data structure and their types, Data structure operations Algorithm: Complexity, Time Space Trade off, Control structure and Complexity of algorithm, Big Oh Notation. Introduction

Array
Representation of Linear array in memory, traversing linear array, Searching Techniques: Linear search, Binary Search, Multi-dimensional array: 2D-array, representation of 2D-array in memory. Record, record structure and matrices.

(14Hours)

PART-B

Linked List
Representation of Linear Linked List , Traversing a linked list , operations on linked list , Memory Allocation , Garbage collection , overflow and underflow , Doubly linked list , circular Linked List , Header Linked List , application of linked list**.**

(14Hours)

PART-C

Stacks and Queues
Operation on stack : push , arithmatic expression , polish notation , quick sort : An application of stack , complexity of quick sort , Recursion , Tower of Honoi , representation of queue , Deques , priority queues.

Trees
Basic terminology, Binary tree, complete binary tree, extended binary tree 2-tree, traversing binary tree: Preorder, Inorder and Postorder. Binary search tree, Searching& Inserting in binary search tree.Heap; Heapsort, General tree.

(14Hours)

PART-D

Graphs
Basic terminology, Representation of Graph, Traversing of Graph; BFS, DFS. Applications of Graph.

Sorting
Bubble Sort, Insertion Sort, Selection Sort, Merging. Merge Sort, Hasing; Hash Functions**.**

(14Hours)

Reference Books:-

1. Langsam, Y. and Augenstein, M.J. Tanenbaum, A.M., Pearson Education. 2nd Edition
2. Kruse, R. Tondo. And C.L. B. Leung ,S. Mogalla. *Data Structures & Program Design in C*. Pearson Education. 2nd Edition.
3. Horowitz, E. and Sahni,S. Mehta, D. *Fundamentals of Data Structures in C++*. Universities Press 2. Donald E. Knuth. 2nd Edition.

Course Title: Digital Electronics
Paper Code: ECE201

L	T	P	Credits	Marks
4	0	0	4	100

Course Objectives: The purpose of this course is to develop a strong foundation in analysis and design of digital electronics.

Learning Outcomes: At the end of the course students should be able to:

- Understand concepts of combinational and sequential circuits.
- Analyze the synchronous and asynchronous logic circuits.
- Design Combinational and sequential systems.
- Understand concepts of memory, programmable logic and digital integrated circuits

PART-A

Number System and Binary Code

Introduction,Binary,Octal,Hexadecimal & some nonstandard Number:-Conversions, Addition, Subtractions, Multiplication, Division, Weighted- Non weighted codes, Signed - unsigned numbers, Binary Subtractions using 1's and 2's compliment, ASCII code, Excess 3 code, Grey code, BCD code and BCD additions & BCD Subtractions.

Minimization of logic function

Review of gates: - OR, AND, NOT, NOR, NAND, EX-OR, EX-NOR, Universal gates.

(14Hours)

PART-B

Minimization of logic function

Basic theorem of Boolean algebra, Sum of Products and Product of Sums, canonical form, Minimization using: - Boolean algebra, K-map and Q-M method.

Combinational Circuits

Introduction, Combinational circuit design, Encoders, decoders, Adders, Sub tractors and Code converters, Parity checker, seven segment display, Magnitude comparators. Multiplexers, De-multiplexer, Implementation of Combinational circuit using MUX & De-MUX.

(14Hours)

PART-C

Sequential Circuits

Introduction, flip flops, Clocked flip flops, SR, JK, D, T and edge triggered flip-flops, Conversions of Flip flops, Shift Registers, Type of Shift Registers, Ring Counter, Twisted Ring Counter, Counters, Counter types, counter design with state equation and state diagrams.

D/A and A/D Converters

Introduction, Weighted register D/A converter, binary ladder D/A converter, steady state accuracy test, monotonicity test, D/A accuracy and resolution, A/D converter:- Simultaneous, Counter type, Continuous, Successive approximation, Single and dual slope A/D converter, A/D accuracy and resolution.

(14Hours)

PART-D

Semiconductor Memories

Introduction, Memory organization, Classification and characteristics of memories, Sequential memories, ROMs, R/W memories, Content addressable memories, PLA and PAL.

Logic Families

RTL, DCTL, DTLTTL, ECL, CMOS and its various types, Comparison of logic families.

(14Hours)

Refernce Books Books:-

1. Mano, Morris. *Digital Design*. Prentice Hall of India Pvt. Ltd
2. Donald P.Leach and Malvino, Albert Paul. *Digital Principles and Applications, 5 ed.* New Delhi: Tata McGraw Hill Publishing Company Limited, 2003.
3. Jain, R.P. *Modern Digital Electronics, 3 ed.*New Delhi: Tata McGraw–Hill publishing Company limited. 2003.
4. Floyd, Thomas L. *Digital Fundamentals* New Delhi: Pearson Education. 2003
5. Tocci, Ronald J. and Widmer Neal S. and Moss,Gregory L. *Digital System -Principles and Applications.* Pearson Education.
6. Roth. *Fundamentals of Logic Design*. Cengage Learning

Course Title: Discrete Mathematics
Course Code: MTH 254

L	T	P	Credits	Marks
4	1	0	4	100

Course Objectives: The objective of this course is to acquaint the students with the basic concepts in Discrete Mathematics and Graph Theory. It includes the topic like Set Theory, Functions, Relations, Graph and Trees.

PART-A

Set Theory: Sets and Subsets, Set Operations and the Laws of Set Theory and Venn Diagrams. Relations and Functions: Cartesian Products and Relations, Introduction to Binary relations, equivalence relations and partitions, Partial order relations, Hasse diagram. Inclusion and exclusion principle. Mathematical Induction.

(14 hours)

PART-B

Mathematical Logic: Basic logical operations, conditional and bi-conditional statements, tautologies, contradiction, Quantifiers, prepositional calculus.Recursively Defined Sequences. Solving Recurrence Relations.The Characteristic Polynomial.Solving Recurrence Relations: Generating Functions.Basics of Counting and the Pigeon-hole Principle.

(14 hours)

PART-C

Graphs and Planar Graphs: Basic Terminology, Special types of Graphs. The Handshaking Theorem, Paths and Circuits Shortest paths.Connectivity of Graphs.Isomorphism of Graphs.Homeomorphic Graphs.Eulerian and Hamiltonian Graphs.Planar and Non Planar Graphs.Euler's formula. Graph Coloring.Travelling Salesman Problem.

(14 hours)

PART-D

Trees: Basic Terminology. Binary Trees. Tree Traversing: Preorder, Postorder and Inorder Traversals. Minimum Spanning Trees, Prim's and Kruskal'sAlogrithm. Boolean AIgebras: Boolean Functions, Logic Gates, Lattices and Algebraic Structures.

(14 hours)

Reference Books:-

1. Rosen, Kenneth H. *Discrete Mathematics and its Applications.* McGraw Hill, 2007. 6th Edition.
2. Malik,D.S. and Sen, M.K. *Discrete Mathematical Structures: Theory and Applications.* Thomson, 2004.
3. Liu, C. L. *Elements of Discrete Mathematics.* McGraw Hill, International Edition, Computer Science Series,

Course Title: Advanced Communication Skills
Course Code: ENG251

L	T	P	Credits	Marks
4	1	0	4	100

Course Objectives:

- To improve fluency in speaking English.
- To enhance students' vocabulary and comprehensive skills through prescribed texts.
- To promote interactive skills through GDs and role plays
- To hone students' writing skills

Learning Outcomes: The students will brush up their knowledge of grammar. Moreover, they will become proficient in business/formal writing.

PART–A

Applied Grammar
Phrase, Clause and Sentence, Conditional Sentences, Subject-Verb Agreement, Transformation of Sentences, Advanced Vocabulary

(14 hours)

PART–B

Reading
H.H. Munro: The Open Window (Short Story), Amrita Pritam: Today, I call Waris Shah, "Speak from your grave," (Poem), Dr. Ambedkar: 'Dr. Ambedkar's Speech at Mahad', in Poisoned Bread

(14 hours)

PART –C

Writing
Oral/PPT presentations, Letter Writing/Memos/E-mails, Report Writing/Job Application/C.V./Resume

(14 hours)

PART–D

Speaking/Listening
Interviews, Skit Enactment (Evaluative), Panel Discussions

(14 hours)

Refernce Books Books:-

1. Dangle, Aijun. *Poisoned Bread.* Hyderabad: Orient Longman, 1994.
2. Gangal, J. K. A *Practical Course In Spoken English*. India: Phi Private Limited,2012.
3. Kumar, Sanjay and Lata, Pushp. *Communication Skills*. India: OUP, 2012.
4. Singh, Vandana, R. *The Written Word* b. New Delhi: Oxford University Press, 2008.

Course Title: Object Oriented Programming Lab
Course Code: CSE205

L	T	P	Credits	Marks
0	0	4	2	50

Instruction for Students: The candidate will be attending a laboratory session of 4 hours weekly and students have to perform the practical related to the following list.

1. Introduction to basic structure of C++ program, utility of header and library files.
2. Implementation of program related to the basic constructs in C++
3. Programs using different data types in C++
4. Programs using Loops and Conditional Statements in C++
5. Programs using arrays single dimension in C++.
6. Programs using functions by passing values using call by value method and call by reference method.
7. Programs related to string handling in C++.
8. Program to demonstrate the objects of the class and their working.
9. Programs to implement the working of constructor & destructor.
10. Programs to implement the concept of operator overloading.
11. Programs to implement Inheritance and its types.
12. Programs using early and late binding.
13. Programs to show the working of abstract classes.
14. Programs to show the working of Exception Handling.
15. Program to illustrate the concept of file handling.

Course Title: Data Structure Programming using C Lab
Paper Code: CSE207

L	T	P	Credits	Marks
0	0	4	2	50

Algorithm development in all areas of data structures covered in the course. Emphasis should be given on the following matters. Development of recursive as well as non recursive a algorithms involving linked list trees and graphs. Use of pointers for dynamic allocations of storage. Development of classes for some of the data structures using the concept of abstract data types.

List of practical's:-

1. W.A.P. and algorithm to check whether number is greater or not.
2. W.A.P. and algorithm to print that given number is even or odd.
3. W.A.P. and algorithm to check whether numberis prime or not.
4. W.A.P. to perform various types of Arithmetic operations.
5. W.A.P. to store marks of a student in array and then print.
6. W.A.P. of traversing of an array.
7. W.A.P. to implement Linear Search.
8. W.A.P. to implement Binary Search.
9. W.A.P. to implement Bubble Sort.
10. W.A.P. to implement Selection sort.
11. W.A.P. to generate the Fibonacci series using Array.
12. W.A.P. to find the transpose of matrix.
13. W.A.P. to addition & subtraction of two matrix
14. W.A.P. to know length of given string.
15. W.A.P. to demonstrate the operation performed on stack.

Course Title: Digital Electronics Lab
Paper Code: ECE204

L	T	P	Credits	Marks
0	0	2	1	25

Course Objectives: To reinforce learning in the accompanying ECE-201 course through hands-on experience with digital electronic circuit analysis, design, construction, and testing. To provide the student with the capability to use simulation tools in digital electronic circuit analysis and design.

Learning Outcomes: To develop necessary skill in designing, analysing and constructing digital electronic circuits**.**

List of Experiments

1. Verification of the truth tables of TTL gates, e.g., 7400, 7402, 7404, 7408, 7432, 7486.
2. Verify the NAND and NOR gates as universal logic gates.
    a) Verification of the truth table of the Multiplexer 74150.
    b) Verification of the truth table of the De-Multiplexer 74154.
3. Design and verification of the truth tables of Half and Full adder circuits.
4. Design and verification of the truth tables of Half and Full subtractor circuits.
5. Design and test of an S-R flip-flop using NOR/NAND gates.
    a) Verify the truth table of a J-K flip-flop (7476)
    b) Verify the truth table of a D flip-flop (7474)
6. Operate the counters 7490, 7493 and 74194. Verify the frequency division at each stage and with a low frequency clock (say 1 Hz) display the count on LEDs.
7. Verify the truth table of decoder driver 7447/7448. Hence operate a 7 segment LED display through a counter using a low frequency clock.
8. Repeat the above with the BCD to Decimal decoder 7442 and an array of LEDs
9. Design and test D/A converter using R-2R Ladder Network
10. Study and test of A/D converter.

DAV UNIVERSITY JALANDHAR

FOURTH SEMESTER

L	T	P	Credits	Marks
3	0	0	3	75

Course Title: Computer Architecture & Organization

Paper Code: CSE202

Course Objective: This course offers a good understanding of the various functional units of a computer system and prepares the student to be in a position to design a basic computer system.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the working of the each functional and finally the student will be exposed to the recent trends in parallel and distributed computing and multithreaded application.

Part-A

Introduction

Basic organization of computers, Block level description of the functional units as related to the execution of a program; Fetch, decode and execute cycle.

Register Transfer and Micro operations

Register transfer language, Inter-Register Transfer, Arithmetic Micro-operations, Logic and Shift micro-operations Language, Control functions.

Arithmetic Logic Unit

Arithmetic, logic and shift micro operations. Constructing an arithmetic logic shift unit.

(10Hours)

Part-B

Basic Computer Architecture and Design

Computer registers, Computer Instructions-Instruction Set Completeness. Classifying Instruction Set Architecture. Basic steps of Instruction Execution. Hardwired Control. Micro programmed Control. Horizontal and Vertical Microprogramming. Interrupts.

Central Processing Unit

General Register Organization. Stack Organized CPU. Instruction Formats, Addressing Modes. Data Transfer and Manipulation.RISCVs CISC.

(11Hours)

Part-C

Pipelining

Parallel and pipeline Processing, Pipeline Control, Pipeline Implementations, Conflicts Resolution, and Pipeline Hazards. Vector Processing, and Array Processors.

Memory Organization

Memory Systems: principle of locality, principles of memory hierarchy Caches, associative memory, main memory, Virtual memory, Paging and Segmentation, Memory Interleaving.

(10Hours)

PART-D

Input Output Organization

I/O performance measures, types and characteristics of I/O devices, I/O Modes-Programmed I/O, Interrupt Initiated I/O and DMA. Buses: connecting I/O devices to processor and memory, interfacing I/O devices to memory, processor, and operating system.

Parallel Computers

Classification, SIMD, MIMD Organizations, Instruction and Arithmetic Pipeline, Parallel Processing.

(15Hours)

Refernce Books Books:-

1. Mano, M Mori. *Computer System Architecture,* Pearson Education, 3rd Edition 1993.
2. Patterson,David A. and Hennessy, John L. *Computer Organization & Design-The Hardware/Software Interface.* Morgan Kaufmann, 2nd Edition 1997.
3. Stallings, William. *Computer Organisation and Architecture, Designing for Performance.* Pearson Education Asia, 6th Edition 2003.
4. Jordan, Harry F. and Alaghband, Gita. *Fundamentals of Parallel Processing.* Pearson Education, 1st Edition 2003.
5. Hayes, J.P. *Computer System Architecture.* New Delhi: Prentice Hall of India.

Course Title: System Programming
Paper Code: CSE-204

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: The objective of this course is to provide the knowledge of one high level procedural language, assembly language and knowledge of data structures and computer organization.
Learning Outcomes: After the completion of this course the participants would gain the knowledge to design various system programs.

PART-A

Introduction to systems software
Definition, features of system Programming, System Programming vs. Application Programming, type of system programs.
Assemblers
Elements of Assembly Language Programming, Single pass assembler, two pass assembler and design procedure of an assembler.

(11Hours)

PART-B

Macros and Macro Processors
Macro Instructions, Features of a Macro facility, Implementation of Two pass Macro.
Compilers
Aspects of Compilation, Phases of compilation, Scanning and Parsing, Compilation of Expressions, Compilation of Control Structures Code Generation and Code optimization techniques,CompilerWritingTools,Compliervs.interpreter.

(12Hours)

PART-C
Loaders & Linkage Editors
Loading Linking and Relocation, Overview of Linkage Editing, Linking for Program Overlay.
Editors and debuggers
Introduction to editors, types of editor, design of an editor, debug monitors, introduction to various debugging techniques, turbo c++ debuggers.

(12Hours)

PART-D
Grammar and automation
Introduction to grammar, types of grammar, acceptability of grammar, introduction to automation, characteristics of automation, finite control, transition system, finite automation, Case study on LEX and YACC**.**
Introduction to Operating systems
Introduction, Operating System Structures, Process Management, Memory management, I/O systems, Distributed Operating Systems.

(13Hours)

Refernce Books Books:-

1. L L , Beck. *Systems Software: An Introduction to Systems Programming.* Addison-Wesley 2001.
2. J J ,Donovan. *Systems Programming.* New York, Mc-Graw Hill 1991.
3. Dhamdhere , D M. *Introduction to Systems Software.* Tata Mc-Graw Hill 2000.
4. Glingaert P. *Assembles Loaders and Compilers.* Prentice Hall 1972.
5. Aho A V and Ullman, J D. *Principles of compiler Design.* Addison Wesley/ Narosa 1985.

Course Title: Microprocessors and its Applications
Paper Code: ECE350

L	T	P	Credits	Marks
4	0	0	4	100

Course Objectives: The purpose of this course is to teach students the fundamentals, internal architectural details and functioning of microprocessors systems. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a microprocessor implementation.

Learning Outcomes: Through the use of assembly language, by the end of the course students will become thoroughly familiar with the elements of microprocessor software and hardware. They will be able to:

- Understand fundamental operating concepts behind microprocessors.
- Appreciate the advantages in using microprocessors in engineering applications.
- Design microprocessor based solutions to problems.

PART-A

Introduction
Introduction to Microprocessors, classification, recent microprocessors.
Microprocessor Architecture
8085 microprocessor Architecture. Bus structure, I/O, Memory &System buses, concept of address Bus, Data Bus & Control Bus, Synchronous & Asynchronous buses. Instruction execution sequence & Data Flow, Instruction cycle.

(14Hours)

PART-B

I/O memory interface
Data transfer modes: Programmable, interrupt initiated and DMA 8257, Serial & parallel interface, study of 8251 & 8255 programmable peripheral interfaces.

