B. TECH SECOND YEAR
COMPUTER SCIENCE & ENGINEERING

(Batch 2018)
Session (2019-20)

SCHEME OF PAPERS

THIRD SEMESTER (COMPUTER SCIENCE & ENGINEERING)

S. No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-201	Computer System Architecture	3	0	0	3.0
2.	CPE-202	Python Programming	3	0	0	3.0
3.	CPE-203	Data Structures	3	0	0	3.0
4.	CPE-204	Computer Networks	3	0	0	3.0
5.	CPE-205	Discrete Mathematical Structures	3	0	0	3.0
6.	HSS-201	Management Practice & Organization Behaviour and Business Intelligence	3	0	0	3.0
7.	CPE-252	Python Programming Lab	0	0	2	1.0
8.	CPE-253	Data Structures Lab	0	0	2	1.0
9.	CPE-254	Computer Networks Lab	0	0	2	1.0
10.	**	Punjabi	3	0	0	0.0
Total			**21**	**0**	**6**	**21**
Total Contact Hours = 27						

CPE-252, CPE-253 and CPE-254 are practical papers only. There will not be any theory examination for these papers.

* *   In addition to above mentioned subjects, there will be an additional course on Punjabi as a qualifying subject.

Department of Computer Science & Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters
(Common for B.Tech. in Computer Science & Engineering, Electronics and Communication
Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech/MBA Branches)

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50
Pass Marks   : 20
Note:- Section C is compulsory. Attempt any six questions selection three questions from each section A & B.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5………………………………………………..

Section-B (From Section B of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9. ....   3x5
Q10…………………………………………….

Section-C (From whole syllabus)
Q11
a)...
b)...
c)...
d)...
e)...
f)...
g)...
h)...
i)...
j)……………………………………………….   10x2=20

Note for the paper setter:

1. Total numbers of questions to be set are Eleven (11) as per the above format.

2. There will be five questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.

3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.

4. The maximum limit on numerical problems to be set in the paper is 35%.

5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.

6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.

7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.

8. Use of Scientific calculator should be clearly specified.

CPE-201   **COMPUTER SYSTEM ARCHITECTURE**

L	T	P	Cr
3	0	0	3.0

Course Objectives:
- To understand the structure, function and characteristics of computer systems.
- To understand the design of the various functional units and components of computers.
- To identify the elements of modern instructions sets and their impact on processor design.
- To explain the function of each element of a memory hierarchy,
- To identify and compare different methods for computer I/O.

SECTION-A

Introduction: Design of basic computer, Registers, Accumulator, Flags, Program Counter, Stack Pointer, Machine Instructions, Instruction Cycle, Machine Cycle, Components of CPU.

Register Transfer and Micro operations: Register transfer Language, Register transfer, Bus & memory transfer, Logic micro operations, Shift micro operation.

Controller Design: Hardwired and Micro programmed Approach.

Micro program Control Organization: Control Memory Address Sequencing, Micro program Sequences, Microinstruction Formats, and Addressing modes.

Arithmetic Unit: Comparison and Subtraction of unsigned Binary Numbers, Addition, Subtraction, Multiplication Algorithm.

SECTION-B

Memory System: Memory - CPU interaction, Principle of locality (Temporal and Spatial).

Memory Organization: Interleaved Memory Organization, Memory Hierarchy, Main Memory, Virtual Memory, Cache Memory, Cache Organization (Direct, Fully Associative, Set Associative), Cache Coherence, Memory Management Hardware, Performance Considerations.

Input-Output Organization: I/O interfaces and Buses, I/O operations, Program driven Input-Output, Interrupt driven Input-Output, DMA, Priority Interrupt.

Pipeline Processing: Overview of Pipelining, Types of Pipelining, Hazards (Data, Control, Structural).

Recommended Books:
1. Computer System Architecture: M.M. Mano, Prentice Hall of India.
2. Structured Computer Organization: Andrew S. Tanenbaum, Prentice Hall of India
3. J.P. Hayes, Computer Systeui Architecture, Prentice Hall of India, New Delhi.
4. Ali leigh. System Architecture, South wester publishing co. New Delhi.
5. William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2003.

CPE-202   **PYTHON PROGRAMMING**

L	T	P	Cr
3	0	0	3.0

Course Objectives:
- Develop a basic understanding of the Python programming language.
- Learn various object types.
- Learn Numpy module for scientific computing.
- Learn to work with various type of data and convert it into meaningful information.
- Learn to visualize the data.

SECTION – A

Introduction to Python: Python features, Type basics (Integer numbers, Complex numbers, Boolean numbers), Functions (Basic functions, local variables, global variables, variable scope, lambda functions),Loops, Flow Control Structures, Shared references, classes & objects.

Object types: Lists(Basic list operations, List iteration and comprehension, indexing, slicing, matrices), Dictionaries (Basic dictionary operations), Tuples (Basic tuple operations).

NumPybasics: Arithmetic with Numpy Arrays,Reshaping Arrays, Indexing, Slicing, Vectors and Matrices, Solving a Linear System.

SECTION – B

Pandas: Creating Series objects,Series atrributes(index, values,dtype, isunique, ndim, shape, size),Series methods (sort_values, sort_index, count, describe, idxmax,idxmin,value_counts, head, tail), inplace parameter,DataFrame, Read data from csv file,Extracting columns from dataframe,Dataframe methods (sort_values, sort_index, astype, loc and iloc), Delete rows and columns from a dataframe, Broadcasting, Handling values (Null, Missing, Duplicate and Categorical), import excel file into pandas.

Visualization: UsingMatplotlib package, Creating Figures and Subplots, Creating charts (Line Chart, Scatter Chart, Bar chart, Pie chart, Box plot), Labels, Titles, Legends.

Recommended Books
1. Mark Lutz, "Learning Python", 5th edition, O'Reilly.
2. Zed Shaw, "Learn Python the hard way", 3rd edition, Pearson.
3. Eli Bresseert, "Scipy and Numpy", O'Reilly.
4. William Mckinney, "Python for Data Analysis:Data wrangling with Pandas, NumPy, and Ipython", 2nd edition, O'Reilly.
5. Phuong Vo.T.H, "Python: Data Analytics and Visualization", Packt.