(14Hours)

PART-C
Instruction set & Assembly Languages Programming
Introduction, instruction & data formats, addressing modes, status flags, 8085 instructions, Data transfer operations, Arithmetic operations, Logical operations, Branch operations.

(14Hours)

Part-D
Case structure & Microprocessor application
Interfacing of keyboards and seven segment LED display, Microprocessor controlled temperature system (MCTS), Study of traffic light system, stepper motor controller.
Basic architecture of higher order microprocessor
Basic introduction to 8086, Architecture, Segmentation & addressing modes**.**

(14Hours)

Refernce Books Books:-

1. Gaonkar, Ramesh. *8085 Microprocessor.* New Delhi: PHI Publications.
2. Tabak, Daniel. *Advanced Microprocessors*. New Delhi: McGraw- Hill, Inc., Second Edition 1995.
3. Hall, Douglas V. *Microprocessors and Interfacing Programming and Hardware*. New Delhi: Tata McGraw Hill, Edition, 1986.
4. Gilmore, Charles M. *Microprocessors: Principles and Applications*. New Delhi: McGraw Hill.
5. Ram, B. *Microprocessor.* New Delhi: Dhanpat Rai Publications.

Course Title: Data Communication
Paper Code: CSE206

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course provides knowledge about various types of Network, Network Topologies, and protocols.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of how a network works during data communication.

PART-A

Introduction
Data Communication: Components, Data Flow; Network Categories: LAN, MAN, WAN (Wireless / Wired); Network Software: Concept of layers, protocols, interfaces and services; Reference Model: OSI, TCP/IP and their comparison.

Physical Layer
Concept of Analog & Digital Signal; Bit rate, Bit Length; Transmission Impairments: Attenuation, Distortion, Noise; Data rate limits: Nyquist formula, Shannon Formula; Multiplexing: Frequency Division, Time Division, Wavelength Division; Transmission media: Twisted pair, coaxial cable, fiber optics, wireless transmission (radio, microwave, infrared);Circuit Switching & Packet Switching.

(14Hours)

PART-B

Data Link Layer
Error correction & Detection; Flow & Error Control; Sliding window protocols: Stop & Wait ARQ, Go back n ARQ, Selective repeat ARQ; Examples of DLL Protocols-HDLC, PPP;Medium Access Sub layer: Channel Allocation; Random Access: ALOHA, CSMA protocols; Controlled Access: Polling, Reservation, Token Passing; Examples of IEEE 802.3, 802.11 standards.

(10Hours)

PART-C
Network Layer: Logical Addressing: IPv4 and IPv6; Packet Formats & their comparison: IPv4 and IPv6;Routing algorithms: Distance vector, Link State Routing, Hierarchical Routing, Broadcast & Multicast Routing; Congestion Control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket &Token bucket algorithms**.**

(10Hours)

PART-D
Transport Layer
Addressing, flow control & buffering, multiplexing & de-multiplexing, crash recovery; Example transport protocols: TCP, SCTP and UDP.
Application Layer: Network Security; Domain Name System; Simple Network Management Protocol; Electronic Mail.

(14Hours)

Reference Books:-

1. Tanenbaum, Andrew S. *Computer Networks.* Ed Pearson Education 4th Edition, 2003.
2. Kurose, James F. and Ross, Keith W. *Computer Networking*. Pearson Education, 2002.
3. Stalling, William. *Data and Computer Communication.* Pearson Education, 7th Edition, 2nd Indian Reprint 2004.
4. Miller. *Data and Network Communication.* Ed Thomson Learning, 2001.
5. Comer, Douglas E. *Computer Networks and Internets*, Pearson Education 2nd Edition, 5th Indian Reprint 2001.

Course Title: Engineering Mathematics-III
Course Code: MTH252

L	T	P	Credits	Marks
4	1	0	4	100

Course Objective:
The objective of the course is to enable the students to understand the basic concepts related to Laplace transforms, Fourier series, ordinary differential and partial differential equations and their applications.

PART-A

Laplace Transforms
Laplace transforms of various standard functions, Linear property of Laplace transforms, Shifting property and change of scale, inverse Laplace transforms, transform of derivatives and integrals, Laplace transform of unit step function, impulse function, periodic functions, applications to solution of ordinary linear differential equations with constant coefficients, and simultaneous differential equations.

(14Hours)

PART-B

Fourier series
Periodic functions, Euler's formula. Dirichlet's conditions. Fourier series of discontinuous functions. Fourier series of Even and Odd functions, half range expansions, Fourier series of different wave forms, Complex form of Fourier series. Fourier Transformation.

(14Hours)

PART-C

Partial Differential Equations
Formulation of partial differential equations, Linear partial differential equations, homogeneous partial differential equations with constant coefficients. Wave equation and Heat conduction equation in one dimension. Two dimensional Laplace equation and their applications, solution by the method of separation of variables.

(14Hours)

PART-D

Functions of Complex Variable
Limits, continuity and derivative of the function of complex variable, Analytic function, Cauchy-Riemann equations, conjugate functions, and harmonic functions.
Conformal Mapping
Definition, standard transformations, translation, rotation, inversion, bilinear.
Complex Integration
Line integrals in the complex plane, Cauchy's theorem, Cauchy's integral formula and derivatives of analytic function. Taylor's and Laurent's expansions (without proofs), singular points, poles, residue, Integration of function of complex variables using the method of residues.

(14Hours)

Refernce Books Books:-

1. E, Kreyzig. *Advanced Engineering Mathematics.* John Wiley and Sons.
2. Ponnusamy S. *Foundations of Complex Analysis.* Narosa Publishers.
3. Sneedon I.N. *Elements of Partial Differential Equations.* McGraw-Hill.
4. Grewal B.S. *Higher Engineering Mathematics.* Khanna Publishers.

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DEPARTMENTAL ELECTIVE-I

Course Title: Web Technologies
Paper Code: CSE208

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: Aim of this paper is to familiarize the students with current technologies used in Web development and maintenance.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of designing the web pages using different packages.

PART-A
Internet and World Wide Web
Introduction, Internet Addressing, ISP, types of Internet Connections, Introduction to WWW, WEB Browsers, WEB Servers, URLS, http, WEB applications, Tools for WEB site creation.
Html: Introduction to HTML, Lists, adding graphics to HTML page, creating tables, linking documents, frames, DHTML and Style sheets.

10Hours)

PART-B

Java Script
Introduction, programming constructs: variables, operators and expressions, conditional checking, functions and dialog boxes, JavaScript DOM, creating forms, introduction to Cookies
JAVA
Introduction to java objects and classes, control statements, arrays, inheritance, polymorphism, Exception handling.

(12Hours)

PART-C

XML
Why XML, XML syntax rules, XML elements, XML attributes, XML DTD displaying XML with CSS, Using XML Processors: DOM and SAX
AJAX
Introduction, HTTP request, HttpRequest, AJAX Server Script, AJAX Database. **(12Hours)**

PART-D
PHP
Introduction, syntax, statements, operators, sessions, E-mail, PHP and MySQL, PHP and AJAX.
Database Access
Database Programming using JDBC, Studying Javax.sql.* package, Accessing a Database from a JSP Page, Application – Specific Database Actions, Deploying JAVA Beans in a JSP Page, Introduction to struts framework.

(12Hours)

Refernce Books Books:-

1. Bergsten, Hans. *Java Server Pages*. SPD O'Reilly.
2. Dietel and Nieto. *Internet and World Wide Web – How to progra*. PHI/Pearson Education Asia.

Course Title: Multimedia Communication
Paper Code: CSE210

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This Course introduces the multimedia systems and their applications to students. This course covers the different compression standards used in multimedia, some current technology and related issues.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various multimedia technologies and their uses.

PART-A

Introduction
Multimedia Elements; Multimedia Applications; Multimedia Systems Architecture; Evolving Technologies for Multimedia Systems; Defining Objects for Multimedia Systems; Multimedia Data Interface Standards; The need for Data Compression; Multimedia Databases

Media and Data Streams
Media : Perception Media, Representation Media, Presentation Media, Storage Media, Transmission Media, Information Exchange Media, Presentation spaces & Values, and Presentation Dimensions; Key Properties of a Multimedia System : Discrete & Continuous Media Independence Media, Computer Controlled Systems, Integration; Characterizing Data Streams: Asynchronous Transmission Mode, Synchronous Transmission Mode, Isochronous Transmission Mode; Characterizing Continuous Media Data Streams.

(10Hours)

PART-B

Audio Technology
Sound: Frequency, Amplitude, Sound Perception and Psychoacoustics; Audio Representation on Computers; Three Dimensional Sound Projection; Music and MIDI Standards; Speech Signals; Speech Output; Speech Input; Speech Transmission.
Graphics and Images
Capturing Graphics and Images Computer Assisted Graphics and Image Processing; Reconstructing Image; Graphics and Image Output Options.
Video Technology & Computer-Based Animation
Basics; Television Systems; Digitalization of Video Signals; Digital Television; Basic Concepts; Specification of Animations; Methods of Controlling Animation; Display of Animation; Transmission of Animation; Virtual Reality Modeling Language.

(13Hours)

PART-C

Data Compression
Storage Space; Coding Requirements; Source, Entropy, and Hybrid Coding; Basic Compression Techniques; JPEG: Image Preparation, Lossy Sequential DCT-based Mode, Expanded Lossy DCT-based Mode, Lossless Mode, Hierarchical Mode; H.261 (Px64) and H.263+ and H.263L; MPEG : Video Encoding, Audio Coding, Data Stream, MPEG-2, MPEG: Video Encoding, Audio Coding, Data Stream, MPEG-2, MPEG-4, MPEG-7; Fractal Compression.

Optical Storage Media

History of Optical Storage; Basic Technology; video Discs and other WORMs; Compact Disc Digital Audio; Compact Disc Read Only Memory; CD-ROM Extended Architecture; Further CD-ROM-Based Developments; compact Disc Recordable; Compact Disc Magneto-Optical; Compact Disc Read/Write; digital Versatile Disc.

(10Hours)

PART-D

Content Analysis

Simple vs. Complex Features; Analysis of Individual Images; Analysis of Image Sequences; Audio Analysis; Applications.

Data and File Format Standard

Rich-Text Format; TIFF file Format; Resource Interchange File Format (RIFF); MIDI File Format; JPEG DIB File Format for Still and Motion Images; AVI Indeo File Format; MPEG Standards; TWAIN.

Multimedia Application Design

Multimedia Application Classes; Types of Multimedia Systems; Virtual Reality Design; Components of Multimedia Systems; Organizing Multimedia Databases; Application Workflow Design Issues; Distributed Application Design Issues.

(10Hours)

Reference Books:-

1. Steinmetz, Ralf and Klara, Narstedt. *Multimedia Fundamentals: Vol 1- Media Coding and Content Processing.* PHI, 2ND Edition, 2003.(Chapters 2,3,4,5,6,7,8,9).
2. Andleigh, Prabhat K.and Thakrar, Kiran. *Multimedia Systems Design.* PHI, 2003..
3. Rao, K.R and Bojkovic, Zoran S. and Dragorad A. Milovanovi. *Multimedia Communication Systems: Techniques, Standards, and Networks.* Pearson 2002.
4. Sharad, Nalin K. *Multimedia information networking.* PHI, 2002.
5. Iain E.G. Richardson. *H.264 and MPEG-4 Video Compression.* John Wiley.

Course Title: Principles of Programming Languages
Paper Code: CSE212

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course should provide the students with a fairly good concept of fundamental concepts and design issues of programming languages and become familiar with major programming paradigms.

Learning Outcomes: After the completion of this course the participants understand similarities and differences between models and know when to use them and also learn programming techniques appropriate for each model.

PART-A

Introduction
Characteristics of programming Languages, Factors influencing the evolution of programming language, developments in programming methodologies, desirable features and design issues. Programming language processors: Structure and operations of translators, software simulated computer, syntax, semantics, structure, virtual computers, binding and binding time.

Elementary and Structured Data Types
Data object variables, constants, data types, elementary data types, declaration, assignment and initialization, enumeration, characters, strings. Structured data type and objects: Specification of data structured types, vectors and arrays, records, variable size data structure, pointers and programmer constructed data structure, Sets files. Sub Program and programmer defined data types: Evolution of data types, abstractions, encapsulations, information hiding, sub programme, abstract data types.

(12Hours)

PART-B
Sequence Control
Implicit and Explicit sequence control, sequence control with within expression and statements, recursive sub programmes, exception handling, co routines, Scheduled sub programmes, concurrent execution. Data control referencing environments, static and dynamic scope, local data local data referencing environment, shared data: Explicit common environment dynamic scope parameter passing mechanism.

(9Hours)

PART-C
Storage Management
Major run time requirements, storage management phases, static storage management, stack based, heap based storage management. Syntax and translation: General syntactic criteria, syntactic element of a language, stages in translation, formal syntax and semantics.

(10Hours)

Part-D
Operating and Programming Environment
Batch Processing Environments, Embedded system requirements, Theoretical models, Introduction to Functional Programming, Lambda calculus, Data flow language and Object

Oriented language, Comparison in various general and special purpose programming languages e.g. Fortran, C, Pascal, Lisp, etc.

(8Hours)

Reference Books:-

1. Pratt, Terrance W. *Programming Languages: Design and Implementation.* PHI.
2. Sebest. *Concept of Programming Language.* Addison Wesley.
3. Horowitz, E. *Programming Languages.* 2nd Edition, Addison Wesley.
4. Louden, *programming Languages-principles and practice.* Cengage Learning, New Delhi.

Course Title: Management Information System
Paper Code: CSE214

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course should provide understanding the planning of Information Systems.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various views of management and knowledge information systems.

Part-A

Management Information Systems A Framework
Importance of MIS; Management Information System: A Concept (Management, Information, And System); MIS: A Definition (Information Technology and MIS); Nature and Scope of MIS (MIS Characteristics, MIS Functions).
Structure and Classification of MIS
Structure of MIS (MIS Structure Bases on Physical Components, Information System Processing Functions, Decision Support, Levels of Management Activities, Organizational Functions); MIS Classification (Transaction Processing System, Management Information System (MIS), Decision Support System (DSS), Executive Support System, Office Automation Systems (OASs), Business Expert Systems (BESs); Functional Information System (Financial Information System, Marketing Information System, Production/Manufacturing Information System, Human Resource Information System.
Decision Making and MIS
Decision-Making, Simon's Model of Decision-Making, Types of Decisions (Purpose of Decision-Making, Level of Programmability, Knowledge of Outcomes); Methods for Choosing among Alternatives (Decision Theory or Decision Analysis, Utility, Decision Tree, Optimization Techniques); Decision Making and MIS.

(15Hours)

Part-B

Information and System Concepts
Information : A Definition; Types of Information (Strategic Information, Tactical Information, Operational Information); Information Quality; Dimensions of Information (Economic Dimension, Business Dimension, Technical Dimension); System : Definition (Multiple Meaning of the Word 'System'); Kinds of Systems (Abstract and Physical Systems, Deterministic and Probabilistic Systems, Open and Closed Systems, User-Machine Systems); System Related Concepts (Boundary, Interface and Black Box, System Decomposition, Integration of Sub-Systems); Elements of a System; Human as an Information Processing System (Information Filtering, Human Differences in Information Processing, Implications for Information Systems).
System Development Approaches
System Development Stages (System Investigation, System Analysis, System Design, Construction and Testing, Implementation, and Maintenance); System Development Approaches (Waterfall Model, Prototyping, Iterative Enhancement Model, Spiral Model.

(12Hours)

PART-C

System Analysis

Introduction; Requirement Determination (Understand the Process, Identify Data Used and Information Generated, Determine Frequency, Timing and Volume, Know the Performance Controls); Strategies for requirement Determination (Interview, Questionnaire, Record Review, Observation); Structured Analysis Tools (Data Flow Diagram, Data Dictionary, Decision Tree and Structured English, Decision Table).

System Design

Design objectives; Conceptual Design (Define Problem, Set System Objectives, Identify constraints, determine information needs, determine information sources, develop various designs, documentation of the conceptual design, report preparation); Design Methods; Detailed System Design (Project Planning and Control, Involve the user, detailed subsystem definition, output/input design, feedback from the user, database design, procedure design, design documentation).

Implementation and Evaluation of MIS

Implementation process (planning and implementation, acquisition of facilities and space planning, MIS Organization and procedure development, User training, acquisition of hardware and software, Creation of forms and database, Testing, Change Over); Hardware and Software Selection (Requirements analysis, Preparation of Tender Specifications, Inviting Tenders, Technical scrutiny and short-listing, Detailed Evaluation, Negotiations and Procurement Decisions, Delivery and Installation, Post Installation Review); Evaluation of MIS (Evaluation Approaches, Evaluation Classes, Product Based MIS Evaluation, Cost/Benefit Based Evaluation); System Maintenance (Corrective Maintenance, Adaptive Maintenance, Perfective Maintenance).

(10Hours)

PART-D

Information System Planning

Information System Planning; Planning Terminology (Mission, Objectives, Strategies, Policies); The Nolan Stage Model; The Four Stage Model of IS Planning (Strategic Planning, Information Requirement Analysis, Resource Allocation, Project Planning); Selecting a Methodology; Information Resource Management (IRM); Organization Structure and Location of MIS.

Information System as an Enabler : Introduction; Changing Concepts of IS (Information as a necessary Evil, Information for General Management Support, Information for decision making, Information as a Strategic Resource); IS as an Enabler (Competitive advantage, Organizational Change, Organizational Learning).

(12Hours)

Refernce Books:

1. Boddy, D. and Boonstra, A. and G. Kennedy. *Managing Information Systems: An Organizational Perspective.* 2nd Edition, Prentice Hall, 2004.
2. Laudon, K.C. and Laudon,J.P. *Management Information Systems: Managing the Digital Firm*, 8th Edition, Prentice Hall, 2004.
3. Turban E., McLean, E. and Wetherbe, J. *Information Technology for Management: Transforming Organizations in the Digital Economy.* 4th edition, Wiley, 2004.
4. Mudricm, R G , Ross J E , Clogget J R. *Information system for Modern Management.* Printce Hall
5. Effyoz. *Management Information System.* Cengage Learning, New Delhi.

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Course Title: System Analysis and Design
Paper Code: CSE216

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: The objective of this course is to provide a solid foundation of systems principles and their working.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of business functions and designing of various systems.

PART-A

System definition and concepts
Characteristics and types of system, Manual and automated systems, Real-life Business sub-systems: Production, Marketing, Personal, Material, Finance**.**

Systems models & systems analyst
Systems environment and boundaries, Real-time and distributed systems, Basic principles of successful systems**,** Role and need of systems analyst, Qualifications and responsibilities ,Systems Analyst as an agent of change.

Phases of systems development life cycle
Analysis, Design, Development, Implementation, Maintenance.

(12Hours)

PART-B

Systems documentation considerations and planning
Principles of systems documentation, Types of documentation and their importance, enforcing documentation discipline in an organization, Data and fact gathering techniques: Interviews, Group communication, Presentations, Site visits. Feasibility study and its importance Types of feasibility reports System, Selection plan and proposal Prototyping, Cost-Benefit and analysis: Tools and techniques.

Systems Design and modeling
Process modeling, Logical and physical design, Design representation, Systems flowcharts and structured charts, Data flow diagrams, Common diagramming conventions and guidelines using DFD and ERD diagrams. Data Modeling and systems analysis, designing the internals: Program and Process design, Designing Distributed Systems.

(12Hours)

PART-C

Modular and structured design
Input/output forms design, User-interface design, Graphical interfaces, Module specifications, Module coupling and cohesion, Top-down and bottom-up design.

System Implementation and Maintenance
Planning considerations, Conversion methods, producers and controls, System acceptance Criteria, System evaluation and performance, Testing and validation, Systems qualify Control and assurance, Maintenance activities and issues. Computer system as an expensive resource: Data and Strong media Procedures and norms for utilization of computer equipment, Audit of computer system usage, Audit trails.

(12 Hours)

PART-D

Types of threats to computer system and control measures

Threat to computer system and control measures, Disaster recovery and contingency planning.

Object Oriented Analysis and design

Introduction to Object Oriented Analysis and design life cycle, object modeling: Class Diagrams, Dynamic modeling: state diagram, Dynamic modeling: sequence diagramming.

Case study of the following systems

(I) Inventory Control (II) Railway Reservation System (III) University Management System (IV) Hospital management System

(10Hours)

Refernce Books:

1. Edwards, Perry. *System Analysis and Design.* McGraw Hill 1993.
2. Awad , Elias M. *System Analysis and Design.* McGraw Hill 2002.
3. Kendall and Kendall. *System Analysis and Design.* Prentice Hall 6th Ed 2005.
4. Valacich, Joseph S. George, J F G Hoffer. *Modern System Analysis and Design.* Addison Wesley 1998.
5. Satzinger. *System Analysis and Design.* Cengage Learning, New Delhi

Course Title: System Programming Laboratory
Paper Code: CSE218

L	T	P	Credits	Marks
0	0	2	1	25

1. Design and Implementation of an Editor in any language.
2. Design and Implementation of One Pass Assembler in any language.
3. Design and Implementation of Two Pass Assembler in any language.
4. Implementation of various search techniques: Linear and Binary Search.
5. Implementation of various sorting techniques: Bucket sort, Merge Sort, Heap Sort
6. Implementation of Lexical Analyzer.
7. Implementation of Top down Parser.
8. Implementation of Bottom up Parser.
9. Design and Implementation of Two Pass Macro- Processor.
10. Study of LEX and YACC.

This is only the suggested list of practical's. Instructor may frame additional practical's relevant to the course contents

Course Title: Microprocessor & its Applications Laboratory
Paper Code: ECE351

L	T	P	Credits	Marks
0	0	2	1	25

Course Objective: This laboratory will provide the students a perfect introduction to the world of Microprocessors and to provide hands-on experience essential to the real understanding of microprocessors architecture and it's interfacing to the peripheral devices. The experiments are designed to provide the students with the design principles of microprocessor systems. The course accomplishes this by using microprocessor kits.

Learning Outcome: After successful completion of this course, student will be able:

- To demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor.
- To apply knowledge of the microprocessor's internal registers and operations by use of a PC based microprocessor simulator.
- To interface the processor to external devices.

List of Experiments:

1. Introduction to 8085 kit.
2. Addition of two 8 bit numbers, sum 8 bit.
3. Subtraction of two 8 bit numbers.
4. Find 1's complement of 8 bit number.
5. Find 2's complement of 8 bit number.
6. Shift an 8 bit no. by one bit.
7. Find Largest of two 8 bit numbers.
8. Find Largest among an array of ten numbers (8 bit).
9. Sum of series of 8 bit numbers.
10. 8255 PPI.
11. Seven segment display
12. Traffic light.
13. Stepper motor control

Course Title: Data Communication Laboratory
Paper Code: CSE220

L	T	P	Credits	Marks
0	0	2	1	25

1. Making Straight, Rollover and Cross-Over cables
2. Cable & RJ-45 Jack outlet installation
3. Installation of NIC Card & using TCP/IP
4. Design, build & test a simple communication system
5. Overview and basic Configuration of Router
6. Router show Command
7. Basic LAN Setup
8. Designing & Implementing LAN using sub netting
9. Study of Amplitude Modulation
10. Study of frequency Modulation
11. Study of ASK Modulation
12. Study of FSK Modulation
13. Simple point-to-point communication & error detection
14. Implementation of STOP and Wait protocol
15. Implementation of Sliding Window protocol

This is only the suggested list of practical's. Instructor may frame additional practical's relevant to the course contents

Course Title: SEMINAR
Paper Code: CSE222

L	T	P	Credits	Marks
0	0	4	2	50

The seminar is based on the research oriented topic. The evaluation of seminar is based upon the contents and presentation of a topic.

FIFTH SEMESTER

Course Title: Computer Networks
Paper Code: CSE301

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course should provide the knowledge of various networking components, protocols and their working.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of how to implement a network and understand the functioning of the network.

PART-A

Introduction
Introduction to Computer Network and Physical Layer, Broadcast and Point-to-point- LAN-MAN-WAN- Wireless networks
Architecture and Reference Models
Layered architecture- OSI reference model, TCP/IP reference model –Internet Protocol Stack – Network Entities in Layers- Connection oriented and Connection less services
ATM
Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Adaptation Layer, Traffic and Congestion Control, ATM LAN Emulation

(12Hours)

PART-B

Internetworking
Principles of Internetworking, Connectionless Internetworking, the Internet Protocol, Routing Protocol, IPv6 (IPng), ICMPv6
Distributed Applications
Abstract Syntax Notation One (ASN.l), Network Management-SNMPV2, Electronic Mail-SMTP and MIME, Uniform Resource Locators (URL) and Universal Resource Identifiers (URI), Hypertext Transfer Protocol (HTTP)

(8Hours)

PART-C

Network Layer and Routing
Network Service model – Datagram and Virtual circuit service-Routing principles-Link state routing-distant vector routing-hierarchical routing-multicast routing-IGMP Internet Protocol (IP): IPv4 addressing-routing and forwarding datagram-datagram format-datagram fragmentation- ICMP- DHCP- Network Address Translators (NATs)-IPv6 packet format-transition from IPv4 to IPv6-Mobile IP. Routing in the Internet: Intra Autonomous System Routing: RIP and OSPF-Inter Autonomous System Routing: BGP – Network layer in ATM.

(8Hours)

PART-D

Transport Layer

Transport Layer Services-Relationship between Transport Layer and Network Layer-Transport Layer in Internet-Multiplexing and De multiplexing. Connectionless Transport: UDP-Segment structure-Checksum Connection Oriented Transport: TCP-TCP connection-TCP Segment Structure-Round trip Time estimation and Time out-Reliable Data transfer-Flow control-TCP connection Management. Congestion Control: Causes and costs of congestion- Approaches to congestion control- TCP congestion control: Fairness-TCP delay modeling. ATM ABR congestion control.ATM AAL Layer protocols.

(8Hours)

Application Layer and Network Security: Application Layer Protocols - WWW and HTTP-File transfer Protocol: FTP Commands and Replies – Domain Name System (DNS)-SMTP - SNMP- multimedia. Remote Procedure Call. Security in Computer Networks: Principles of Cryptography-Symmetric key-Public key-authentication protocols -Digital Signatures – Firewalls. Security in different Layers: Secure E-mail- SSL – IP security.

(6Hours)

Refernce Books:

1. Kurose ,James F. and Ross, Keith W. *Computer Networking – A Top-Down Approach Featuring the Internet*. 2/e Pearson Education, 2003.
2. Keshav, S. *An Engineering Approach to Computer Networking*. Pearson education , 2002.
3. Halsall, F. *Data Communication, Computer Networks and Open Systems*. Addison Wesley, 1996.
4. Tanenbaum, Andrew S. *Computer Networks* , 4/e, Pearson education, 2003
5. Fourouzan, Behrouz A. *Data Communications and Networking*. 2/e TataMcGrawhill, 2000.

Course Title: Database Management System
Paper Code: CSE303

L	T	P	Credits	Marks
3	1	0	3	75

Course Objective: This course offers a good understanding of database systems concepts and prepares the student to be in apposition to use and design databases for different applications.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of how to use a DBMS and how to build a DBMS.

PART-A
Introduction to Database Systems: File Systems Versus a DBMS, Advantages of a DBMS, Describing and Storing Data in a DBMS, Database System Architecture, DBMS Layers, Data independence.
Physical Data Organization: File Organization and Indexing, Index Data Structures, Hashing, B-trees, Clustered Index, Sparse Index, Dense Index, Fixed length and Variable Length Records.

(12Hours)

PART-B
Data Models
Relational Model, Network Model, Hierarchical Model, ER Model: Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Database Design with the ER Model, Comparison of Models.
The Relational Model
Introduction to the Relational Model, ER to Relational Model Conversion, Integrity Constraints over Relations, Enforcing Integrity Constraints, Relational Algebra, Relational Calculus, Querying Relational Data.

(12Hours)

PART-C

Relational Query Languages
SQL: Basic SQL Query, Creating Table and Views, SQL as DML, DDL and DCL, SQL Algebraic Operations, Nested Queries, Aggregate Operations, Cursors, Dynamic SQL, Integrity Constraints in SQL, Triggers and Active Database, Relational Completeness, Basic Query Optimization Strategies, Algebraic Manipulation and Equivalences.
Database Design
Functional Dependencies, Reasoning about Functional Dependencies, Normal Forms, Schema Refinement, First, Second and Third Normal Forms, BCNF, Multi-valued Dependency, Join Dependency, Fourth and Fifth Normal Forms, Domain Key Normal Forms, Decompositions.

(14Hours)

PART-D

Transaction Management

ACID Properties, Serializability, Two-phase Commit Protocol, Concurrency Control, Lock Management, Lost Update Problem, Inconsistent Read Problem , Read-Write Locks, Deadlocks Handling, 2PL protocol.

Database Protection

Threats, Access Control Mechanisms, Discretionary Access Control, Grant and Revoke, Mandatory Access Control, Bell LaPadula Model, Role Based Security, Firewalls, Encryption and Digital Signatures.

(11Hours)

Reference Books:

1. C J, Date. *An Introduction To Database System.* Addision Wesley, Eighth Edition.
2. Korth, Silbertz, Sudarshan. *Database Concepts.* McGraw Hill.
3. Navathe, Elmasri. *Fundamentals of Database Systems.* Addision Wesley, Fifth Edition.
4. Desai, Bipin C. *An introduction to Database Systems.* Galgotia Publication.
5. Rob and Coronel. *Database Systems 5th Edition.* Cengage Learning, New Delhi.

Course Title: Operating Systems
Paper Code: CSE305

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course should provide the students with good understanding of Operating System including its architecture and all its components.
Learning Outcomes: After the completion of this course the participants would understand the overall architecture of the operating system and its main components, Functions of Kernel, file system architecture and implementation, concurrent programming and concurrency.

PART-A

Introduction
What is an O.S., O.S. Functions; Different types of O.S.: batch, multi-programmed, time sharing, real-time, distributed, parallel; General structure of operating system, O/S services, system calls.
Process Management
Introduction to processes - Concept of processes, process scheduling, operations on processes; Inter Process Communication, Critical Sections, Mutual Exclusion with Busy Waiting, Sleep and Wakeup, Semaphores, Message passing; CPU scheduling- scheduling criteria, preemptive & non-preemptive scheduling, Scheduling Algorithms: FCFS, SJF, RR and priority.

(14Hours)

PART-B
Memory Management
background, logical vs. physical address space, memory management without swapping; swapping; contiguous memory allocation, paging, segmentation, segmentation with paging; Virtual Memory, demand paging, performance, page replacement, page replacement algorithms (FIFO, Optimal ,LRU); Thrashing.

(6Hours)

PART-C
File Systems
Files - file concept, file structure, file types, access methods, File attributes, file operations; directory structure, allocation methods (contiguous, linked, indexed), free-space management (bit vector, linked list, grouping),Protection mechanisms.
Secondary Storage
Disk Structure, Disk Scheduling (FCFS, SSTF, SCAN, C-SCAN, and LOOK), Disk Management (Disk Formatting, Boot Blocks, and Bad Blocks), Swap Space Management (Swap Space use, Swap Space Location, Swap Space Management)

(12Hours)

PART-D
Deadlocks
Introduction to deadlocks, Conditions for deadlock, Resource allocation graphs, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention

Case Studies
Brief introduction of MS-DOS, Windows, UNIX and LINUX

(12Hours)

Refernce Books:

1. Peterson and Silberschatz. *Operating System Concepts.* Addison-Wesley 4th Edition 1994.
2. Milenkoviac. *Operating Systems Concepts and Design.* Tata McGraw-Hill 1992.
3. Crowley, Charles. *Operating Systems a Design Oriented Approach.* Tata McGraw-Hill 1996.
4. Tanenbaum, Andrews S. *Modern Operating Systems.* Pearson Education, 2nd edition 2001.
5. Stevens, W Richard. *Linux Network Programming.* PHI, Ist Edition 2003.

Course Title: Algorithm Design & Analysis
Paper Code: CSE307

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The subject will give an insight into performance analysis, measurements and optimization of the various algorithm development techniques.
Learning Outcomes: After the completion of this course the participants will be able to choose one algorithm technique for any kind of problem.

PART-A
Introduction
Role of Algorithms in Computing; Growth of functions: Asymptotic Notation, Standard notation &common functions; Introduction to Recurrences: substitution method, recursion-tree method, master method; Randomizing Algorithms.
Divide and Conquer
Performance analysis of Binary Search, Merge sort, Quick sort, Selection sort. **(14Hours)**

PART-B
Greedy Algorithms
Elements of Greedy strategy, Activity Selection Problem, Knapsack problem, Single source Shortcut paths problem, Minimum Spanning tree problem and analysis of these problems.

(10Hours)

PART-C
Dynamic Programming
Elements of dynamic programming, Assembly-line scheduling problem, Matrix-chain multiplication, Multistage Graph, All Pairs Shortest paths, Longest common subsequence, 0/1 Knap Sack. **(10Hours)**

PART-D
Back Tracking
General method, 8 queen's problem, Graph coloring, 0/1 Knap Sack Problem
NP-Completeness
Polynomial Time, polynomial-time verification, NP-completeness & reducibility, NP-complete problems

(12Hours)

Refernce Books:

1. Sahni, Horowitz. *Fundamentals of Computer Algorithm*. Latest edition, Galgotia Publication.
2. Goodman. *Design & Analysis of Algorithm*. Latest Edition, McGraw hill Publication.
3. Rogers D. and Adams, J. *Mathematical Elements for Computer Graphics*. McGraw - Hill International Edition.
4. Rogers, David F. *Procedural Elements for Computer Graphics*. McGraw HillBook Company.
5. Watt, Alan. and Watt,Mark.*Advanced Animation and Rendering Techniques*. Addison-Wesley.
6. Young, X Window. *System Programming.* OSF/Motif Edition, Prentice Hall.

DAV UNIVERSITY JALANDHAR

DEPARTMENTAL ELECTIVE (DE)-II

Course Title: Java Programming
Paper Code: CSE311

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: The course is an introduction to Computer Science that exposes students to the concept of computing and programming using JAVA. This course is for those with little or no programming experience. The exercises are designed to help the students get a solid grasp of declaring and using methods and also learn the fundamental concepts of object oriented programming. Students will learn to use Java technologies in the real world and write numerous programs throughout the semester to demonstrate mastery of the concepts discussed in the classroom.

Learning Outcomes: Upon successful completion of this course, students should be able to: Analyze and explain the behavior of programs involving the fundamental program, write programs that use the fundamental program constructs including standard conditional and iterative control structures, Identify and correct syntax and logic errors in short programs and they will be able to Design and implement program by using packages, interfaces, events, applets and swings. Students will also be able to handle exceptions in programs.

PART-A

Overview of Basic OO Concepts
Need for object-oriented paradigm: Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting.

Features of OOP language
classes and objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling, inheritance, super keyword, polymorphism- method overriding, abstract classes.

(10Hours)

PART-B

Packages:
Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, exploring packages – Java.io, Java.util.

Interfaces:
differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interface

Exception handling:
Concepts of exception handling, benefits of exception handling, Termination models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Multithreading
Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

(15Hours)

PART-C

Introduction to Event Handling

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes, The AWT class hierarchy.

User interface components

labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scroll pane, dialogs, menu bar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grib bag.

Applets

Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

(10Hours)

PART-D

Swing

Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing-JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

Networking

Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, Java .net package Packages – java.util.

(12 Hours)

Refernce Books:-

1. Nino, J. and Hosch, F.A. *An Introduction to programming and OO design using Java.* John wiley& sons.
2. Budd, T. *An Introduction to OOP*. second edition, pearson education.
3. Liang Y, Daniel. *Introduction to Java programming.* 6th edition, Pearson education.
4. Johnson, R.A. *An introduction to Java programming and object oriented application development*. Thomson.
5. Horstmann Cay. S. and Cornell, Gary. *Core Java 2, Vol 1, Fundamentals.* seventh Edition, Pearson Education**.**

Course Title: Symbolic Logic and Logic Programming
Paper Code: CSE313

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: We will learn how software evolved from circuits and symbolic logic, and we will see how every computer program contains a "logical skeleton" (like a electronic circuit's schematic) that forecasts the program's computation. We can use the logical skeleton as a mathematical proof of the program's correctness, just like you do in algebra or circuit-theory class.