CPE -203   **DATA STRUCTURES**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

COURSE OBJECTIVES:

- To impart the basic concepts of data structures and algorithms
- To understand concepts about searching and sorting techniques
- To Understand basic concepts about stacks, queues, lists, trees and graphs
- To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

SECTION-A

Basic Data Structures and Operations on them: Arrays, Stacks and Queues and Their Applications, Linked and Sequential Representation. Linked List, Representation of Linked List, Multi-Linked Structures

Searching and Sorting: use of Various Data Structures for Searching and Sorting, Linear and Binary Search, Bubble Sort, Insertion Sort, Shell Sort, Selection Sort. Merge Sort, Radix Sort, Quick Sort.

Hashing: Introduction to hash table, hash function, resolving collision by chaining and open addressing, deleting items from a hash table.

SECTION-B

Trees: Definitions and Basic Concepts, Linked Tree Representation, Representations in Contiguous Storage, Binary Trees, Binary Tree Traversal, Searching, Insertion and Deletion in Binary Trees, Binary Search Tree, Heap and Heap Sort Algorithm, AVL Trees.

Graphs and Their Application, Sequential and Linked Representation of Graph-Adjacency Matrix, Operations on Graph, Traversing a Graph, Dijkstra's Algorithm for Shortest Distance, DFS and BFS, Minimal Spanning Tree.

File Organization: Sequential, Relative, Index Sequential.

Recommended Books:

1. Data structures: a Pseudocode Approach with-C, IInd Edition,' Cengage Learning (Thomson).
2. Fundamentals of Data Structures, CBS Publishers and Distributors, Delhi, Ellis HorwitZ and Sartaj Sahni.
3. An introduction to data structures with applications, Mc-Graw Hill Inc., J.P. Trembley and P.G, Sorensen.
4. Data Structures and Program Design in C Prentice Hall of India, 1992, Robort L. Kruse, Bruce P. Leung, Cluvis L. Tundo.
5. Data Structure using (C & C++, Sanjeev Kumar, Khanna Publishers.
6. A Simplified Approach to Data Structures, Shroff Publications,Vishal Goyal, Lalit Goyal and Pawan Kumar.

CPE-204   **COMPUTER NETWORKS**

L	T	P	Cr
3	0	0	3.0

Course Objectives

At the end of the course, the students will be able to:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

SECTION-A

Introduction, history and development of computer networks, Types of computer networks: LAN, MAN, WAN, broadcast and point to point networks, Network topologies,

Layered Architecture: concept of layers, protocols, interfaces and services, The OSI Reference Model, The TCP/IP Reference Model, Comparison of OSI and TCP/IP Models

Physical Layer: Concept of Analog & Digital Signal, Bandwidth, Transmission Impairments: Attenuation, Distortion, Noise, Data rate limits: Nyquist formula, Shannon Formula, Switching: Circuit Switching, Message Switching and Packet Switching, Comparison of Repeaters, Hubs, Switches.

Transmission media: Twisted Pair, Co-axial Cables, Fiber Optics, Wireless Transmission: Radio and Microwave and Infrared Transmission

SECTION-B

Data Link Layer: Data link layer Design Issues, Error Detection and Correction, Elementary data link protocols: An Unrestricted Simplex Protocol, A Simplex Stop and Wait Protocol, A Simplex Protocol for a Noisy Channel. Sliding window protocols: A One Bit Sliding Window Protocol, A Protocol Using go back N, A Protocol using Selective Repeat, CSMA CSMA/CD Protocols

Network layer: IP Addressing, IPV4 header, Fragmentation, Routing algorithms:-Shortest Path Routing, Flooding, Distance Vector Routing and Link State Routing, Introduction to Congestion, Congestion Control.

Transport layer: Introduction to Elements of Transport Protocols UDP, TCP

Application layer: Electronic-mail, WWW, Domain Name System, SMTP, HTTP.

Recommended Books:

1. A. S. Tannenbaum. Computer Networks, 3rd Edition, Prentice-Hall.
2. D. E. Comer. Internetworking with TCP-IP: Principles, Protocols and Architecture, Vol I, 2nd Edition, Prentice Hall, 1991.
3. D. E. Comer and D. L. Stevens. Internetworking with TCP-IP: Design, Implementation, and Internals, Vol II, Prentice Hall, 1990.

CPE-205   **DISCRETE MATHEMATICAL STRUCTURE**

L	T	P	Cr
3	0	0	3.0

Course Objectives

Students will be able to:

- Write an argument using logical notation and determine if the argument is or is not valid.
- Demonstrate the ability to write and evaluate a proof or outline the basic structure
- Understand the basic principles of sets and operations in sets.
- Prove basic set equalities.
- Demonstrate different traversal methods for trees and graphs.
- Model problems in Computer Science using graphs and trees.

SECTION-A

Relations and Functions: Binary relations, composition of relations; Equivalence relations and partitions; partially ordered sets and Lattice Hasse diagrams; Functions, Injection, Surjection and Bisection; Composition of functions. Recursion and Recurrence Relations: Polynomials and their evaluation, recursion, iteration, sequences and discrete functions, Recurrence Relations, generating functions.

Graphs: Introduction to graphs, Graph terminology, Representing Graphs and Graph Isomorphism, Connectivity. Mathematical Logic: Statement and notations, normal forms, theory and inference for statement and calculus, predicate calculus, inference theory for predicate calculus. Graph Theory: Directed and undirected graphs and their matrix representations: Euclidean paths and cycles; Hamiltonian paths and cycles; shortest paths, Euler.'s formula.

SECTION-B

Boolean Algebra: Basic Circuits and theorems, Boolean expressions; Logic gates and relation of Boolean functions. Induction and Recursion: Principle of Mathematical induction; Recursive definition.

Algebraic Structures: Introduction to algebraic structures, semi groups; Groups and subgroups; Homomorphism and homomorphism of groups, Lagrange theorem.

Recommended Books:

1. J.P.Tremble: Discrete Mathematics Structure with application to Computer Science, McGraw Hill, 1987
2. Truss, Johan.K: Discrete Mathematics for Computer Scientist, Pearson Education, India.
3. Liu, C.L.: Elements of Discrete Mathematics, 4lh Edition, McGraw Hill, New York, 1998.