Learning Outcomes: This course is designed to help students acquire facility with logic, both as a formal system in its own right, and as a means to distinguish well from bad reasoning in informal argumentation. This course satisfies both the Quantitative Reasoning and Philosophical and Religious Inquiry and Ethics I pillars of the University Curriculum.

PART-A

Prepositional logic
Syntax and semantics, Validity and consequence. Normal forms. Representing world knowledge using prepositional logic. Proportional Logic, FOPL, Clausal Form, Resolution & Unification. Knowledge representation, acquisition, organization & Manipulation, Semantic nets, Frames, Conceptual Dependency, Scripts & CYC.
First order logic
World knowledge representation and the need for quantifiers. Syntax, semantics validity consequence clause normal from

(10Hours)

PART-B

Introduction to prolog
Syntax of prolog, structured data representation. Execution model Introduction to Programming in Prolog, Illustrative examples. The connection between logic and logic programming interpreting logic programs in terms of Horn clauses Deduction from clause form formulas resolution for prepositional logic Ground resolution. Unification and first order resolution SLD resolution; the computation and search rules. SLD trees and interpretation of non-declarative features of Prolog.

(15Hours)

PART-C

Introduction to Fuzzy logic
Fuzzy sets and Fuzzy reasoning - Fuzzy matrices - Fuzzy functions - Decomposition -Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making
Artificial Neural Networks
Basic concepts - Single layer perception - Multilayer Perception Supervised and Unsupervised learning – Back propagation networks - Kohen's self-organizing networks - Hopfield network

(10Hours)

PART-D

Advanced prolog features
Programming techniques: Structural Induction and Recursion, Extra Logical features.
Cut and Negation Case studies.

(10Hours)

Refernce Books:-

1. Stoll. *set Theory and logic*. Dover publishers, New York, 1963.
2. Clocksin, W.F. and Mellish, C.S. *Programming in Prolog* 2nd edition, Springer - Verlag, 1984.
3. Gries. *The Science of Programming*, Narosa Publishers, 1985.
4. O' Keefe, R. *The Craft of Prolog*. The MIT Press, 1991.
5. Lloyd, J. W. *Foundation of Logic Programming*, Springer, 1984.

Course Title: Computer Graphics and Animation
Paper Code: CSE315

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: To introduce students to the basics of computer graphics. To make students aware of the full range of techniques required to enable implementation of a graphics system capable of generating complex, realistic and animated images.

Learning Outcomes: Students will demonstrate an understanding of contemporary graphics concepts. Students will create interactive graphics applications in using one or more graphics application programming interfaces on basis of learned techniques geometrical transformations, visibility detection, computer graphics animation and rendering.

PART-A

Introduction
Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems, graphics monitors and work stations and input devices**.**

Output primitives
Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

2-D geometrical transforms
Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

(15Hours)

PART-B

2-D viewing
The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm

3-D object representation
Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

3-D Geometric transformations
Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

(10Hours)

PART-C

Visible surface detection methods
Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

Rendering
Introduction to shading models- Flat and smooth shading – Adding texture to faces – Adding Shadow of object- Building a camera in a program- Creating shaded object- Rendering

texture- Drawing Shadows. **(10Hours)**

PART-D

Fractals

Fractals and Self similarity- Peano curves – Creating image by iterated function- Mandelbrot sets- Julia Sets- Random Fractals- Overview of Ray Tracing – Intersecting rays with other primitives- Adding Surface texture- Reflections and Transparency- Boolean operations on objects.

(10Hours)

Refernce Books:-

1. Hearn,Donald and Baker, M. Pauline. *Computer Graphics.* second Edition, PHI/Pearson Education.
2. Zhigandxiang, Plastock, Roy. *Computer Graphics Second edition.* Schaum's outlines, Tata Mc- Graw hill edition.
3. Rogers, David F. *Procedural elements for Computer Graphics*. Tata McGraw hill, 2nd edition.
4. Neuman and Sproul. *Principles of Interactive Computer Graphics.* TMH.
5. Foley, VanDam, Feiner and Hughes. *Computer Graphics Principles & practice.* second edition in C, Pearson Education.

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L	T	P	Credits	Marks
3	0	0	3	75

Course Title: Dot NET Programming
Paper Code: CSE317

Course Objective:

- The ability to effectively use visual studio .NET.
- An understanding of the goals and objectives of the .NET Framework. .NET is a revolutionary concept on how software should be developed and deployed.
- A working knowledge of the C# programming language.

Learning Outcomes: Upon successful completion of this course, students should be able to: Analyze and explain the behavior of programs involving the fundamental program, write programs that use the fundamental program constructs including standard structures, Identify and correct syntax and logic errors in short programs and they will be able to Design and implement program by using NET Framework

PART-A

Introduction:
NET Framework - Common Language Runtime (CLR) - .NET Framework Class Library - .NET Windows Forms – Uses of Web Forms & Web Services - Common Language Runtime (CLR) – Common Type System - Microsoft Intermediate Language (MSIL) - Components of the CLR - Distinguish Between the .NET Compilers – Organizing and Executing Managed Code. NET Framework Class Library – Namespace – Input and Output - Serialization – Working with XML – Remoting – Enterprise Services –Interoperability – GUIs.

(15Hours)

PART-B

.NET Languages
C# Language Fundamentals – Classes and Objects – Methods – Fields and Properties - Inheritance and Polymorphism – Operator Overloading – Struts - Interfaces – Arrays – Indexers and Collections – Strings and Regular Expressions – Handling Exceptions – Delegates and Events.
VB .NET:
Language Fundamentals – Classes and Objects – Methods – Fields and Properties - Inheritance and Polymorphism – Operator Overloading– Interfaces – Arrays – Indexers and Collections – Strings and Regular Expressions.

(15Hours)

PART-C

VB .NET
Handling Exceptions – Delegates and Events - Accessing Data – ADO.NET Object Model- .NET Data Providers – Direct Access to Data – Accessing Data with Datasets.

(10Hours)

PART-D

J2EE: Enterprise Edition Overview - Multi-Tier Architecture - Best Practices-Comparison between J2EE and .NET

(5Hours)

Reference Books:-

1. David Chappell. *Understanding .NET – A Tutorial and Analysis.* Addison Wesley, 2002. (UNIT I) .
2. Schildt, Herbert. *C# 3.0 the Complete Reference.* McGraw-Hill Professional, Third Edition, 2008. (UNIT II)
3. Harvey M. Deitel, Paul J. Deitel, Tem R. Nieto, Contributor Paul J. Deitel, and Tem R. Nieto. *Visual Basic .NET – How to Program.* Prentice Hall, Second edition, 2001. (UNITs III & IV).
4. Keogh. *J2EE the Complete Reference.* Tata McGraw-Hill, 2008. (UNIT V)

Course Title: Computer Networks Laboratory
Paper Code: CSE319

L	T	P	Credits	Marks
0	0	2	1	25

1. Introduction to Network Simulator OPNET/NS2.
2. Evaluate Ethernet Delay and Load Statics of Switched Ethernet
3. Evaluate the comparative investigations on the performance issues of switched Ethernet with VLAN based on Email and FTP applications.
4. Evaluate Internet connection choice for PC Network on different Data Rate for WAN based on Web Browsing and Email application
5. Implementation of Firewall; in a Network.
6. Simulation of Wireless data Network with different with physical characteristics.
7. Implementation of CSMA/CD Protocol and its comparative investigation with ALOHA Protocol.
8. Design and Implementation of Simple Transfer Protocol in C/ C++.
9. Design of substitution Cipher in C/ C++.
10. Design of Transposition Cipher in C/ C++.
11. Design of Public Key Algorithm in C/ C++.

Course Title: Database Management System Laboratory
Paper Code: CSE321

L	T	P	Credits	Marks
0	0	4	2	50

1. Introduction to SQL and installation of SQL Server / Oracle.
2. Data Types, Creating Tables, Retrieval of Rows using Select Statement, Conditional Retrieval of Rows, Alter and Drop Statements.
3. Working with Null Values, Matching a Pattern from a Table, Ordering the Result of a Query, Aggregate Functions,
4. Grouping the Result of a Query, Update and Delete Statements.
5. Set Operators, Nested Queries, Joins, Sequences.
6. Views, Indexes, Database Security and Privileges: Grant and Revoke Commands, Commit and Rollback Commands.
7. PL/SQL Architecture, Assignments and Expressions, Writing PL/SQL Code, Referencing Non-SQL parameters.
8. Stored Procedures and Exception Handling.
9. Triggers and Cursor Management in PL/SQL.

* Students are advised to use Developer 2000/Oracle-10i or higher version or other latest version for above listed experiments.

This is only the suggested list of Practicals. Instructor may frame additional Practicals relevant to the course contents.

Course Title: Operating Systems Laboratory
Paper Code: CSE323

L	T	P	Credits	Marks
0	0	4	2	50

1. Simulation of the CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Simulation of MUTEX and SEMAPHORES.
3. Simulation of Bankers Deadlock Avoidance and Prevention algorithms.
4. Implementation of Process Synchronization (Reader-Writer, Sleeping Barber and Dining Philosopher's Problem)
5. Simulation of page Replacement Algorithms a) FIFO b) LRU c) LFU
6. Simulation of paging techniques of memory management.
7. Simulation of file allocation Strategies a) Sequential b) Indexed c) Linked
8. Simulation of file organization techniques
   a) Single Level Directory b) Two Level c) Hierarchical d) DAG
9. To automate the allocation of IP addresses i.e. to set and configure the DHCP server and DHCP client.
10. To share files and directories between RedHat Linux operating systems i.e. to set and configure the NFS server and NFS clients.
11. To share files and directories between Red Hat Linux and Windows operating systems i.e. to set and configure the samba server.
12. To set and configure the DNS (Domain Name Server).
13. To set and configure the print server and to share printers between Windows and Red Hat Linux operating systems.

This is only the suggested list of Practicals. Instructor may frame additional Practicals relevant to the course contents.

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Course Title: JAVA Programming Laboratory
Paper Code: CSE325

L	T	P	Credits	Marks
0	0	4	2	50

Objective:

To make the student learn the application of advanced object oriented concepts for solving problems.

To teach the student to write programs using advanced Java features to solve the problems

List of practical:

1. a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
   b) Write a Java program to multiply two given matrices.
2. a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
   b) Write a Java program for sorting a given list of names in ascending order.
3. Write a java program to create an abstract class named Shape that contains an empty method named number Of Sides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method number Of Sides ( ) that shows the number of sides in the given geometrical figures.
4. a) Develop an applet that displays a simple message.
   b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
5. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.
6. Write a Java program for handling mouse events.
7. a) Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
   b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
8. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.
9. Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)
10. a) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.
    b) Write a Java program that allows the user to draw lines, rectangles and ovals.

11. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using JTable component.

This is only the suggested list of Practical's. Instructor may frame additional Practical's relevant to the course contents**.**

Course Title: Symbolic Logic and Logic Programming Lab
Paper Code: CSE327

L	T	P	Credits	Marks
0	0	4	2	50

Study of Propositional Logic

1. Study of First Order Predicate Logic
2. Introduction to prolog programming by a simple prolog program
3. Program to check whether input is alphabet or not
4. Program to find if given number is positive or negative.
5. Write a program to check whether a given person is a member of Club
6. Program in prolog showing mapping that is constructing new structure similar to old one.
7. Program illustrating the use of recursion that is finding sum of first N integers.
8. Program to find the length of a list using 'Recursion' and then using "recursion and Accumulators';
9. Program to find the factorial of a number using recursion and accumulators and cut.
10. Program to calculate average tax illustrating cut-fail combination usage.
11. Program showing use of cut in terminating a 'generate and test'.
12. Program to play "Tic Tac Toe"
13. Write a program to generate fibonacci series upto the given no.
14. Write a program which accepts any number and checks whether it is prime or not.
15. To describe some basic predicates that are useful for manipulating lists.
16. .Program for Bubble Sort
17. Program for Insertion Sort

This is only the suggested list of Practical's. Instructor may frame additional Practicals relevant to the course contents

Course Title: COMPUTER GRAPHICS & ANIMATION LAB
Paper code: CSE329

L	T	P	Credits	Marks
0	0	4	2	50

Objective: To understand the logic used in drawing graphs and to implement it through the use of a programming language.

List of programs:

1. To draw a line using DDA Algorithm.
2. To draw a line using Bresenham's Algorithm.
3. To draw a circle using trigonometric Algorithm.
4. To draw a circle using Bresenham's Algorithm.
5. To draw a circle using Midpoint Algorithm.
6. To draw an ellipse using Trigonometric Algorithm.
7. To draw an ellipse using Midpoint Algorithm.
8. To translate an object with translation parameters in X and Y directions.
9. To scale an object with scaling factors along X and Y directions.
10. To rotate an object with a certain angle.
11. To perform composite transformations of an object.
12. To clip line segments against windows.
13. Demonstrate the properties of Bezier Curve.
14. Run a sample session on Microsoft Windows including the use of Paintbrush.
15. Generating Fractal images

This is only the suggested list of Practicals. Instructor may frame additional Practicals relevant to the course contents

Course Title: DOT NET PROGRAMMING LAB
Paper Code: CSE331

L	T	P	Credits	Marks
0	0	4	2	50

List of Practical:

1. Shopping cart project using ADO.NET: This sample project has all basic features required for a shopping cart web site including Login, Registration, Add to Cart, Checkout etc. A good ASP.NET learning project using C#, ASP.NET, SQL Server.

2. Personal Assistant: This is a small project for managing personal details. Current version of this project support AddressBook feature - Add, Edit andManage contacts and addresses using VB.NET.

3. Address Book: This is a small project for managing contact details. This is a C# version of the 'Personal Assistant' project.

4. School Management System: This is a project for managing education institutes using C#.

5. Library Management System: This is an academic project for students using Java.

6. Spider Alerts & Web services: This project communicates with web services and downloads Alerts from the web server using Java & XML.

7. Patient Information System: This software can be used to keep track of the patients' information andtreatment details in a hospital or clinic. Some of the advanced features include patient consulting, lab information, billing etc using JSP, Servlet & JDBC.

8. Web based Address Book: This application can be used to keep track of your contacts/addresses. N Tier architecture is used to separate data layer, business layer and UI layers.

Course Title: Theory of Computation
Course Code: CSE302

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: To understand the basic concepts of grammar, automata, languages and Expressions.
Learning Outcomes: Students will learn about all three theories of computer science – automata, formal languages and computation.

PART- A

Basics in Theory of Computations:
Basic concepts of strings, alphabets, languages, Principles of Mathematical Induction.
Languages and Grammars:
Construct of a language, Grammar, Chomsky Classification of Formal Languages.
Finite Automata:
Automata and Applications of Automata Theory, Deterministic and Non-Deterministic FA, Comparison and Equivalence of DFA and NFA.

(14 Hours)

PART- B

Regular Expressions:
Regular Expression, Equivalence of Regular Expression and Finite Automata, Equivalence of Regular Grammar and Finite Automata, Regular and Non- Regular Languages, Pumping Lemma for Regular Sets
Finite State Machines:
Moore and Mealy Machines, Equivalence of Moore and Mealy Machines.

(14 Hours)

PART-C
Context Free Language:
Context Free Grammar, Derivation trees, Context Free Grammar Simplification, Chomsky & Greibach Normal forms, Ambiguities.
Pushdown Automata:
Definition, Equivalence of PDA by Empty Store and PDA by Final State, Construction of PDA for CFLs.

(14 Hours)

PART- D
Turing Machines
Introduction and Turing Machine Model, Computable functions and languages, Techniques for construction of Turing machines, Church's Hypothesis.
Undecidability
Recursive and recursively enumerable languages, Rice theorem, Post's correspondence problem

(14Hours)

Reference Books:-

1. Hopcroft, J E, and Ullman, J D. *Introduction to Automata Theory, Languages and Computation.* Narosa Publishers, 2002.
2. Mishra, K L P, and Chandrasekaran, N. *Theory of Computer Science.* Prentice Hall Inc, 2002.
3. Lewis, Harry R, and Papadimitriou, Chritos H. *Elements of the Theory of Computation.* Pearson Education, 2001.
4. Linz, Peter. *An Introduction to Formal Languages and Automata.* Narosa Publishers, 2002.
5. Sipser, Michael. *Introduction to the theory of computation.* New Delhi: Cengage Learning.

Course Title: Relational Database Management System

Paper Code: CSE304

L	T	P	Credits	Marks
3	1	0	3	75

Course Objectives: To learn how to use a RDBMS and how to build a RDBMS.

Learning outcome: It will help to make carrier in database administration & related data base designing & maintenance places.

PART-A

Data base system architecture, data independence, storage structures, data representation, indexing, relational data structure, relations, attributes, keys, embedded SQL, Relational Algebra, Query by example, relational calculus, normalization & normal forms, functional dependence, over view of security, integrity, recovery, backup, etc.

(12 Hours)

PART-B

SQL, Transact-SQL, PL SQL, SQL *PLUS

Managing Database and Queries: Creating, defining and modifying Table structure

Transact-SQL PLUS and substitution of variables.

(12 Hours)

PART-C

- **Introduction to SQL Server and Oracle Server**
- **Indexes**
- **Views**
- **Packages**

(12 Hours)

PART-D

- **Triggers,**
- **Stored Procedures**
- **Cursors**
- **Control structure**

(12 Hours)

Reference Books:

1. Korth, Abraham, and Silberschatz. *Database System Concepts*. McGraw Hall, 1991.
2. Date, C.J. *An Introduction to Database Systems*. Addison Wesley, Vol.-1.
3. Elmasri, Ramez, Shamkant, B, and Navathe. *Fundamentals of Database System*. The Benjamin Cummings Publishing Co., 2nd Edition. 1994.
4. Bayross, Ivan. *PL/SQL the Programming Language of ORACLE*, BPB Publication.

Course Title: Software Engineering & Project Management
Course Code: CSE306

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: To understand the basic concepts of software engineering and software development life cycle.
Learning Outcomes: Students will learn about the different activities of software development and about the risk management. They will get aware about the different case tools.

PART – A

Introduction to Software Engineering:
Software Problem, Software Engineering, Approach, Software process, Characteristics of Software Engineering Process.
Process models:
The waterfall model, Incremental process models, Evolutionary process models, The Unified process.
Software Requirements:
Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document

(12Hours)

PART – B
Software Project Planning:
Cost estimation, cost estimation models, Project scheduling, Software Configuration management, Team Structure, Risk Management.
Requirements engineering process:
Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
System models:
Context Models, Behavioural models, Data models, Object models, structured methods
Design Engineering:
Design process and Design quality, Design concepts, the design model.

(12Hours)

PART – C

Creating an architectural design:
Software architecture, Data design, Architectural styles and patterns, Architectural Design
Object-Oriented Design:
Objects and object classes, An Object-Oriented design process, Design evolution.
Performing User interface design:
Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation
Testing Strategies:
A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging
Product metrics:
Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.
Metrics for Process and Products:

Software Measurement, Metrics for software quality.

(12Hours)

PART – D

Risk management:
Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management:
Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

CASE Tools:
Types of CASE tools, advantages and components of CASE tools, Unified Modelling Language (UML)

(12Hours)

Reference Books:-

1. Agarwal, K.K, and Yogesh Singh.*Software Engineering*. New Age International Publishers,
2. Peters, James F. *Software Engineering, an Engineering approach*. Witold Pedrycz, John Wiely.
3. Jawadekar, Waman S. *Software Engineering principles and practice*. The McGraw-Hill Companies.
4. Pressman, R. S. *Software Engineering Approach*.
5. Pressman, Roger S. *Software Engineering, A practitioner's Approach*. McGraw Hill International Edition, 6th edition.
6. Sommerville. *Software Engineering*. Pearson education,7th edition.
7. Jalote, Pankaj. *An Integrated Approach to software Engineering*.

Course Title: Peripheral Devices & Interface
Course Code: CSE308

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: To understand the functional details of various peripheral devices.
Learning Outcomes: Students will learn about features and working of various peripheral devices and role of various device drivers.

PART- A
System Resources:
Interrupt, DMA Channel, I/O Port Addresses and resolving and resolving the conflict of resources. I/O buses-ISA, EISA, Local bus, VESA Local bus, PCI bus, PCI Express, Accelerated graphics port bus.
IDE & SCSI Interfaces:
IDE origin, IDE Interface ATA standards ATA1 to ATA7, ATA feature, ATA RAID and SCSI RAID, SCSI Cable and pin Connector pin outs SCSI V/s IDE Advantages and limitation.

(12Hours)

PART- B
Video Hardware:
Video display technologies, DVI Digital signals for CRT Monitor, LCD Panels, Video adapter types, Integrated Video/ Motherboard chipset, Video RAM, Video driver and multiple Monitor, Graphic accelerators. Advanced 3D Technologies, TV Tuner and Video Capture upgrades troubleshooting Video Cards and Drivers.

(12Hours)

PART- C
I/O Interfaces:
I/O Interfaces from USB and IEEE1394, I/O Interface from serial and Parallel to IEEE1394 and USB 961, Parallel to SCSI converter. Testing of serial and parallel port, USB Mouse/ Keyboard Interfaces

(10Hours)

PART- D
Input/ Output Driver software aspects:
Role of device driver DOS and UNIX/ LINUX device drivers, Design & Integration of Peripheral devices to a computer system as a Case Study
Future Trends:
Detailed Analysis of recent Progress in the Peripheral and Bus systems, Some aspects of cost Performance analysis while designing the system

(12Hours)

Reference Books:-

1. Chaudhary, P. Pal.*Computer Organization and design.* Prentice Hall of India Pvt. Ltd, 1994.
2. Corso, Del, Kirrman, H, and JD Nicond. *Microcomputer buses & links.* Academic Press, 1986.
3. Hall, Douglas V. *Microprocessor & Interfacing Programming & H/W.* McGraw Hill International, 2nd Edition, 1992.
4. Muller, Scott. *Upgrading and repairing PC.*

DAV UNIVERSITY JALANDHAR

Course Title: DISTRIBUTED SYSTEMS
Paper Code: CSE310

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: The course is intended to provide basic foundation with fundamental concepts and mechanisms of distributed computing systems. Most of the issues discussed in this course material are the essence of advanced operating systems. Broad coverage as: Introduction to distributed computing systems (DCS) DCS design goals, Transparencies, Fundamental issues, Distributed Coordination, Process synchronization, Inter-process communication.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the working of the each functional and finally the student will be exposed to the recent trends in distributed computing systems and multithreaded application.

Part-A
Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges.
System Models: Architectural models, Fundamental Models
Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, and termination detection.

(10Hours)

Part-B
Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non-token based algorithms, performance metric for distributed mutual exclusion algorithms.
Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.
Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.

(14Hours)

Part-C
Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study.
Security: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent.
Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances.
Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

(12Hours)

Part-D

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault -tolerant services, highly available services, Transactions with replicated data.

Distributed Algorithms: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to wave & traversal algorithms, Election algorithm.

CORBA Case Study: CORBA RMI, CORBA services.

(10Hours)

Reference Books:

1. Singhal and Shivaratri. *Advanced Concept in Operating Systems.* McGraw Hill.
2. Coulouris,Dollimore, and Kindberg. *Distributed System: Concepts and Design.* Pearson, Ed.
3. Tel, Gerald.*Distributed Algorithms.* Cambridge University Press.
4. Lynch, Nancy. *Distributed Algorithms.* Morgan Kaufmann.
5. Tanenbaum, Andrew S. *Distributed Operating Systems*. ACM Press.

DAV UNIVERSITY JALANDHAR

DEPARTMENT ELECTIVE-III

Course Title: Data Mining
Paper Code: CSE312

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course will be an introduction to data mining. Topics will range from statistics to database, with a focus on analysis of large data sets. Another objective is to study the methodology of engineering legacy databases for data warehousing and data mining to derive business rules for decision support systems.

Learning Outcomes: Upon completion of the course, students will be able to:

- Understand the nature and purpose of data mining
- Describe the theoretical constructs and core processes of data mining
- Understand the role of data mining in institutional research.
- Understand the basic statistical concepts related to data mining.
- Describe the predictive modelling functions of data mining.

PART-A

Introduction: Data Mining Concepts, Input, Instances, Attributes and Output, Knowledge Representation & Review of Graph Theory, Lattices, Probability & Statistics
Machine learning concepts and approaches: Supervised Learning Framework, concepts & hypothesis, Training & Learning, Boolean functions and formulae, Monomials, Disjunctive Normal Form & Conjunctive Normal Form, A learning algorithm for monomials

(12Hours)

PART-B

Data Preparation: Data Cleaning, Data Integration & Transformation, Data Reduction
Mining Association Rules: Associations, Maximal Frequent & Closed Frequent item sets, Covering Algorithms & Association Rules, Linear Models & Instance-Based Learning, Mining Association Rules from Transactional databases, Mining Association Rules from Relational databases & Warehouses, Correlation analysis & Constraint-based Association Mining.

(12Hours)

PART-C

Classification and Prediction: Issues regarding Classification & Prediction, Classification by Decision Tree induction, Bayesian classification, Classification by Back Propagation, k-Nearest Neighbor Classifiers, Genetic algorithms, Rough Set & Fuzzy Set approaches
Cluster Analysis: Types of data in Clustering Analysis, Categorization of Major Clustering methods, Hierarchical methods, Density-based methods, Grid-based methods, Model-based Clustering methods

(12Hours)

PART-D

Mining Complex Types of Data: Multidimensional analysis & Descriptive mining of Complex data objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-series & Sequence data, Mining Text databases, Mining World -Wide Web
Data Mining Applications and Trends in Data Mining: Massive Datasets/Text mining, Agent-Based Mining

(10Hours)

Reference Books:-

1. Dunham, M.H. *Data Mining: Introductory and Advanced Topics*. Pearson Education.
2. Han, Jiawei, and Micheline Kamber. *Data Mining Concepts & Techniques*. Elsevier.
3. Bishop, C. M. *Pattern Recognition and Machine Learning*. Springer.
4. Theodoridis, S, and K Koutroumbas. *Pattern Recognition*, 4th Edition, Academic Press, 2009.
5. Pujari, Arun k. *Data Mining Techniques*. Universities Press Private Limited.

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Course Tile: Wireless Networks
Paper Code: CSE314

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course is designed to provide the students with a basic understanding and experiential learning of wireless communications and networking.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of how a Wireless networks work during data communication between wireless end points and how to implement the Security on it.

PART-A

Introduction: Differences between wireless and fixed telephone networks, Evolution of wireless networks, Examples of Wireless Communication Systems: Paging Systems, Cordless Telephone Systems, Cellular Telephone Systems, Comparison of common Wireless Communication systems, Traffic routing in wireless networks: circuit switching and packet switching.

(12 Hours)

PART-B

Wireless Local Area Networks: Introduction, WLAN topologies, requirements, working and function of physical layer and MAC layer, IEEE standards for wireless networks, Wi-Fi, Bluetooth, WiMax.

(12 Hours)

PART-C

Wireless Internet: Mobile IP components, process of agent discovery, registration and de-registration, care-of-address, concept of tunnelling, Limitations of Mobile IP, introduction to micro-mobility protocols.

(12 Hours)

PART-D

Ad Hoc Wireless Networks: Introduction, Challenges in ad hoc networks: spectrum allocation, media access, routing, multicasting, energy efficiency, security and privacy; problems in ad hoc channel access, receiver-initiated MAC protocols, sender-initiated MAC protocols and existing ad hoc MAC protocols; Ad hoc routing protocols: Destination sequenced distance vector (DSDV), Ad hoc on demand distance vector routing (AODV), Dynamic source routing (DSR), Temporally ordered routing algorithm (TORA).

(10Hours)

Reference Books:-

1. Pahlavan and Krishnamurthy. *Principles of Wireless Networks.* Prentice Hall, 2002.
2. Schiller, J. *Mobile Communications.* Addison-Wesley, 2000.
3. Gibson, Jerry D.*The Mobile Communications Handbook.* CRC Press, 1999.
4. .Held, G. *Data over Wireless Networks.* McGraw-Hill, 2001.
5. Blake.*Wireless Communication Systems.* New Delhi : Cengage Learning.

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Course Title: High Performance Communication Networks

Paper Code: CSE316

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: Speed is one of the demands put forth by the users. Hence it is required to focus the engineer's attention in developing high speed networks and applications. This syllabus is framed to satisfy the requirements of future telecommunication.

Learning Outcomes: To learn high performance protocols and learn requirements for high speed packet based Networks. How to apply QoS in large network's backbone for flow and congestion control.

PART -A

Basics of Networks: Telephone, computer, Cable television and Wireless network, networking principles, Digitalization: Service integration, network services and layered architecture, traffic characterization and QOS, networks services: network elements and network mechanisms.

Packet Switched Networks: OSI and IP models: Ethernet (IEEE 802.3); token ring (I EEE 802.5), FDDI, DQDB, frame relay, SMDS: Internetworking with SMDS.

(14Hours)

PART -B

Internet and TCP/IP Networks: Overview; internet protocol; TCP and VDP; performance of TCP/IP networks circuit switched networks: SONET; DWDM, Fibre to home, DSL. Intelligent networks, CATV.

(8 Hours)

PART –C

ATM and Wireless Networks: Main features-addressing, signalling and routing; ATM header structure-adaptation layer, management and control; BISDN, interworking with ATM ,Wireless channel, link level design, channel access; Network design and wireless networks.

(12Hours)

PART –D

Optical Networks and Switching: Optical links- WDM systems, cross-connects ,optical LAN's, optical paths and networks, TDS and SDS, modular switch designs-Packet switching, distributed, shared, input and output buffers.

(12Hours)

Reference Books

1. Warland, Jean, and Pravin Varaiya. *High Performance Communication Networks*. London: Harcourt and Morgan Kauffman, 2nd Edition, 2000.
2. Widjaja, Leon Gracia.*Communication networks.* New Delhi: Tata McGraw-Hill, 2000.
3. Kasera, Sethi,Sumit, and Pankaj Sethi. *ATM Networks.* New Delhi: Tata McGraw-Hill, 2000.

Course Title: C Shell Programming
Course Code: CSE318

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: To understand the basic concepts of shell programming.

Learning Outcomes: Students will learn about unix file system, C shell programming and file management.

PART- A

Introduction to UNIX: Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

UNIX Utilities: Introduction to unix file system, vi editor, filehandling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text processing utilities and backup utilities , detailed commands to be covered are tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, Cpio

Introduction to Shells: UNIX Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

(13Hours)

PART- B

Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines,
Count characters, Words or Lines, Comparing Files.

Grep: Operation, grep Family, Searching for File Content.

Sed: Scripts, Operation, Addresses, commands, Applications, grep and sed.

awk: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk,
Applications, awk and grep, sed and awk.

Interactive Korn Shell: Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

(15Hours)

PART- C

Korn Shell Programming: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

Interactive C Shell: C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startupand Shutdown Scripts, Command History, Command Execution Scripts.

(10 Hours)

PART- D

C Shell Programming: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.
File Management: File Structures, System Calls for File Management– create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask

(8 Hours)

Reference Books:-

1. Forouzan, Behrouz, Gilberg A, and Richard F. *Unix and shell Programming*. Thomson.
2. Das Sumitabha. *Your UNIX the ultimate guide*. TMH, 2nd Edition.
3. Graham, Glass, and King Ables. *UNIX for programmers and users*.Pearson Education, 3rd edition.
4. Kernighan and Pike. UNIX *programming environment.* PHI. / Pearson Education
5. Foster, E.Johnson & other *Beginning shell scripting.* Wile Y India.

Course Title: Relational Database Management System-Lab

Paper Code: CSE320

L	T	P	Credits	Marks
0	0	4	2	50

1) To run the various queries using commands of SQL.
2) To write programs using control structures of PL/SQL like
   If-else statements.
3) To write programs using loops of PL/SQL like For , Do-while , while
4) Implementation of Cursors, Procedures ,Packages Triggers

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Course Title: Software Engineering & Project Management Lab

Course Code: CSE322

L	T	P	Credits	Marks
0	0	2	1	25

Instruction for Students: The students will be attending a laboratory session of 2 hours weekly and they have to perform the practical related to the following list.

- System Requirement Specification (SRS) and related analysis documents Design documents representing the complete design of the software system.

Use of CASE Tools:

- Analysis and design for the same problem should be done using Object-Oriented approach.
- Simple exercises in effort and cost estimation in COCOMO model.
- Application of COCOMO and Function Point (FP) model for the actual project that has been chosen.
- Familiarization of SCM tools with some public domain software.
- Familiarization of some reverse engineering tools available in the public domain.

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DEPARTMENTAL ELECTIVE (DE)-III LAB

L	T	P	Credits	Marks
0	0	2	1	25

Course Title: D**ata Mining Lab.**
Paper Code: **CSE324**

Students are required to perform practical's in Oracle/MS SQL Server and STATISTICA Data Miner

1. Building a Database Design using ER Modeling and Normalization Techniques
2. Implementation of functions, Procedures, Triggers and Cursors
3. Load Data from heterogenous sources including text files into a predefined warehouse schema.
4. Feature Selection and Variable Filtering (for very large data sets)
5. Association mining in large data sets
6. Interactive Drill-Down, Roll up, Slice and Dice operations
7. Generalized EM & k-Means Cluster Analysis
8. General Classification

Course Title: Wireless Networks Lab
Paper Code: CSE326

L	T	P	Credits	Marks
0	0	2	1	25

1. Design an 802.11 network of mesh topology, using set of suitable inputs check the performance parameters like: Battery Energy consumed, Bit error Rate, Busy, Signal to Noise ratio, Throughput, Utilization.
2. Design Wireless network using Carrier Sensing Multiple Access Technique, Check the performance parameters like: Channel Throughput, Signal to Noise Ratio etc.
3. Design a Project having two scenarios: (a) Star Topology Wireless Network using rapid configuration method. (b) Ring Topology Wireless network also using rapid configuration method, Compare the performance parameters like: End to End Delay for data, Traffic Received, Queue size etc.
4. Design a Star shaped Wireless network, and suggest a way to configure a Physical layer of selected nodes.
5. Design a Project having two scenarios: (a) Bus Topology Wireless Network (b) Ring Topology Wireless network, make use of the Web Reporting to compare the result of two different scenarios.
6. Design a Wireless model having four networks which are ten meters apart from each other, connected to each other wirelessly and are susceptible to delays etc.
7. Create a radio network and observe variations in the quality of received signal that results from radio noise at the receiving node in a dynamic network topology.
8. Designs a Star shaped Wireless topology and suggest a suitable way to import traffic.
9. Performance analysis of wireless mesh backhaul network with 802.11 a/b/g technologies using OPNET.
10. Performance analysis of wireless mesh backhaul network with 802.11 a/p technologies using OPNET.
11. Development of a new CDMA based MAC on top of 802.11p Physical layer

Course Title: High Performance Communication Networks Laboratory
Paper code: CSE328

L	T	P	Credits	Marks
0	0	2	1	25

1. Design an 802.3 network of mesh topology, using set of suitable inputs check the performance parameters like: Battery Energy consumed, Bit error Rate, Busy, Signal to Noise ratio, Throughput, Utilization.
2. Design 802.5 network using Carrier Sensing Multiple Access Technique, Check the performance parameters like: Channel Throughput, Signal to Noise Ratio etc.
3. Design a Project having two scenarios: (a) Star Topology 802.3 Network using rapid configuration method. (b) Ring Topology 802.3 network also using rapid configuration method, Compare the performance parameters like: End to End Delay for data, Traffic Received, Queue size etc.
4. Design a Star shaped ATM network, and suggest a way to configure a Physical layer of selected nodes.
5. Design a Project having two scenarios: (a) Bus Topology TCP/IP Network (b) Ring Topology TCP/IP network, make use of the Web Reporting to compare the result of two different scenarios.
6. Design a Wireless model having four networks, which are ten meters apart from each other, connected to each other wirelessly and are susceptible to delays etc.
7. Create a radio network and observe variations in the quality of received signal that results from radio noise at the receiving node in a dynamic network topology.
8. Designs a Frame Relay Network and suggest a suitable way to import traffic.
9. Performance analysis of FDDI networks using OPNET.
10. Performance analysis of Enterprise Network with ATM using OPNET.
11. Emulate LAN over ATM using OPNET.