**HSS-201   MANAGEMENT PRACTICE & ORGANIZATION BEHAVIOUR
                 AND BUSNIESS INTELLIGENCE**

L	T	P	Cr
3	0	0	3.0

SECTION-A

Introduction to Management: Definition, Importance and functions of Management. Theories of Management; Classical, Neo-classical and Modern. Planning: Nature of planning, planning process, types of plans, Importance and Limitations of Planning. Introduction to MBO (Management by Objectives). Social responsibility of business.

Decision Making: Importance and Process. Organization: Process of Organizing, Organizing Principles, Organization Chart, Authority and Responsibility relationship, Steps in Delegation of Authority. Communication: Process, channels, medium of communication, communication barriers. Controlling: Steps, types of control system, essentials.of effective control system.

SECTION-B

Organizational Behaviour: Concept, features and importance. Personality: determinants and development. Role of Values and Attitudes in individual's behaviour. The concept of motivation and its theories. Perception: Concept, Process, Errors in perceptual accuracy, Role of perception in decision making

Learning: Classical and Operant conditioning theory, Reinforcement-kinds and administration. Concept of group dynamics. Leadership theories and styles. Organizational conflict: Concept, Dimensions, conflict management techniques. Introduction to concept of power and politics in work related organization. Organization culture and effectiveness

Recommended Books:

1.   Aswathappa, K and Reddy G. Sudarsana, Management and Organisation Behaviour, Himalya Publishing House.
2.   Pierce John L., Gardner Donald, Gardner Donald, Management and Organisational Behavior: An Integrated Perspective, Ed.1, Cengage Learning India
3.   Laurie Mullins, Management and Organisation Behaviour, 7/e, Pearson Education.
4.   Stephen, P. Robbins, Seema Sanghi and Timothi A Judge, Organizational Behavior 13/e, Pearson Education.
5.   Stephen P. Robbins, Mary Coulter and Neharika Vohra, Management 10/e, Pearson Education.
6.   Heinz, Weihrich and Harold Koontz, Essentials of Management, Tata McGraw Hill.
7.   Gene Burton and Manab Thakur, Management Today: Principles and Practice, Tata McGraw-Hill.
8.   P C Tripathy, P N Reddy, Principles of Management, Tata McGraw-Hill.
9.   Dr. Neeru Vashishth, Principles of Management with case studies, Taxmann Publication.
10.   L.M.Prasad, Principles & Practice of Management, Sultan Chand & Sons   N Delhi
11.   James Stoner, R Edward Freeman and Daniel R Gilbert, Management 6/e, Pearson Education.

CPE - 252   **PYTHON PROGRAMMING LAB**

	L	**T**	**P**	**Cr**
	0	0	2	1.0

List of Experiments:

1. Write a program to calculate the average of numbers in a given List.

2. Write a program to remove duplicate items from the List.

3. Write a program to sum all the items in a dictionary.

4. Write a program to create a function that finds the product of List elements. Also do the same operation using lambda functions.

5. Write a program to create a numpy array and retrieve the value from it using array index and slicing. Also reshape the 1-D array into 2-D array.

6. Write a program to extract data from a csv and excel file.

7. Write a program to select columns and rows from a dataframe.

8. Write a program to handle missing data in a dataframe using pandas library.

9. Write a program to plot a scatter graph for the data contained in two lists.

10. Write a program to create various charts for the given data.

CPE-253   **DATA STRUCUTRE USING C++ LAB**

	L	**T**	**P**	**Cr**
	0	0	2	1.0

1. Write a program to check whether a string is palindrome or not

2. Write a program to extract substring from given string.

3. Write a program to implement stack using arrays.

4. Write a program to implement queues using arrays.

5. Write a program to sort a given list of number using following algorithm.
   1. Bubble sort
   2. Insertion sort
   3. Selection sort
   4. Quick sort
   5. Radix sort

6. Write a program to implement linear and binary search algorithm.

7. Write a program to create a linked list and perform following operations:
   1) Insert element at beginning.
   2) Insert element at end.
   3) Insert element at given position.
   4) Delete element from beginning
   5) Delete element at end.
   6) Delete element from given position.

8. Take a list of number and create a sorted linked list from given list

9. Implement stack using linked representation.

10. Implement queue using linked representation.

CPE-254   **COMPUTER NETWORKS LAB**

L	**T**	**P**	**Cr**
0	0	2	1.0

List of Experiments

1 Identification and study of various network components such as connectors: BNC, RJ-45, I/O box Cables: Co-axial, twisted pair, UTP, Fiber Optic, NIC (network interface card) , Switch , hub and router

2 Study of different types of Network Cables and practically implementing the cross-wired cable and straight through cable using clamping tool.

3 To implement and test different network related commands in Windows Operating System (ipconfig, ifconfig/all, ping, tracert, etc.).

4 Installation and Configuration of Peer to peer and client Server based Networks

5 To Share files, printers etc. between different machines.

6 To Study of Network IP addressing schemes and learns to how to configure IP configuration.

7 To learn basic introduction of Switching, TCP/IP and Routing using Packet Tracer.

8 To study the fundamental differences between hub, switch and router.

Hardware Requirements

1. NIC card
2. RJ-45 Connector
3. Hub
4. Clamping Tool
5. Switch
6. Twisted Pair Cable
7. Co-axial Cable

Software Requirement

Packet Tracer

Network Management Software

ਸਿਲੇਬਸ

ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ)

ਅੰਡਰ ਗ੍ਰੈਜੂਏਟ ਪੱਧਰ ਤੇ ਪ੍ਰੈਫੈਸ਼ਨਲ ਕੋਰਸਾਂ ਲਈ ਕੁਆਲੀਫਾਇੰਗ ਪੰਜਾਬੀ (ਬੈਚ 2014 ਤੋ ਲਾਗੂ)

For Other State Students of
B. Tech & 6 Yr. Engineering Management Integrated Program Only