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Course Title: C Shell Programming Lab

L	T	P	Credits	Marks
0	0	2	1	25

Course Code: CSE330

Instruction for Students: The students will be attending a laboratory session of 2 hours weekly and they have to perform the practical related to the following list.

1. a) Login to the system
b) Use the appropriate command to determine your login shell
c) Use the /etc./password file to verify the result of step b.
d) Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.
e) Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

2) a) Write a sed command that deletes the first character in each line in a file.
b) Write a sed command that deletes the character before the last character
in each line in a file.
c) Write a sed command that swaps the first and second words in each line in a file.

3. a) Pipe your /etc/passwd file to awk, and print out the home directory of each user.
b) Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.
c) Repeat
d) Part using awk

4. a) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.
b) Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.
c) Write a shell script that determines the period for which a specified user
is working on the system.

5. a) Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.
b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

6. a) Write a shell script that computes the gross salary of a employee according to the following rules:
i) If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.
ii) If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic. The basic salary is entered interactively through the key board.
b) Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.

7. a) Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.

b) Write shell script that takes a login name as command – line argument and reports when that person logs in
c) Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.

8. a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
c) Write a shell script to perform the following string operations:
i) To extract a sub-string from a given string.
ii) To find the length of a given string.

9. Write a C program that takes one or more file or directory names as command line input and reports the following information on the file:
i) File type
ii) Number of links
iii) Read, write and execute permissions
iv) Time of last access
(Note: Use stat/fstat system calls)

10. Write C programs that simulate the following unix commands:
a) mv
b) cp (Use system calls)

11. Write a C program that simulates ls Command (Use system calls / directory API)

DAV UNIVERSITY JALANDHAR

Course Title: Seminar
Paper Code: CSE332

L	T	P	Credits	Marks
0	0	4	2	50

The seminar is based on the research oriented topic. The evaluation of seminar is based upon the contents and presentation of a topic.

DAV UNIVERSITY JALANDHAR

SEVENTH SEMESTER

Course Title: System Simulation & Modeling

Paper Code: CSE401

L	T	P	Credits	Marks
4	1	0	4	100

Course Objective: This Course introduces
the simulation systems and their modelling applications to students. This course covers the different techniques of Simulation, General Principles and related issues.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various simulation technologies and their uses.

Part-A

Introduction to Simulation: System & System Environment, Components of a System, Discrete and Continuous Systems, Model of a System and Types of Models, Discrete Event System Simulation, Advantages and Disadvantages of Simulation, Areas of Application

Techniques of Simulation: Monte Carlo Method, Types of System Simulations, Real Time Simulation, Stochastic Variables, Discrete Probability Functions.

(14 Hours)

Part-B

General Principles: Concepts in Discrete Event Simulation, Event Scheduling /Time Advance Algorithm, List Processing, Using Dynamic Allocation & Linked List

Simulation Software: History of Simulation Software, Selection of Simulation Software, Simulation in C++, GPSS, Simulations Packages, Trends in simulation Software.

Statistical Models in Simulation: Useful Statistical Models, Discrete Distribution s, Continuous Distributions, Poisson Process, Empirical Distributions.

(14 Hours)

Part-C

Queuing Models: Characteristics of Queuing systems, Queuing Notation, Long Run Measures of performance of Queuing Systems, Steady State Behavior of infinite Population Markovian Models, Steady State Behavior of finite Population Models, Networks of Queues.

Random Number Generation: Properties of Random Numbers, Generation of Pseudo-Random Numbers, Techniques for Generating Random Numbers, Tests for Random Numbers, Inverse transform Techniques, Convolution Methods, and Acceptance –Rejection Techniques.

(14 Hours)

Part-D

Input Modeling: Data Collection, Identifying the Distribution with Data, Parameter Estimation, Chi – Square Test, Selecting Input Models with Data.

Verification & Validation of simulation Modeling: Model Building, Verification & Validation, Verification of simulation Models, Calibration & Validation of Models.

(14 Hours)

Refernce Books:

1. Gordon G, *"System Simulation",* PHI 2nd Edition 1998.
2. Deo Narsingh, *"System Simulation with Digital Computers",* PHI, New Delhi 1993.
3. Trivedi, K S. *"Probability and Statistics with Reliability,* Queuing and Computer Science Application", PHI
4. Subranranian, K R V and Sudaresan R Kadayam, *"System simulation: Introduction to GPSS"*, CBS, New Delhi 1993.
5. Feller,W*"An introduction to Probability Theory and its Applications,"* Val 182, Wiley Eastern Ltd. ND.

DAV UNIVERSITY JALANDHAR

Course Title: Compiler Design

L	T	P	Credits	Marks
4	1	0	4	100

Paper Code: CSE403

Course Objective: This course should provide the students with a fairly good concept of fundamental concepts and compiler design issues of programming languages and become familiar with major programming paradigms.
Learning Outcomes: After the completion of this course the participants understand similarities and differences between models and know when to use them and also learn designing techniques appropriate for each model.

PART-A

Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction.

Lexical analysis: interface with input, parser and symbol table, token, lexeme and patterns. Difficulties in lexical analysis. Error reporting. Implementation. Regular definition, Transition diagrams, LEX.

(14Hours)

PART-B

Syntax analysis: CFGs, ambiguity, associativity, precedence, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), YACC.

Syntax directed definitions: inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions.

(14Hours)

PART-C

Type checking: type system, type expressions, structural and name equivalence of types, type conversion, overloaded functions and operators, polymorphic functions.

Run time system: storage organization, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation.

(14Hours)

PART-D

Intermediate code generation: intermediate representations, translation of declarations, assignments, control flow, boolean expressions and procedure calls. Implementation issues.

Code generation and instruction selection: issues, basic blocks and flow graphs, register allocation, code generation, dag representation of programs, code generation from dags, peep hole optimization, code generator generators, specifications of machine.

(14 Hours)

Reference Books:

1. Aho, V. Sethi, R. and Ullman. J. D. *Compilers: Principles, Techniques and Tools* , Addison-Wesley, 1988.
2. Fischer and LeBlanc, R. Crafting *a Compiler* , Benjamin Cummings, 1991..
3. . Holub, C. *Compiler Design in C* , Prentice-Hall Inc., 1993.
4. Appel. *Modern Compiler Implementation in C: Basic Design* , Cambridge Press.
5. Fraser and Hanson. *A Retargetable C Compiler: Design and Implementation* , Addison-Wesley.

DEPARTMENTAL ELECTIVE-IV

Course Title: Mobile Computing
Paper Code: CSE407

L	T	P	Credits	Marks
3	1	0	3	75

Objectives: To impart knowledge of mobile and wireless computing systems and techniques.

Learning outcomes: - This course offers a good understanding of the concepts, methods and techniques of mobile computing and helps to make a good carrier in the field of telecommunication.

PART – A

Mobility: Issues, challenges, and benefits; Review of mobile and cellular communication technology; Review of distributed/network operating systems, ubiquitous computing. Global System for Mobile Communication (GSM) System Overview: GSM Architecture, Mobility Management, Network Signalling, GPRS.

(14Hours)

PART-B

Mobile IP Networks: Physical mobility, challenges, limits and connectivity, mobile IP and cellular IP in mobile computing. Mobile Transport Layer: Transport layer issues in wireless, Indirect TCP, Snoop TCP, Mobile TCP

(10Hours)

PART – C

Wireless LANs: Introduction to IEEE 802.11, Bluetooth technologies and standards. Mobile Adhoc Networks: Hidden and exposed terminal problems; Routing protocols: DSDV, DSR, AODV.

(10 Hours)

PART-D

Mobile Devices and OS: Various types of Devices, Operating System: PalmOS, WindowsCE, Windows Mobile. Application Development: WWW programming model, Development Environment for Mobile Devices.

(12 Hours)

Refernce Books:

1 Tanenbaum, A.S. *Computer Networks. 4th Ed.,* Pearson Education.
2 Milojicic, D., and Douglis, F. *Mobility Processes, Computers and Agents.* Addison Wesley.
3 Kamal, Raj. *Mobile Computing.* Oxford University Press.

Course Title: Internetworking Technologies

L	T	P	Credits	Marks
3	1	0	3	75

Paper Code: CSE409

Course Objective: The subject will give the knowledge of various internetworking components and techniques.
Learning Outcomes: After the completion of this course the participants are able to design the different networks.

Part-A
Introduction to Internetworking: Internetworking Basics, Ethernet Protocol, FDDI Protocol, Token Ring / IEEE 802.5 Protocol

(4Hours)
WAN Technologies: Frame Relay, High Speed Serial Interface, Point to Point Protocol, Switched Multimegabit Data Service, Asymmetric Digital Subscriber Line, Synchronous Data Link Control & Derivatives

(5Hours)

Part-B
Bridging and Switching: ATM Switching, Data-Link Switching, LAN Switching, Tag Switching, Mixed Media Bridging, Source- Route Bridging, Transparent Bridging

(5Hours)
Network Protocols: Apple Talk, DECNET, SNA, NETWARE, Banyan Vines, Xerox Network Systems

(5Hours)
Part-C
Routing Protocols: Border Gateway, IGRP & Enhanced IGRP, Internet Protocol Multicast, NLSP, OSPF, Resource Reservation Protocol, RIP, Simple Multicast Routing Protocol**Network Management Basics:** IBM Network Management, Remote Monitoring, Simple Network Management Protocol

(12Hours)

Part-D
Introduction to Troubleshooting: Symptoms, Problems and Solutions, General Problem Solving Models, Preparing for Network Failures, Use of Some Troubleshooting Tools

(6Hours)
Handling Troubleshooting for Some Important Components: Ethernet, FDDI and Token Ring, TCP/IP, Apple talk, DECNET, SNA & NETWARE, Banyan Vines & XNS, Serial lines & WAN Connections, Bridging and Switching.

(**6Hours)**

Reference Books:

1. Ford, Merilee. *Internetworking Technologies Handbook.* Ed Cisco Press, 2004.
2. Downes, Kevin. *Internetworking Troubleshooting Handbook.* Ed Cisco Press, 2004.
3. Tanenbaum, Andrew S. *Computer Networks.* Pearson Education 4th Edition, 2003.

4. Kurose, James F, and W Ross Keith. *Computer Networking.* Pearson Education, 2002.
5. Nance. *Introduction to Networking.* PHI 4th Edition, 2002.

Course Title: Soft Computing

L	T	P	Credits	Marks
3	1	0	3	75

Paper Code: CSE411

Course Objective: This course should provide the basic knowledge of different soft computing techniques and different problem solving techniques.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of the soft computing techniques and their implementation. Also they learn intelligent systems and various learning techniques.

Part-A

Artificial Neural Networks: Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning – Back propagation networks - Kohnen's self-organizing networks - Hopfield network.

(10 Hours)

Part-B

Fuzzy Systems: Fuzzy sets and Fuzzy reasoning - Fuzzy matrices - Fuzzy functions - Decomposition -Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making.

(10 Hours)

Part-C

Neuro - Fuzzy Modelling: Adaptive networks based Fuzzy interface systems - Classification and Regression Trees -Data clustering algorithms - Rule based structure identification - Neuro-Fuzzy controls -Simulated annealing – Evolutionary computation.

(10 Hours)

Part-D

Genetic Algorithms: Survival of the Fittest - Fitness Computations - Cross over - Mutation - Reproduction -Rank method - Rank space method.

(6Hours)

Soft computing and Conventional AI: AI search algorithm - Predicate calculus - Rules of interference – Semantic networks -Frames - Objects - Hybrid models - Applications.

(5Hours)

Reference Books:

1. Jang J.S.R., C.T. Sun, and Mizutani E. *Neuro-Fuzzy and Soft computing.* Prentice Hall, 1998.
2. Fausett, Laurene. *Fundamentals of Neural Networks.* Prentice Hall, 1994.
3. Klir, George J., and Bo Yuan. *Fuzzy sets and Fuzzy Logic.* Prentice Hall, USA 1995.
4. Nelsson, N. J. *Artificial Intelligence - A New Synthesis.* Harcourt Asia Ltd., 1998.
5. Goldberg, D.E. *Genetic Algorithms: Search, Optimization and Machine Learning.* Addison Wesley, 1989.

Course Title: High Speed & Broadband Network
Paper Code: CSE413

L	T	P	Credits	Marks
3	1	0	3	75

Objective: - To impart knowledge of High speed broadband network
Learning outcomes: - It will help to enhance knowledge in the field of broadband network.

Part-A

Introduction: Introduction to modern networking trends Optical networking: principles and challenges; evolution of optical networks, wavelength routed network, wavelength division multiplexing (WDM) network technology, sub-carrier multiplexing optical networks.

(8 Hours)

Part-B

Enabling technologies: optical transmitter, optical fiber, optical receivers, optical amplifiers, optical switching elements, optical cross-connects (OXC), multiplexers/demultiplexers, wavelength routers, optical wavelength converters, WDM network test beds. Network architecture, IP over WDM. Broadcast optical networks: single and multiple hop networks, channel sharing and multi-casting, shared channel multicasting network-GEMNET, performance evaluation for unicast and multicast traffic, experimental WDM networks.

(15 Hours)

Part-C

Wavelength routed networks: virtual topology design, routing and wavelength assignment, circuit switched and packet switched approaches, performance evaluation. Reconfiguration in WDM network, network control and management, network optimization, design considerations. Multi wavelength star and ring networks

(10Hours)

Part-D

Photonic switching, optical TDM (OTDM) and optical CDMA (O-CDMA) networks, next generation optical networks. Protection and Restoration on WDM networks Network Flow problem and Simulations Control and signaling schemes in WDM networks GMPLS Deeper Protection/Restoration issues on WDM networks Optical Network Security

(12 Hours)

Refernce Books:

1. Stern, Thomas E. *Multi wavelength Optical Networks: A Layered Approach.* Krishna Bala.
2. Cameron, Debra. *Optical Networking.* Wiley, December 2001.
3. Vivek Alwayn. *Optical Network Design and Implementation.* Cisco Press.
4. Gumaste, Ashwin, and Antony, Tony. *DWDM Network Designs and Engineering Solutions*, Pearson Education.

5. Gurusamy, Mohan C. Siva Murthy. *WDM Technology and Issues in WDM Optical Networks.* Prentice Hall Publications, 2002.

DEPARTMENTAL ELECTIVE-V

Course Title: Natural Language Processing
Paper Code: CSE415

L	T	P	Credits	Marks
4	0	0	4	100

Objective: - Introduction to the methods and techniques of Natural Processing- semantics, pragmatics, Applications of Natural Language Processing.
Learning outcomes: - To learn how to make interface between human and machine & Semantics knowledge Representation approaches.

Part-A
Components of natural language processing: lexicography, syntax, semantics, and pragmatics: word level representation of natural languages prosody & natural languages. Formal languages and grammars: Shomsky Hierarchy; Left Associative Grammars. Ambiguous Grammars. Resolution of Ambiguities.

(14 Hours)

Part-B
Semantics knowledge Representation: Semantic Network Logic and inference. Pragmatics, Graph Models and Optimization. Prolog for natural semantic.

(14 Hours)

Part-C
Computation Linguistics: Recognition and parsing of natural language structures: ATN & RTN; General techniques of parsing: CKY, Earley& Tomita's Algorithm.

(14 Hours)

Part-D
Application of NLP: Intelligent Work Processors: Machine Translation; User Interfaces; Man-Machine Interfaces: Natural language Querying Tutoring and Authoring Systems. Speech Recognition Commercial use of NLP.

(13 Hours)

Reference Books:-

1. Arbib, Mdlj, and faury, K. *Introduction to formal language Theory*, Springer Verlag. 1988.
2. Allen, J. *Natural Language understanding*. Benjamin/Cunnings, 1987.
3. Gazder, G. *Natual Language processing in Prolog*. Addison Wesley, 1989.

Course Title: Information Retrieval System
Paper Code: CSE417

L	T	P	Credits	Marks
4	0	0	4	100

Objective: - To impart knowledge of information retrieval system
Learning outcomes: - To enhance knowledge in Information visualization technologies.

Part –A

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses. Information Retrieval System Capabilities: Search, Browse, Miscellaneous Cataloguing and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.

(12 Hours)

Part-B

Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure. Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages, Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

(15 Hours)

Part-C

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext.

(13 Hours)

Part-D

Information Visualization: Introduction, Cognition and perception, Information visualization technologies. Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

(13 Hours)

Refernce Books:

1. Kowalski, Gerald, and Maybury, Mark T. *Information Retrieval Systems: Theory and Implementation,* Kluwer Academic Press, 1997.
2. Frakes, W.B., and Yates, Ricardo Baeza. *Information Retrieval Data Structures and Algorithms,* Prentice Hall, 1992.
3. Yates. *Modern Information Retrieval.* Pearson Education.
4. Korfhage, Robert. *Information Storage & Retrieval*. John Wiley & Sons.

Course Title: Data Compression
Paper Code: CSE419

L	T	P	Credits	Marks
4	0	0	4	100

Objective: - To impart knowledge of Data Compression
Learning outcomes: - To know different types of data compression techniques.

Part-A
Introduction: Compression Techniques: Loss less compression, Lossy Compression, Measures of prefonnance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

(12 Hours)

Part-B
Huffman coding: The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, encoding procedure, decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Hoffman coding: Loss less image compression, Text compression, Audio Compression. Arithmetic Coding: Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary.

(15 Hours)

Part-C .
The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to- front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markoy Compression.

(14 Hours)

Part-D
Mathematical Preliminaries for Lossy Coding: Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization. Vector Quantization: Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm, and Tree structured Vector Quantizers. Structured Vector Quantizers. **(13 Hours)**

Reference Books:

1. Sayood, Khalid. *Introduction to Data Compression*. Morgan Kaufmann Publishers.
2. Nelson, Mark. *The data compression book: Featuring fast, efficient data compression Techniques in C.* M&T Books.
3. Nelson, Mark, and Gailly, Jean-loup. *The Data Compression Book 2nd edition*. M&T.
4. Hankerson, D. and Johnson, P. D. and Harris,G. A. *Introduction to Information Theory and Data Compression*. CRC Press, 1998.
5. Held, G., and Marshall, T. R. *Data and Image Compression*: *Tools and Techniques*. Wiley, 1996.

Course Title: Neural Networks & Fuzzy Logic
Paper Code: CSE421

L	T	P	Credits	Marks
4	0	0	4	100

Objective: - To impart knowledge of neural network and fuzzy logic
Learning outcomes: - After completion of this subject student will able to make various types of Projects and will help to make carrier in the field of artificial intelligence.

PART-A
Neural networks: introduction, neural networks, supervised or unsupervised learning, feed forward network, Hopfield network Neural network models: neural network models, layers in neural network and their connections. Instar, out star, weights on connections, threshold function, application- Ada line and mada line Back propagation: feed forward back propagation network- mapping, layout, training, BPN applications

(15 Hours)

PART-B
Learning and training: objectives of learning, Hebb's rule, delta rule, supervised learning, unsupervised networks, learning vector quantize, associative memory models , one-shot learning, resonance, stability, training and convergence .

(14 Hours)

PART-C
Fuzzy Logic: Introduction, fuzzy sets, fuzzy operations, fuzziness in neural networks, neural trained fuzzy system BAM- bidirectional associative memory, inputs and outputs, weights and training. FAM-fuzzy associative memory, association, FAM neural networks, encoding.

(14 Hours)

PART-D
Adaptive Resource theory- network for ART, processing in ART Kohen Self Organizing Map- Competitive learning, lateral inhibition, training law for Kohen network, implementation, applications to pattern recognition Application of fuzzy Logic: Fuzzy databases and quantification, fuzzy control, designing fuzzy logic controller.

(13 Hours)

Reference Books:

1. Rao, Vallinu B. and Rao, Hayagriva. *Neural networks and fuzzy Logic, second edition,* BPB Publication.
2. Riza, Berkan C. Trubatch L, Sheldon, *Fuzzy Systems design Principle*. IEEE Press: Standard publisher's distributers.
3. James, Freeman A. and David Skapura M. *Neural networks algorithms, applications and programming Techniques*. Pearson Education.
4. Anderson, James A. *Introduction to neural N/W.* PHI 5. Neural N/W Freeman Publisher: Addison Wesley.

DEPARTMENTAL ELECTIVE –VI

L	T	P	Credits	Marks
3	1	0	3	75

Course Title: Virtual Reality

Paper Code: CSE423

Course Objective: This course offers a good understanding of the various functional Trackers, Navigation, and Gesture Interfaces and knowledge of 3D Sprites, animated 3D sprites and particle systems.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the working of the each functional of virtual reality and finally the student will be exposed to the recent trends in 3D Sprites, animated 3D sprites and application.

Part-A

Introduction: The three I's of virtual reality, commercial VR technology and the five classic components of a VR system.

Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation, interfaces and gesture interfaces.

Output Devices: Graphics displays, sound displays & haptic feedback.

(14Hours)

Part-B

Modeling: Geometric modeling, kinematics modeling, physical modeling, behaviour modeling, model management.

(10Hours)

Part-C

Human Factors: Methodology and terminology, user performance studies, VR health and safety issues.

Applications: Medical applications, military applications, robotics applications.

(10Hours)

Part-D

VR Programming-I: Introducing Java 3D, loading and manipulating external models, using a lathe to make shapes.

VR Programming-II: 3D Sprites, animated 3D sprites, particle systems.

(11Hours)

Reference Books

1. Burdea, Gregory C., and Coiffet, Philippe. *Virtual Reality Technology, Second Edition*, John Wiley & Sons, Inc.
2. Sherman, William R. and Craig, Alan. *Understanding Virtual Reality, interface, Application and Design*, Elsevier: Morgan Kaufmann.
3. Fleming, Bill *3D. Modeling and surfacing*, Elsevier: Morgan Kauffman.
4. Eberly, H, David. *3D Game Engine Design*, Elsevier.
5. Vince, John. *Virtual Reality Systems*, Pearson Education.

Course Title: Optical Networks Design and Implementation

Paper Code: CSE425

L	T	P	Credits	Marks
3	1	0	3	75

Course Objective: The objective of this course is to gain an understanding of various issues in designing an optical network. Topics include SONET/SDH, wavelength division multiplexing, framing techniques, Parametric Process**,** protection and restoration, and optical packet switching.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of Various Optical topologies and designing stagey of Optical Communication Systems.

Part-A

Introduction: Historical perspective, Fibre Characteristics, Group Velocity Dispersion, Different propagation Regimes, Dispersion Induced pulse broadening, higher order Dispersion, Dispersion Slope, Growth of optical communication systems to its current scenario. (12 Hours)

Part-B

Fiber non linearties: Fiber nonlinearties: SPM and XPM Induced Nonlinear effects, Nonlinear Birefringence Effects, XPM induced Modulation Stability, spectral & temporal Effects, XPM induced Non reciprocity, Implications for Optical Communication Systems. (12 Hours)

Part-C

Parametric Process: Four Wave Mixing, Second harmonic Generation Parametric Gain, Phase Matching Techniques, parametric Amplifications & its applications, Dispersion Management**.** (12 Hours)

Part-D

Optical Networks: Introduction to optical networks, LAN, WAN and MAN, Various Optical topologies, Wavelength Routers, wavelength Converters, Survivability and multicast in optical networks. (12 Hours)

Reference Books:

1. Alwayn. *Optical Network Design and Implementation.* Cisco Press.
2. Dutton. *Understanding Optical Communication.* IBM publications.
3. Myneav. *Optical Fibre Technology*. Pearson.
4. Agarwal, G.P. *Fiber optic communication systems 2nd Edition.* New York: John Wiley & Sons.
5. Keiser, G. *Optical fiber communication Systems.* New York: McGraw-Hill, 2000.

Course Title: Grid Computing
Paper Code: CSE427

L	T	P	Credits	Marks
3	1	0	3	75

Course Objective: This Course introduces the Grid Computing and their applications to students. This course covers the different compression standards used in business, some current technology and related issues.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various technical and management issues regarding Grid business.

Part-A

Introduction: Fundamentals of Grid Computing, Types of resources, Problems in Grid computing, Global Distribution System for Grid Computing, Ecosystem of the Grid, Early Grid Activities. **(12Hours)**

Part-B

Grid Architecture: Autonomic Computing, Service-Oriented Architecture and Grid, Semantic Grids, Merging the Grid Services Architecture with the Web Services Architecture. Open Grid Services Architecture (OGSA)

Grid Computing in Business: Grid-specializing vendors and niche vendors, Grid resource providers, Departmental grids, Enterprise grids, Partner grids, Open grids. **(11Hours)**

Part-C

Grid software components: Management components, Donor software, Submission software, Distributed grid management, Schedulers, Enrolling and installing grid software, Logging onto the grid, Logging onto the grid

Grid administration: Planning, Installation, Managing enrollment of donors and users, Certificate authority, Resource management, Data sharing. **(10Hours)**

Part-D

Technical and Management Issues: Building and selling Grid business case, transition period management, Role of consultants, Risk Mitigation, Organizational security requirements and firewalls, Authorization scalability and federations.

Case Study: The MCNC Enterprise Grid: Service, Customers, Financials, Resources, Location. **(12Hours)**

Reference Books:

1. Joseph, Joshy. and Fellenstein, Craig. *Grid Computing.* IBM Press.
2. Li, Maozhen. and Baker, Mark. *The Grid: Core Technologies.* John Wiley & Son's Publisher.
3. Ahmar Abbas. *Grid Computing: Practical guide to technology and applications.* Publisher: Charles River Media.
4. Pawel, Plaszczak, and Rich, Wellner. *Grid Computing: The Savvy Manager's Guide.* Morgan Kaufmann Publishers.
5. Marios, D. Dikaiakos. *Grid Computing",* Spinger.

Course Title: Unified Modelling Language

L	T	P	Credits	Marks
3	1	0	3	75

Paper Code: CSE429

Course Objective: This Course introduces the object oriented design and modelling. It provides the various diagrams to represent and design the various systems.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various models and diagrams to design the system blueprints.

Part-A

Object Oriented Design and Modelling: Object Oriented Fundamentals, Objects and object classes, object oriented design process, importance of modelling, principles of modelling, object oriented modelling.

Introduction to UML: Conceptual model of UML, building blocks of UML, Mechanisms in UML, architecture, software development life cycle.

(12Hours)

Part-B

Basic Structural Modelling: Classes, relationships, common mechanisms, class and object diagrams.

Advanced structural Modelling: Advanced classes, advanced relationships, Interfaces types and roles, packages, instances and object diagrams.

(12Hours)

Part-C

Collaboration Diagrams and Sequence Diagrams: Terms, concepts and depicting a message in collaboration diagrams. Terms and concepts in sequence diagrams. Difference between collaboration and sequence diagram. Depicting synchronous messages with/without priority call back mechanism.

Basic behavioral modelling: Interactions, use cases, Use Case Diagrams, Interaction Diagrams and activity diagrams.

(12Hours)

Part-D

Advanced behavioral modelling: Events and signals, state machines, process and threads, time and space, state chart diagrams.

Architectural Modelling: Terms, Concepts, examples, Modelling techniques for component diagrams and deployment diagrams.

(12Hours)

Reference Books:

1. Booch, Grandy, Rumbough, James, and Jacobson, Ivar. *The Unified Modelling Language User Guide*. Pearson Education, 2002.
2. Sommerville, Ian. *Software Engineering Sixth Edition.* Pearson education, 2003.
3. Jones, Meilir Page. *Fundamentals of Object Oriented Design in UML*. Addison Wesley, 2000.

Course Title: System Simulation and Modeling Laboratory

Paper Code: CSE431

L	T	P	Credits	Marks
0	0	4	2	50

Implementation of the followings Simulation problems in GPSS or any High Level Programming Language

1. Computer Generation of Random Numbers.
2. Testing Random Number Generators.
3. Monte-Carlo Simulation.
4. Simulation of Single Server Queuing System.
5. Simulation of Two-Server Queuing System.
6. Simulation of Inventory System.
7. Simulation of Telephone System.

Course Title: Minor Project

Paper Code: CSE433

L	T	P	Credits	Marks
0	0	4	2	50

The minor project may be a

- Database
- Application software
- System software
- Multimedia
- Web Related

A complete project report must be submitted along with softcopy of project. Project report may include requirements of project, Flow Chart, DFDs, coding and test results.

DAV UNIVERSITY JALANDHAR

EIGHTH SEMESTER

Course Title: Information Security Systems
Paper Code: CSE402

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: The aim of this course is to provide attendees with a thorough understanding of the issues associated with the design, provision and management of security services for modern communication and information systems. Students will learn the different aspects of information and network security and you will be able to speak about a multitude of security attacks and the defensive strategies used to combat them.

Learning Outcomes: After completing this course the student should be able to:

- Describe the fundamental concepts of information system security.
- Understand the following terms: security policy, host based security, firewall, and packet filtering and intrusion detection.

PART-A

Overview: Services, Mechanisms, and Attacks, the OSI Security Architecture, A Model for Network, Security.
Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.
Block Ciphers And The Data Encryption Standard: Simplified DES, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operation.
Introduction To Finite Fields: Groups, Rings, and Fields, Modular Arithmetic, Euclid's Algorithm, Finite Fields of the Form GF(p), Polynomial Arithmetic, Finite Fields of the Form GF(2n).

(12Hours)

PART-B

Advanced Encryption Standard: Evaluation Criteria for AES, The AES Cipher.
Contemporary Symmetric Ciphers: Triple DES, Blowfish, RC5, Characteristics of Advanced Symmetric Block Ciphers, RC4 Stream Cipher.
Confidentiality Using Symmetric Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation.
Public-Key Encryption and Hash Functions: Introduction to Number Theory: Prime Numbers, Format's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms.
Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems, the RSA Algorithm, Recommended Reading and Web Site, Key Terms, Review Questions, and Problems.
Key Management and Other Public-Key Cryptosystems: Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

(12Hours)

PART-C

Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs.

Hash Algorithms: MD5 Message Digest Algorithm, Secure Hash Algorithm, RIPEMD-160, and HMAC.
Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols, Digital Signature Standard.

(12Hours)

PART-D

Network Security Practice: Authentication Applications: Kerberos, X.509 Authentication Service, Electronic Mail Security: Pretty Good Privacy, S/MIME. IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Key Management, Web Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.
System Security: Intruders: Intruders, Intrusion Detection, Password Management, Malicious Software: Viruses and Related Threats, Virus Countermeasures, Firewalls: Firewall Design Principles, Trusted Systems.

(12Hours)

Reference books:

1. Stallings, William. *Cryptography and network Security.* Pearson Education, 2003.
2. Trappe, and Washington. *Introduction to Cryptography with Coding Theory.* Prentice-Hall 2001.
3. Stinson, D. *Cryptography: Theory and Practice.* Second Edition: Chapman & Hall, 2002.
4. Perlman, Kaufman, and Speciner. *Network Security.* Prentice-Hall Second Edition, 2001.
5. Whitman, Michael E. *Principles of information Security.* Cen gage Learning, New Delhi.

Course Title: Image Processing and Pattern Recognition
Paper Code: CSE404

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: The students develop understanding of use of statistical analysis for multidimensional data. It also give fundamentals to understand data analysis from raw measurement values to higher level decision making in colour and image context. The students develop basic understanding for difference between analysis with or without a priori data as well as ways to evaluate results.

Learning Outcomes: On completion of this course the students will be able to:
Understand principles how multidimensional statistical methods differ from one dimensional method. Program some basic clustering and classification methods and test their validity.

PART-A

- **Introduction:** Digital Image Processing and Applications – Image Representation and Modeling – Image Enhancement – Image Restoration – Image Analysis – Image Data Compression **5 hours**
- **Digital Image Fundamentals:** Elements of Visual perception – A simple Image Model – Sampling and Quantization – Some Basic Relationship between Pixels **5 hours**
- **Image Transforms:** Two Dimensional Orthogonal and Unitary Transforms – Properties of Unitary Transforms – One Dimensional DFT – Two Dimensional DFT – Cosine Transforms – Sine transforms – Hadamard Transforms – Haar Transforms – Slant transforms. **8 hours**

PART-B

- **Image Enhancement:** **4 hours**
  Point Operations – Histogram Modeling – Spatial Operations – Transform Operations.
- **Image Restoration and Compression:** Image observation models – Inverse and Wiener Filtering – Pixel Coding – Predictive techniques – Transform Coding of Images **4 hours**

PART-C

- **Statistical and Non – Parametric Decision Making:** Applications of Pattern Recognition – Baye's Theorem – Multiple Features – Conditionality Independent Features – Decision Boundaries – Unequal Costs of Error – Estimation of Error Rates – Kernel and Window Estimator – Nearest Neighborhood Classification Techniques – Adaptive Decision Boundaries – Adaptive Discriminant Functions **9 hours**
- **Clustering:** Introduction – Hierarchical Clustering – Partitioned Clustering **4 hours**

PART-D

- **Artificial Neural Networks:** Introduction – Nets without Hidden Layers – Nets With Hidden Layers – The Back Propagation Algorithms – Hopfield Nets – Classifying Sex From Facial Images **5 hours**

Reference Books:

1. Jain, Anil K. *Fundamentals of Digital Image Processing*. PHI.
2. Gose, Earl, and Jost, Richard Johnson Baugh Steve. *Pattern Recognition and Image Analysis*, PHI.
3. Gonzalez, Rafael C, and Woods, Richard E. *Digital Image Processing,* Addison – Wesley.
4. AHMED, M. A. SID. *Image Processing Theory Algorithms and Architecture.* McGraw Hill Inc.

DAV UNIVERSITY JALANDHAR

Course Title: Parallel Computing

Paper Code: CSE406

L	T	P	Credits	Marks
3	0	0	3	75

Objectives: To impart knowledge of parallel computing systems and techniques.
Learning outcome: - Student will able to find parallelism approaches and use of parallel programming.

Part-A
Introduction: Paradigms of parallel computing: Synchronous - vector/array, SIMD, Systolic; Asynchronous- MIMD, reduction paradigm. Hardware taxonomy: Flynn's classifications, Handler's classifications. Software taxonomy: Kung's taxonomy, SPMD.

(8 Hours)

Part-B
Abstract parallel computational models: Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one, Sorting network, Interconnection RAMs. Parallelism approaches - data parallelism, control parallelism.

(12 Hours)

Part-C
Performance Metrices: Laws governing performance measurements. Metrices - speedups, efficiency, utilization, communication overheads, single/multiple program performances, benchmarks. Parallel Processors: Taxonomy and topology - shared memory mutliprocessors, distributed memory networks. Processor organization - Static and dynamic interconnections. Embeddings and simulations

(12 Hours)

Part-D
Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming. Scheduling and Parallelization: Scheduling parallel programs. Loop scheduling. Parallelization of sequential programs. Parallel programming support environments

(13 Hours)

Reference Books:

1. Quinn, M. J. *Parallel Computing: Theory and Practice*, New York: McGraw Hill, 1994.
2. Lewis, T. G. and Rewini, H. El. *Introduction to Parallel Computing.* New Jersey:Prentice Hall, 1992.
3. Lewis, T. G. *Parallel Programming: A Machine-Independent Approach*. Los Alamitos: IEEE Computer Society Press, 1994.
4. Akl, S.G. *Design and Analysis of Parallel Algorithms*, Prentice Hall, 1989.
5. Akl, S.G. *Parallel Sorting Algorithm.* New York: Academic Press, 1984.

DAV UNIVERSITY JALANDHAR

DEPARTMENTAL ELECTIVE- VII

Course Title: Cyber Laws And IPR
Paper Code: CSE408

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This syllabus presents the meaning and definition of cybercrime, the legislation in India dealing with offences relating to the use of or concerned with the abuse of computers or other electronic gadgets. The Information Technology Act 2000 and the I.T. Amendment Act 2008 have been dealt with in detail and other legislations dealing with electronic offences have been discussed in brief.

Learning Outcomes: Upon successful completion of this course, students will be aware of present cyber laws, Cyber Crimes, Cyber Security, Criminal Liability, Corporate policies.