ਕੁੱਲ ਅੰਕ: 100 (ਮੌਖਿਕ ਪ੍ਰੀਖਿਆਂ 40 ਅੰਕ; ਬਾਹਰੀ ਪ੍ਰੀਖਿਆਂ 60 ਅੰਕ)   ਪਾਸ ਅੰਕ 35

ਸਮਾਂ : 3 ਘੰਟੇ   ਪੀਰੀਅਡ: 3 ਪ੍ਰਤੀ ਹਫ਼ਤਾ

ਭਾਗ ੳ

1)   ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ ਤੇ ਲੇਖਣ ਪ੍ਰਬੰਧ

ੳ) ਅੱਖਰ ਸਿੱਖਿਆ: ਤਰਤੀਬਵਾਰ ਤੇ ਭੁਲਾਵੇਂ ਅੱਖਰ

ਅ) ਅੱਖਰ ਬਣਤਰ: ਅੱਖਰ ਰੂਪ ਤੇ ਲਿਖਣ ਦੇ ਨਿਯਮ

2) ਗੁਰਮੁਖੀ ਅੱਖਰ ਤੇ ਪੰਜਾਬੀ ਧੁਨੀਆਂ ਦਾ ਪ੍ਰਬੰਧ

ੳ) ਸਵਰ ਤੇ ਵਿਅੰਜਨ: ਵਰਗੀਕਰਨ ਦੇ ਸਿਧਾਂਤ ਤੇ ਉਚਾਰਨ

ਅ) ਲਗਾਂਮਾਤਰਾਂ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ

ਭਾਗ ਅ

1) ਲਿਪੀ ਦੇ ਅੱਖਰਾ ਦੀ ਵਰਤੋ ਦੇ ਨਿਯਮ

                ੳ) ਪੂਰੇ ਤੇ ਅੱਧੇ ਅੱਖਰ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ

                ਅ) ਸਵਰ ਸੂਚਕ ਅੱਖਰਾ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ

2) ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਜਾਣਪਛਾਣ।

                ੳ) ਹਫ਼ਤੇ ਦੇ ਦਿਨ

                ਅ) ਮਹੀਨਿਆ ਦੇ ਨਾਮ

                ੲ) ਰੰਗਾ ਦੇ ਨਾਮ

                ਸ) ਪੰਜਾਬੀ ਰਿਸਤਾਨਾਤਾ ਪ੍ਰਬੰਧ ਸ਼ਬਦਾਵਲੀ

ਭਾਗ ੲ

1)   ਸ਼ਬਦ ਪ੍ਰਬੰਧ: ਸ਼ਬਦ ਜੋੜਾ ਦੀ ਵਰਤੋ

                ੳ) ਦੋ ਅੱਖਰੀ ਸ਼ਬਦਾ ਦੇ ਸ਼ਬਦਜੋੜ

                ਅ) ਤਿੰਨ ਅੱਖਰੀ ਸ਼ਬਦਾ ਦੇ ਸ਼ਬਦ ਜੋੜ

2) ਸ਼ਬਦਾਂ ਦੀਆ ਸ਼੍ਰੇਣੀਆਂ ਤੇ ਵਿਆਕਰਨਕ ਵਰਗਾ ਦੀ ਪਛਾਣ

                ੳ) ਸ਼ਬਦਾ ਦੀਆ ਸ਼੍ਰੇਣੀਆਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ, (ਨਾਵ, ਪੜਨਾਵ, ਵਿਸ਼ੇਸਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸਣ ਆਦਿ)

ਭਾਗ ਸ

1)   ਸ਼ਬਦ ਬਣਤਰਾਂ ਤੇ ਵਿਆਕਰਨਕ ਇਕਾਈਆ ਦਾ ਸਿਧਾਂਤ ਤੇ ਵਰਤੋ

                ੳ) ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰਾ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ

                (ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਸਮਾਸ, ਦੁਹਰੁਕਤੀ)

                ਅ) ਵਿਆਕਰਨਕ ਇਕਾਈਆ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ (ਵਾਕੰਸ਼, ਉਪਵਾਕ ਤੇ ਵਾਕ)

Punjabi University, Patiala

Four Year B.Tech (Computer Sc. & Engg.) Batch 2018
BOS: 2019

ਅੰਡਰ ਗ੍ਰੈਜੂਏਟ ਪੱਧਰ ਤੇ ਪ੍ਰੋਫੈਸ਼ਨਲ ਕੋਰਸਾਂ ਲਈ ਕੁਆਲੀਫਾਇੰਗ ਪੰਜਾਬੀ

ਸਿਲੇਬਸ

ਕੁਲ ਸਮਾਂ:100   ਲਿਖਤੀ:60 ਅੰਕ

ਸਮਾਂ:3 ਘੰਟੇ   ਮੌਖਿਕ ਪ੍ਰੀਖਿਆ:40 ਅੰਕ

ਪੀਰੀਅਡ: 3 ਪ੍ਰਤੀ ਹਫ਼ਤਾ   ਪਾਸ ਅੰਕ:35%

1. ਪੰਜਾਬੀ ਦੀ ਪਾਠਪੁਸਤਕ

   (ਮੁੱਖ ਸੰਪਾਦਕ: ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਪ੍ਰਕਾਸ਼ਕ ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ)

        ਭਾਗ ਪਹਿਲਾ ਪੰਜਾਬੀ ਸਾਹਿਤ

           (ੳ) ਕਵਿਤਾ

           (ਅ) ਕਹਾਣੀ

           (ੲ) ਨਾਟਕ

        ਭਾਗ ਦੂਜਾ ਪੰਜਾਬ ਸਭਿਆਚਾਰ ਅਤੇ ਲੋਕਧਾਰਾ

        ਭਾਗ ਤੀਜਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

        ਪੁਸਤਕ ਦੇ ਤਿੰਨ ਭਾਗ ਹਨ। ਪ੍ਰੰਤੂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਭਾਗਾਂ ਵਿਚ ਹੋਵੇਗਾ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦਾ ਪਹਿਲਾ ਭਾਗ ਪੁਸਤਕ ਦੇ ਪਹਿਲੇ ਭਾਗ ਉੱਤੇ ਆਧਾਰਿਤ ਹੋਵੇਗਾ। ਇਸ ਭਾਗ ਦੇ ਕੁਲ 36 ਅੰਕ ਹਨ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦਾ ਦੂਜਾ ਭਾਗ ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਉੱਤੇ ਅਧਾਰਿਤ ਹੋਵੇਗਾ। ਇਸ ਭਾਗ ਦੇ ਕੁਲ 24 ਅੰਕ ਹੋਣਗੇ ਅਤੇ ਇਸ ਵਿਚ ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਦੇ 1212 ਅੰਕ ਹੋਣਗੇ।

(1)   ਪੁਸਤਕ ਦੇ ਪਹਿਲੇ ਭਾਗ ਦੇ ਤਿੰਨ ਉਪਭਾਗ ੳ, ਅ ਅਤੇ ੲ ਹਨ। ਇਨ੍ਹਾਂ ਤਿੰਨਾਂ ਉਪਭਾਗਾਂ ਵਿੱਚੋਂ ਹੇਠ ਅਨੁਸਾਰ ਸੁਆਲ ਪੁੱਛੇ ਜਾਣ।

        (ੳ) ਇਸ ਵਿਚ ਕੁਲ 12 ਪ੍ਰਸ਼ਨ ਔਬਜੈਕਟਿਵ ਟਾਈਪ/ਮਲਟੀਪਲ ਚੋਣ ਵਾਲੇ ਹੋਣਗੇ। ਹਰ ਉਪਭਾਗ ਵਿੱਚੋਂ 4 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।   ਅੰਕ 3 X 4 = 12

        (ਅ) ਹਰ ਉਪ ਭਾਗ ਵਿੱਚੋਂ 5--5 ਲਘੂ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਹਰ ਭਾਗ ਵਿੱਚੋਂ 3 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਉੱਤਰ ਪੰਜ ਲਾਈਨਾਂ ਤੋਂ ਵੱਧ ਨਾ ਹੋਵੇ।   ਅੰਕ 9 X 2 = 18

        (ੲ) ਹਰ ਉਪ ਭਾਗ ਵਿੱਚੋਂ 1 ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾਵੇਗਾ। ਇਨ੍ਹਾਂ ਵਿੱਚੋਂ ਕੋਈ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ। ਉੱਤਰ ਇਕ ਸਫ਼ੇ ਤੱਕ ਸੀਮਤ ਹੋਵੇ।   ਅੰਕ = 06

(2)   ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਵਿੱਚੋਂ ਪ੍ਰਸ਼ਨ ਇਸ ਪ੍ਰਕਾਰ ਪੁੱਛੇ ਜਾਣਗੇ।

        (ੳ) ਹਰ ਭਾਗ ਵਿੱਚੋਂ 4 ਪ੍ਰਸ਼ਨ ਔਬਜੈਕਟਿਵ ਟਾਈਪ/ਮਲਟੀਪਲ ਚੋਣ ਵਾਲੇ ਹੋਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।   ਅੰਕ 4+4 = 8

        (ਅ) ਹਰ ਇਕ ਭਾਗ ਵਿਚ 4 ਸੰਖੇਪ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। 8 ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚੋਂ ਕੁਲ 5 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ 2 ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ।   ਅੰਕ 5 X 2 = 10

        (ੲ) ਹਰ ਇਕ ਭਾਗ ਵਿੱਚੋਂ 1 ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾਵੇਗਾ। ਇਨ੍ਹਾਂ ਵਿੱਚੋਂ ਕੋਈ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ। ਉੱਤਰ ਇਕ ਸਫ਼ੇ ਤੱਕ ਸੀਮਤ ਹੋਵੇ।   ਅੰਕ = 06

ਨੋਟ: ਮੌਖਿਕ ਪ੍ਰੀਖਿਆ ਪਾਠਪੁਸਤਕ ਤੇ ਹੀ ਅਧਾਰਿਤ ਹੋਵੇਗੀ। ਇਸ ਦੀ ਵਿਧੀ ਪ੍ਰੈਕਟੀਕਲ ਵਾਲੀ ਹੋਵੇਗੀ।

B. TECH SECOND YEAR
COMPUTER SCIENCE & ENGINEERING

(Batch 2018)
Session (2019-20)

SCHEME OF PAPERS

FOURTH SEMESTER (COMPUTER SCIENCE & ENGINEERING)

S.No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-206	Visual Programming using VB.Net	2	0	0	2.0
2.	CPE-207	Algorithm Analysis & Design	3	0	0	3.0
3.	CPE-208	Operating Systems	3	0	0	3.0
4.	CPE-209	Object Oriented Programming using C++	3	0	0	3.0
5.		Elective – I*	3	0	0	3.0
6.	CPE-256	Visual Programming using VB.Net Lab	0	0	4	2.0
7.	CPE-257	Algorithm Analysis & Design Lab	0	0	2	1.0
8.	CPE-258	Operating Systems Lab	0	0	2	1.0
9.	CPE-259	Object Oriented Programming using C++ Lab	0	0	2	1.0
10.	**	Environment and Road Safety Awareness	2	0	0	0.0
Total			**16**	**0**	**10**	**19**
Total Contact Hours = 26						

ELECTIVE SUBJECTS – I *

S.No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-210	Microprocessor & Assembly Language Prog.	3	0	0	3.0
2.	CPE-211	Multimedia Systems & Animations	3	0	0	3.0
3.	CPE-212	E-Commerce	3	0	0	3.0
4.	CPE-213	Building Enterprise Applications	3	0	0	3.0

*Choose any one from the list. Elective under Massive Open Online Courses (MOOCS) available on SWAYAM platform of Govt. of India offered through online mode. The subjects which students can opt from MOOCS will be notified by the department semester wise time to time

CPE-256, CPE-257, CPE-258 and CPE-259 are practical papers only. There will not be any theory examination for these papers.

* *   In addition to above mentioned subjects, there will be an additional course on Environment and Road Safety Awareness as a qualifying subject.

Department of Computer Science & Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters
(Common for B.Tech. in Computer Science & Engineering, Electronics and Communication Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech/MBA Branches)

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50
Pass Marks   : 20
Note:- Section C is compulsory. Attempt any six questions selection three questions from each section A & B.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5…………………………………………..

Section-B (From Section B of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9. ....   3x5
Q10………………………………………….