PART-A

Cyber laws: Introduction to the Cyber World and Cyber Law, Information Technology Act, 2000 –Digital Signature; E-Governance; Regulation of Certifying Authorities; Duties of pub scribers; Penalties and Adjudications; Offences under the Act; Making of Rules and Regulations etc.

Cyber Crimes Introduction –computer crime and cybercrimes; Classification of cybercrimes. Cyber forensic, Cyber criminals and their objectives Kinds of cybercrimes – cyber stalking; cyber pornography; forgery and fraud; crime related to IPRs; Cyber terrorism; computer vandalism etc

(11Hours)

PART-B

Cyber Security: Cyber Security and its problem-Intervention Strategies: Redundancy, Diversity and Autarchy. Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Losing

(11Hours)

PART-C

Copy Right: Source of risks, Pirates, Internet Infringement, air Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, Technology expanding privacy rights.

Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence. Information security policies and procedures: Corporate policies- Tier 1, Tier 2 and Tier3 policies -process management-planning and preparation-developing policies-asset classification policy developing standards**.**

(15Hours)

PART-D

Corporate policies- Tier 1, Tier 2 and Tier3 policies -process management-planning and preparation-developing policies-asset classification policy developing standards.

(8Hours)

Reference:

1. Rosenoer,Jonathan. *Cyber Law: The law of the Internet*. Springer, 1997.
2. Grady, Mark. And Peltier, F Fransesco Parisi Thomas R. *The Law and Economics of Cyber Security.* Cambridge University Press, 2005.
3. Knapp, Kenneth J. *Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions.* IGI Global, 2009.
4. Peltier, Thomas R Justin Peltier, and blackley, John. "*Information Security Fundamentals",* 2nd Edition, Prentice Hall, 1996.

DAV UNIVERSITY JALANDHAR

Course Title: MODELING AND SIMULATION OF NETWORKS

Paper Code: CSE410

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: The subject will provide the knowledge of various networking techniques and routing mechanism of data networks.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various routing protocols used in networking and the working strategy of different components.

Part-A

Delay Models in Data Networks: Queuing Models, M/M/1, M/M/m, M/M/m/m and other Markov System, M/G/1 System, Networks of Transmission Lines, Time Reversibility, and Networks of Queues.

(10Hours)

Part-B

Multi-access Communication: Slotted Multi-access and the Aloha System, Splitting Algorithms, Carrier Sensing, Multi-access Reservations, Packet Radio Networks.

(11Hours)

Part-C

Routing in Data Networks: Introduction, Network Algorithms and Shortest Path Routing, Broadcasting Routing Information: Coping with Link Failures, Flow models, Optimal Routing, and Topological Design, Characterization of Optimal Routing, Feasible Direction Methods for Optimal Routing, Projection Methods for Optimum Routing, Routing in the Codex Network.

(12Hours)

Part-D

Flow Control: Introduction, Window Flow Control, Rate Control Schemes, Overview of Flow Control Practice, Rate Adjustment Algorithms.

(12Hours)

Reference Books:

1. Bertsekas, Dimitri, and Gallager, Robert. *Data Networks, 2nd edition*. Prentice Hall of India, 2003.
2. Stallings, William. *High-Speed Networks and Internets.* Pearson Education (Asia) Pte. Ltd, 2004.
3. Walrand, J. and Varaya, P. *High Performance Communication Networks.* 2nd edition, Harcourt India Pte. Ltd. & Morgan Kaufman, 2000.
4. Walrand, Jean, and Bagchi, Kallol. Zobrist, George W. *Network performance modeling and simulation.* Gordon and Breach Science Publishers, Inc. Newark, NJ, USA.
5. Mir, Nader F. *Computer and Communication.* Prentice hall.

DAV UNIVERSITY JALANDHAR

Course Title: Database Administration
Paper Code: CSE412

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course uses the latest database tools and techniques to prepare the student to understand, develop, and manage more advanced database applications. Students gain considerable hands-on experience with the Oracle family of databases, and define, design, and implement databases. Students learn how to use object-oriented technologies to design relational databases, and how to design relational databases to support object-oriented applications.

Learning Outcomes: Upon completion of this course the student will be able to: • properly install, configure and tune a database • properly administer servers and server groups • properly manage and optimize schemas, tables, indexes, and views •

PART-A

- **Introduction to Database**: Client/Server Concept, Types of Databases, Relational Vs. Flat File Database. Background of SQL Server, Versions of SQL Server and Clients Supported by SQL Server **5 hours**
- **SQL Server 2000:** Installation & Configuring SQL Server: Installing SQL Server 2000, Unattended Installations, SQL Server Services. Configuring SQL Server Network Protocol Settings. Installing SQL Server Clients. **5 hours**

PART-B

- **SQL Server Tools and Utilities**: Managing SQL Server with Enterprise Manager, Query Analyzer, SQL Server Groups. Tools Menu, Action Menu. Introduction to Transact – SQL (T-SQL) **5 hours**
- **Managing Database**: Creating Database, Database File Placement (RAID 0, RAID 1 RAID 5), Creating Database using T-SQL and Enterprise Manager. Altering, Renaming, Dropping Database. Creating Objects in Database: Tables, Views, Constraints, Indexes. **6 hours**

PART-C

- **Managing Security:** Understanding Security Modes, Windows Authentication Modes, Mixed Mode, SQL Server Logins, Windows Logins, Fixed Server Logins, Creating Users, Database Roles, (Grant, Revoke ,Deny) N-Tier Security.. **6 Hours**
- **Database Backups and Restore:** Copying Database with Copy Database Wizard. SQL Database Backup Modes (Full, Differential, Transactional Log Backup). Backing Up of the Database. Restoring Database. DTS: Its meaning, DTS Packages. DTS Storage and Designer. **6 hours**

PART-D

- **SQL Server Agent:** Configuring Understanding Alerts, Jobs and Events. Creating Jobs: Multi Server Jobs, Creating, Editing and Deleting of Jobs. SQL Server and IIS. Understanding the Static Page and Dynamic Pages of the Internet. Internet Database Connector **6 hours**
- **Replication and Performance Optimization**: Overview of Replication. Installing. Types of Replication: Merge Replication, Snapshot Replication, Transactional Replication. Using Windows System Monitor: Monitor with SQL Profiler and Query Analyzer. Optimization Techniques: Queries and Stored Procedure, Proper Indexing, Locks and Defragmentation **6 hours**

Reference Books:

1. Kreines, David ,. and Laskey, Brian. *Oracle Database Administration.* Oreilly Media.
2. Mullins, Craig S. *Database Administration: The Complete Guide to Practices and Procedures.* Powell's books.
3. Rajan, Claire. *Oracle 10g Database Administrator II: Backup/recovery & Network Administration.* Thomson.
4. Alapati, Sam R. *Expert Oracle9i Database Administration.* Apress,2003.
5. Wood, Dan. *Begininig SQL Server 2005 Administration.* Wrox publication,2009.

DAV UNIVERSITY JALANDHAR

Course Title: Network Management Systems
Paper Code: CSE414

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: Appreciate the need for inter operable network management. Understand general concepts and architecture behind standards based network management. Understand concepts and terminology associated with SNMP and TMN

Learning Outcomes: Critically analyses evaluate and explain the concepts, architectures and operation of Network Management systems. Critically reflect on the changing needs and requirements of Network Management in Industrial contexts.

PART-A

- Data communications and Network Management Overview : Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management **9 hours**
- **SNMPV1 Network Management**: Organization and Information and Information Models.. **3 hours**
- **Managed network** : Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model **3 hours**
- **SNMPv1 Network Management**: Communication and Functional Models. The SNMP Communication Model, Functional model. **3 hours**

PART-B

- **SNMP Management:** SNMPv2 : Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility With SNMPv1. **5 hours**
- RMON : What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON **5 hours**
- Telecommunications Management Network: Why TMN? , Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, mplementation Issues. **5 hours**

PART-D

- Network Management Tools and Systems:Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.. **7 hours**
- Web-Based Management:NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management. **8 hours**

References Books:

1. Morris. *Network management*. Pearson Education.
2. Burges, Mark. *Principles of Network System Administration*, Wiley Dreamtech.
3. Paul. *Distributed Network Management.* John Wiley.

OPEN ELECTIVE (OE)-I

Course Title: Organisational Behaviour

L	T	P	Credits	Marks
3	0	0	3	75

Paper Code: MGT452

Course Objective: The course aims at studying the individual and group behavior in the context of organization.

Learning Outcomes: After the completion of the course the participant will be able to better comprehend the personalities of others. The participant will also learn about designing the structure of organizations, how to handle situations of conflict as well as learn about his/her own self. It will make the participant more empathetic towards others.

UNIT-A

- Introduction to human behavior, perception, attitudes and job satisfaction. 2 hours
- Concepts of Personality, Self-awareness, Perception and Attribution, Learning, Values and Attitudes and their determinants, theories 2 hours
- MBIT and big five model, Hofstede's cultural dimensions theory 2 hours
- Concept of teams, Foundations of Team Dynamics, types of teams, teams in modern workplace 2 hours
- Group process: group and intergroup behavior, group decision making 3 hours
- Interpersonal group dynamics 2 hours
- Skills for Managing Teams: Communication, Conflicts and negotiation, Power & Influence, Group Development and Cohesiveness, Team Performance and Decision Making. 2 hours

UNIT-B

- Concept of Leadership Theories and Perspectives on Effective Leadership-Power and Influence, Charismatic and Transformational Leadership power distribution in organization, organizational politics: concept, consequences, reasons and management of political behavior, 3 hours
- Work stress: causes, organizational and extra organizational stressor, individual and group stressor, effect of stress, stress coping strategies. 2 hours
- Conflict and inter-group behavior: sources of conflict, types of conflict, functional and dysfunctional aspects of conflict, approaches to conflict management 2 hours

UNIT-C

- Organizational culture: functions of OC, creating and sustaining of OC, development and implications of OC 4 hours
- Organizational effectiveness: concept and approaches to OE, factors in OE, effectiveness through adaptive coping cycle 2 hours
- 0rganizational health development 2 hours

- Emotional intelligence. 2 hours

UNIT-D

- Organization Design, Determinants of Organizational Design, Parameters of Organizational Design 3 hours
- Organizational Failure and Pathology 2 hours
- Organizational Change and Development, Organizational Learning and Transformation. 2 hours
- Do "Organizations" Have a Future? Designing Organizations' for Uncertain Environment. 2 hours
- Building Learning Organizations 2 hours
- Transactional Analysis 2 hours

45 hours

Text Book:

1. Robbins, S.P., and Judge, T, and Sanghi, S. *Organizational Behavior*. Pearson Education.

Reference Books:

1. Luthans, F. *Organizational Behavior*. McGraw –Hill Inc.
2. Newstrom, J.W. and Davis, K. *Organizational Behavior - Human Behavior at Work*. McGraw Hill.
3. Weiss, P. *Organizational Behaviour and Change.* West Group Publication.
4. Koontz, Harold. and Koontz, Weihrich. *Essentials of management*

Course Title: Robotic and Automation

Course Code: MEC401

L	T	P	Credits	Marks
3	0	0	3	75

Course Objectives: Students will learn about the basic concepts of automation, about the fluid power, about the robotic, about the robotic sensors, end effectors and its programming.

Part – A

Introduction to Robotic

(4)

Introduction, terminology, laws of robotics, classification based on geometry, machine vision, robot components, degree of freedom, coordinators, reference frames,

Robot Sensors and End Effectors

(5)

Types of Sensors in robots, exteroceptors, proprioceptors, tactile, proximity, range, velocity and machine vision sensors, robot end-effectors, classification, gripper, gripper mechanism, type of gripper.

Part – B

Robot Programming

(5)

Robot programming, techniques of programming, robot languages, requirement for a standard robot language, types of languages.

Industrial applications

(4)

Applications of robots in welding, machine loading, fabrication, spray painting, assembly and unusual applications.

Part – C

Industrial Automation

(3)

Basic principles of automation; Hard Automation, Flexible Automation, Low Cost Automation Elements of Automation

Fluid Power

(6)

Fluid power control elements, Construction and performance of fluid power generators; Hydraulic and pneumatic cylinders - construction, design and mounting; Hydraulic and pneumatic valves for pressure, flow and direction control.

Part – D

Logic Circuits

(5)

Design of pneumatic logic circuits for a given time displacement diagram or sequence of operations

Fluidics

(4)

Boolean algebra; Truth tables; Conda effect; Fluidic elements – their construction working and performance characteristics

Reference Books:

1. SR, Deb. *Robotics and Flexible Automation.* Tata McGraw-Hill Publishing Company Ltd., New Delhi.
2. SR, Majumdar. *Pneumatic Control.* Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. CR, Asfahl. *Robotics and Manufacturing Automation.* Wiley India.
4. SB, Niku. *Introduction to Robotic.* Wiley India.

DAV UNIVERSITY JALANDHAR

Course: MATLAB Programming

Course Code: ELE455

L	T	P	Credits	Marks
3	0	0	3	75

Unit-A

Introduction to MATLAB Programming and Environment

MATLAB Windows, Expressions, Constants, Variables and assignment statement, Arrays Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save

(12hrs)

Unit-B

Procedures and Functions and Control Statements

Arguments and return values, M-files, Formatted console input-output, String handling, ,Manipulating Text, Writing to a text file, Reading from a text file, Randomising and sorting a list, Searching a list, Attaching buttons to actions, Getting Input, Setting Output, Variables, Data Types, Control Statements: Conditional program flow, Iteration / Looping,Conditional statements.

(12hrs)

Unit-C

Spectral Analysis and Speech Signal Analysis

Filterbank analysis, Fourier analysis, Spectrograms, Filterbank synthesis, Fundamental of Speech Signal, frequency estimation – frequency domain, Fundamental frequency estimation, time domain, Formant frequency estimation

(12hrs)

Unit-D

MATLAB Applications

Math and computation – Algorithm development – Modeling, simulation, and prototyping – Data analysis, exploration, and visualization – Scientific and engineering graphics – Application development, including graphical user interface building, Working with Sound and Images, Reading and Writing files, Recursion, Compression.

(12hrs)

Reference Books:

1. Agam Kumar Tyagi. *MATLAB and Simulink for Engineers,* Oxford University Press, USA, 2012.
2. Chapman, Stephen J. *MATLAB Programming for Engineers.* Cengage Learning, 2008.

DAV UNIVERSITY JALANDHAR

Course: Bio-Medical Engineering

L	T	P	Credits	Marks
3	0	0	3	75

Paper Code: ICE430

Course Objective: To teach students that medical field is based on instrumentation and to enhance their skills in different biomedical instruments.

Learning Objective:

- Origin of bio-electric signals
- Physiological parameters adaptable to bio-telemetry
- security in medical methods

UNIT-I

Physiological Transducers: Introduction to physiological systems, Pressure transducers, Transducer for body temperature measurement. Pulse sensors, Respiration sensors.

Bio-Electric Signals and Electrodes: Origin of bio-electric signals, Recording electrodes, Polarization Skin contact impendence, Electrodes for ECG, EEG, Electrical conductivity of electrode jellies and creams, Microelectrodes.

12 Hr

UNIT-II

Measurement And Analysis Techniques: Blood flow meters, Cardiac Output measurement, Pulmonary function analyzers, Spiro-meter, Respiratory gas analyzers, Blood gas analyzers Blood pH, PCO2, PO2 measurement, Blood cell counters, Audio meter, Pure tone audio meters, Speech audiometers Evoked response audio-metric systems, Oxy-meters.

X-Ray And Ultrasonic Diagnosis: Soft & Hard X-Rays. X-Ray generators for diagnosis. Radiography, Angiography, Fluoroscopy, X-Ray computed tomography, Ultrasonic principles, Application of ultrasonic for diagnosis.

12 Hr

UNIT-III

Physical Medicine And Assist Devices: Diathermy-Short wave, ultrasonic and Microwave, Range and area of irritation of each type, Nerve and muscle simulators, Pace makers external and implantable pacemakers, DC defibrillators, Defibrillator with synchronizer, Implantable defibrillators.

Radiotherapy: X-Raytherapy, Radio nuclide therapy, Units for radiation and radiation dose.

12 Hr

UNIT-IV

Bio-Telemetry: Physiological parameters adaptable to bio-telemetry, Components of a biotelemetry system, Implantable units, Application of telemetry in patient care.

Introduction to Telemedicine: Telemedicine System's classification, input and output peripherals, Characteristic of available transmission media, introduction to communication system for telemedicine. Medical image format standards, introduction to DICOM and PACs technologies various image compression

techniques, loss less and lossy image compression for biomedical application. Telemedicine and law, confidentiality of telemedicine records, security in medical methods.

12 Hr

Reference Books:

1. Khandpur, R. S. *Handbook of Biomedical Instrumentation.* TMH.
2. Pratt, Cromwell. *Biomedical Instrumentation.* Prentice Hall.
3. Webster, John G. *Medical Instrumentation, Applications &Design.* John Wiley.
4. Geddes. *Baker Principles of Applied Biomedical Instrumentation.* John Wiley.

Course Title: Information Security Systems Laboratory

Paper Code: CSE416

L	T	P	Credits	Marks
0	0	4	2	50

Implementation of the followings in any High Level Programming Language:

1. Transposition Techniques, Steganography.
2. Block Ciphers and The Data Encryption Standard
3. Random Number Generation.
4. Testing for Primarily, the Chinese Remainder Theorem
5. The RSA Algorithm.
6. Elliptic Curve Cryptography.
7. Hash Algorithms: MD5 Message Digest Algorithm, Authentication Protocols.
8. System Security: Firewalls: Firewall Design Principles

L	T	P	Credits	Marks
0	0	8	6	150

Course Title: Major Project

Paper Code: CSE418

1. Project should include following phases

- System analysis and design
- Coding - Implementation
- Testing

2. Should be a working project

3. Must have a future perspective

4. It may be a

- Database
- Application software
- System software
- Multimedia
- Web Related

5. A complete project report must be submitted along with soft copy of project. Project report may include requirements of project, Flow Chart, DFDs, coding and test results.

DAV UNIVERSITY JALANDHAR

Course Title: SEMINAR
Paper Code: CSE420

L	T	P	Credits	Marks
0	0	4	2	50

The seminar is based on the research oriented topic. The evaluation of seminar is based upon the contents and presentation of a topic.