Section-C (From whole syllabus)
Q11
a)..
b)..
c)..
d)..
e)..
f)..
g)..
h)..
i)..
j)…………………………………………….   10x2=20

Note for the paper setter:
1. Total numbers of questions to be set are Eleven (11) as per the above format.

2. There will be five questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.

3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.

4. The maximum limit on numerical problems to be set in the paper is 35%.

5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.

6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.

7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.

8. Use of Scientific calculator should be clearly specified.

CPE-206   **VISUAL PROGRAMMING USING VB.NET**

L	T	P	Cr
2	0	0	2.0

Course Objectives
The student will use Visual Basic.Net to build Windows applications using structured and object-based programming techniques. Students will be exposed to the following concepts and/or skills:
- Analyze program requirements
- Explain the structure of Visual Basic .NET projects.
- Design/develop programs with GUI interfaces
- Code programs and develop interface using Visual Basic .Net
- Perform tests, resolve defects and revise existing code
- Identify the purpose of each major controls of the Visual Basic .NET IDE.
- Explain basic programming practices that contribute

SECTION-A

Introduction to .NET: NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries.

Introduction to Visual studio: Project basics, types of project in .Net, IDE of VB.NET-Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. Event driven programming: Methods and Events.

The VB.NET Language: Variables, Declaring variables, Data Type of variables, Scope & lifetime of a variable, Constants. Control flow statements: conditional statement, loop statement. Msgbox & Inputbox. Arrays, types of array, String.

Working with Forms: Loading, showing and hiding forms, controlling One form within another.GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, Radio Button, Panel, Scroll bar, Timer, List View, Tree View, Toolbar, Status Bar. Their Properties, Methods and Events.

Common Dialog Controls: OpenFile Dilog, SaveFileDialog, FontDialog, ColorDialog, Print Dialog.

MDI: SDI vs MDI,Designing menus, Adding Menus.

SECTION-B

Procedures And Classes: Collections, Subroutines, Functions, Passing variable, Number of Argument, Optional Argument, Returning value from function, classes. Object & Classes, Namespaces, Error Handling, Debugging.

Using ADO.Net: Connection, Data Adapter, Data Sets, Data Commands, Advance Data Bound Controls, Introduction to Crystal Reports.

Building a custom window control: Adding new properties, methods and events, testing a control, enhancing existing controls.

Introduction to Database Concepts: Data independence, DBMS Architecture, components of a database system, Advantages and disadvantages of Database system, Schemas, Instances, ER Model.

Introduction to Relational Database Management System: DDL statements: Table Creation and Management: Create Alter, Drop and Rename Table, create view, DML statements: select, insert, update and delete. TCL statement: Commit, Rollback. Integrity Constraints in SQL: Primary key**,** Foreign Key, Not Null, Unique, Check, Basic SQL Query,

Note: This subject is common to all branches. Only basics of Database concepts and SQL are covered.

RECOMMENDED BOOKS:
1. Brian Siler & Jeff Spotts, "Microsoft Visual Basic.Net"
2. Matthew MacDonald, ".NET Insight for VB Developers"
3. "Mastering in VB.Net"
4. "Using Microsoft Visual Basic.NET" by Brian Siler and Jeff Spotts, Pearson Education.
5. Prateek Bhatia, Database Management system, Kalayani Publishers
6. Korth and Silberschatz Abraham, Database Concepts, McGraw Hall, 1991

CPE-207   **ALGORITHM ANALYSIS & DESIGN**

L	T	P	Cr
3	0	0	3.0

Course Objectives:
- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

SECTION-A

Introduction: Algorithm, analyzing algorithms, internal and external sorting, sets, graphs, stacks, queues, trees, heaps, graphs, hashing.

Divide and Conquer: General method, binary search, Min-max problem, Merge sort, Quick sort, Strassen's matrix multiplication.

Greedy Method: General Method, Job sequencing with deadlines, Knapsack problem, minimum spanning trees, single source shortest paths.

SECTION-B

Dynamic Programming: General Method multistage graphs, Optimal Binary search tree, All pairs shortest path, traveling salesman problem.

Backtracking: 8 queens problem, sum of subsets, graph coloring, knapsack problem.

Branch & Bound Method, 0/1 Knapsack problem, Traveling salesman problem.

Lower Bound Theory: Lower bound technique, Comparison trees for sorting and searching, some lower bound on parallel computation.

Problem classes: P, NP, NP-hard & NP-complete, deterministic and non- deterministic polynomial time algorithm.

Recommended Books:
1. Fundamentals of Computer Algorithm, Latest edition, By Horowitz Sahni, Galgotia Publication.
2. Algorithms, Latest Edition, By knuth.
3. Design & Analysis of Algorithm, Latest Edition, By Goodman, McGraw hill Publication.

CPE-208   **OPERATING SYSTEMS**

L	T	P	Cr
3	0	0	3.0

Course objectives:
- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To learn programmatically to implement simple OS mechanisms

SECTION-A

Basic Functions and Concepts of Operating Systems: Concept of an operating system, batch system, Multi-programmed, Time sharing, Personal Computer System, Parallel system, Real time system, Network Operating System and Distributed Operating System.

Features and Objective of Operating Systems: System components, operating system services, System calls, System Programmers, System Structure: Simple Structure, Layered Approach, Microkernel

Process Management: Concept of process, process states, process control block, Process Scheduling: Scheduling Queues, Schedulers, and Context Switch, operations on processes CPU scheduling Algorithms: FCFS, SJF, RR and priority, Multilevel queue scheduling, Multilevel feedback queue scheduling

Deadlocks: Introduction to deadlocks, Necessary Conditions for deadlock, Resource allocation graph, Deadlock Prevention, Deadlock Avoidance: Safe state, Resource-Allocation-Graph Algorithm, Banker's Algorithm, Deadlock Detection, Recovery from Deadlock

SECTION-B

Memory Management: Logical and physical address space, Swapping, Contiguous memory Allocation: Memory Protection, Memory Allocation, Fragmentation, paging: basic method, Protection and shared pages, segmentation: basic method, hardware, Protection and sharing, virtual memory, Demand Paging, Page Replacement Algorithms ((FIFO, Optimal, LRU, LRU Approximation page replacement), Allocation of Frames, Thrashing.

Information Management: Files - file concept, file types, File attributes, file operations, access methods, allocation methods (contiguous, linked, indexed), directory structure free-space management (bit vector, linked list, grouping, counting),

Disk Management: Disk structure, Disk Scheduling (FCFS, SSTF, SCAN, C-SCAN, LOOK), Disk Management (Disk Formatting, Boot Block, Bad Blocks), Swap Space Management: Swap Space Use, Swap Space Location.

Case Studies: Brief introduction of Windows, UNIX and LINUX.

Recommended Books:

1. Operating System: (Sixth Edition) 2005: Galvin Silberschatz, Addison Wesley Publishing Ltd.
2. Flynn "Understanding operating Systems", Cengage Learning (Thomson)
3. DM Dhamdhere, "Operating System r A Concept Based Approach", Tata Me Graw- Hill.
4. Operating Systems Design and Implementation: Andrew S. Tanembaum, PHI (Latest Edition).

CPE-209   **OBJECT ORIENTED PROGRAMMING USING C++**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

Course Objectives:

The learning objectives of this course are:
- To understand how C++ improves C with object-oriented features.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to design C++ classes for code reuse.
- To learn how to implement copy constructors and class member functions.
- To understand the concept of data abstraction and encapsulation.
- To learn how containment and inheritance promote code reuse in C++.
- To learn inheritance, virtual functions, polymorphism, templates and exception handling

SECTION - A

Introduction: - Review of basic concepts (Data types, tokens, operators, arrays, strings, structure). Concepts of OOPS, Comparison between procedural and OOPS, Elements of OOPS, its paradigm, its merits and demerits, functions, function overloading and function.

Classes and Objects :- Classes, creating a class, accessing class members, memory allocation for objects, array of objects, static objects, friend class, empty classes, nested classes, abstract classes and container class.

Constructor and Destructor :- Its need, Types of constructor- Default, Copy, Multiple, Dynamic, Destructor, Constructor and Destructor with static members, Order of execution of constructor and destructor.

Operator Overloading and type Conversion :- Definition, Rules for overloading, Overloading of unary and binary operators, Overloading NEW and DELETE operators, Type conversion- Basic type to class type, class type to basic type, class to class type.

SECTION - B

Inheritance: - Virtual base class, types of inheritance, typing conversions and visibility

Polymorphism: - Virtual functions, Virtual destructors, Concept of binding- early and late, Virtual functions, Pure virtual functions, Polymorphism.

Exception Handling: - Basics of exception handling, Exception handling mechanisms, Throwing mechanisms, Catching mechanisms

Pointers and dynamic memory management :- Understanding pointers, accessing address of a variable, declaring and initialization, pointer arithmetic, pointer to pointer, pointer to function, pointer to array, array of pointers, pointer to object, this pointers, null pointers, dangling pointers and memory leak.

Managing Data Files: - File streams, Hierarchy of file streams, Reading/Writing of files, accessing records randomly and sequentially and updating files.

Recommended Books:

1. Object Oriented Programming with C + + by   Bala Guruswamy; TATA McGraw Hill Publishing Co. Ltd.
2. Turbo C + + Robert and Lafore: Galgolia Publications.
3. Satzinger, Object Oriented Analysis and Design with the unified process, Cengage Learning (Thomson)
4. C++ Primer Plus by Stephan & PRAT: Galgotia Publications

CPE – 256   **VISUAL PROGRAMMING USING VB.NET LAB**

	L	**T**	**P**	**Cr**
	0	0	4	2.0

1. Write windows applications to demonstrate control structures of VB.NET.

2. Write window applications to demonstrate various controls of VB.NET.

3. Write a Windows application that functions like a Mathematical Calculator.

4. Write a windows application that functions like a Stopwatch.

5. Write a Windows application demonstrating the use of string functions.

6. Write a Windows application demonstrating the use of Arrays.

7. Write a windows application that functions like a Notepad (using Menu Editor, Common Dialog Control, Textbox's properties).

8. Write a windows application demonstrating the use of ADO

9. Write a Windows application for building a user control.

10. Write a windows application demonstrating various MDI features supported in   VB.NET.

11.Creation of tables, virtual tables and views in SQL.

12.Viewing the contents of data dictionary.

13.Insert, update, delete of rows tables in SQL.

14. Manipulation (Insert, Update, Delete) on Tables.

15. Adding constraints like: primary key, not Null, Foreign key.

CPE 257   **ALGORITHM ANALYSIS & DESIGN LAB**

                                                    L   **T**   **P**   **Cr**
                                                    0   0   2   1.0

List of Experiments

1. Write a program to sort 'n' numbers using merge sort. Mention the numbers of comparisons made by the program.

2. Write a program to sort 'n' numbers using quick sort. Mention the numbers of comparisons made by the program.

3. Write a program for stressor's matrix multiplication.

4. Write a program for knapsack problem.

5. Write a program for minimum spanning trees.

6. Write a program for single source shortest paths.

7. Write a program of traveling salesman problem.

8. Write a program for all pairs shortest paths

CPE-258   **OPERATING SYSTEM LAB**

L	T	P	Cr
0	0	2	1.0

Hardware Lab

List of Experiments:

1. Identification of various computer components: Motherboard, Processor, System buses, Expansion Buses and PC Power supplies Memories etc.
2. PC assembling

Operating Lab

List of Experiments:

1. Familiarization of UNIX/LINUX Environment.

2. Installation and Administration of UNIX/LINUX operating system.

3. Implementation of common commands of UNIX operating systems.

4. Working on vi editor using its different modes.

5. Redirection of input and output using Filters and Pipes.

6. Shell programming and its features.

7. Implementation of programs using shell scripts.

Recommended Books:

1. Forouzan UNIX and Shell Programming 1st Edition, Cengage Learning (Thomson)
2. Subhadeep Choudhury 'The A to Z of PC hardware and Maintenance', Dhannpat Rai & Co.

Punjabi University, Patiala   Four Year B.Tech (Computer Sc. & Engg.) Batch 2018

BOS: 2019

CPE - 259   **OBJECT ORIENTED PROGRAMMING USING C++ LAB**

L	T	P	Cr
0	0	2	1.0

List of Experiments:

1. Write a program to illustrate the working of different iterative controls.

2. Write a program to illustrate the use of conditional statements.

3. Write a program to illustrate difference between call by reference and call by value.

4. Write a program to illustrate use of classes and objects.

5. Write a program to illustrate the use of constructors and destructors in object oriented language.

6. Write a program to illustrate the use operator overloading in object oriented language.

7. Write a program to illustrate the use of inheritance and type of inheritance in object oriented language.

8. Write a program to illustrate the use virtual function in object oriented language.

9. Write a program to illustrate the use runtime polymorphism in object oriented   language.

10. Write a program to illustrate the use of File Stream operation in object oriented language.

CPE-210   MICROPROCESSOR & ASSEMBLY LANGUAGE PROGRAMMING

	L	**T**	**P**	**Cr**
	3	0	0	3.0

Section-A

Introduction of Microprocessor: CPU, I/O devices, clock, memory, bus architecture, tri-state logic, address bus, data bus & control bus and their operations.

Semiconductor Memories: Development of semiconductor memory, internal structure and decoding, Read and Write timing diagrams, MROM, ROM, EPROM, EEPROM, DRAM.

Architecture of 8-bit Microprocessor: Intel 8085Amicroprocessor, Pin description and internal architecture.

Operation and Control of Microprocessor: Timing and control unit, op-code fetch machine cycle, memory read/write machine cycles, I/O read/write machine cycles, state transition diagram.

Instruction Set: Instruction format, Addressing modes; Data transfer, arithmetic, logical, branch, stack and machine control groups of instruction set.

Section-B

Assembly Language Programming: Assembler directives, simple examples; Subroutines, parameter passing to subroutines. Data transfer operations, 16-bit arithmetic instructions, 16-bit address operations.

Interfacing: Interfacing of memory chips, address allocation technique and decoding; Interfacing of I/O devices, LEDs and toggle-switches as examples , memory mapped and isolated I/O structure;

I/O techniques: CPU initiated unconditional and conditional I/O transfer, device initiated interrupt I/O transfer.

Code Conversions: BCD to binary to ASCII and vice-versa, BCD addition and subtraction, BCD to 7-segment LED code conversion.

Programmable Peripheral Interface: Intel 8255 A, pin configuration, internal structure of a port bit, modes of operation, bit SET/RESET feature, programming; ADC and DAC chips and their interfacing.

Interrupts: Interrupt structure of 8085A microprocessor, processing of vectored and non-vectored interrupts, latency time and response time; Handling multiple interrupts

Programmable Interval Timer: Intel 8253, pin configuration, internal block diagram of counter and modes of operation, counter read methods ,programming. 8257 DMA controller and 8259 interrupt controller. Serial I/O operations.

Recommended Books:
1. Hall, D. V., "Microprocessor and Interfacing-Programming and Hardware", 2nd Ed., Tata McGraw-Hill Publishing Company Limited, 2008.
2. Gaonkar R. S., "Microprocessor Architecture, Programming and Applications", 5th Ed., Penram International, 2007.
3. Stewart J, "Microprocessor Systems- Hardware, Software and Programming", Prentice Hall International Edition,1990.
4. Short K. L., "Microprocessors and Programmed Logic", 2nd Ed., Pearson Education, 2008.
5. B.Ram, Introduction to Microprocessors and Assembly Language.

CPE-211   MULTIMEDIA SYSTEMS & ANIMATIONS

	L	T	P	Cr
	3	0	0	3.0

Course Objectives:
- To acquire fundamentals principles of multimedia, including digitization and data compression for non-textual information
- To understand issues in representing, processing, and transmitting multimedia data
- To understand core multimedia technologies and standards
- To gain hands-on experience in image, sound and video editing and in some aspects of multimedia authoring (incorporating images, sound, video, and animation)
- Use animation software in the production of animated works.
- Study the history of animation.

SECTION – A

Introduction: Introduction to Multimedia, Introduction to Hypermedia and Hyper Text, Multimedia Systems and Desirable Features, Applications of Multimedia

Multimedia Technology: Multimedia software development tools, Multimedia Authoring Tools, Multimedia Standards for Document Architecture: SGML and ODA.

Multimedia Storage Media : Magnetic and Optical Media, RAID and its levels, Compact Disc and its standards, DVD and its standards, other optical storage devices

Text, Image, Graphics and Video: Types of text, ASCII codes, Unicode standards, Font, Insertion of text, OCR, Graphic/Image File Formats, Graphic/Image Data, Colour in Image, introduction to Video ,Types of Video Signals: Analog Video, Digital Video, TV standards.

Compression: Basics of Information theory, Classifying Compression Algorithms: Lossless, Lossless/Perceptual Compression Algorithms: Entropy Encoding: Run-length Encoding, Huffman Coding. Differential Encoding, Definitions of Scalar Quantization and Vector Quantization, Frequency Domain Methods: JPEG Compression, Video Compression; MPEG Video Compression, MPEG Video Bit stream.

Audio Compression: Brief introduction to: Decibels, Microphone, Amplifier, Speakers, Digital audio specifications, Sound card, Synthesizers, Purpose of Musical Instrument Digital Interface (MIDI), Psychoacoustics, Perceptual Audio Coder, Simple Audio Compression Methods; PCM, DPCM, MPEG-1 Audio Compression, MP3, ADPCM speech coder, Multimedia System architecture, Components, Quality of service.

SECTION – B

Introduction Animation: Its definition, Principles of Animation, early examples of Animation, Animation by Computer.

History of Animation: Stop Motion Photo Animation, Zoetrope, Thaumatrope, Cel and Paper Animation, early Disney's Cel Animation Processes.

Types of Animation: Animation Techniques, File formats for Animation, Cel Animation, Stop Motion Animation, 2-D Animation, 3-D Animation.

Keyframe Animation: Creating Keyframes, Auto Keyframes, Move & Scale Keyframe on the timeline, Animating with constraints & simple controllers, animation Modifiers & complex controllers, function curves in the track view, motion mixer.

Reference Books
1. Li, Drew , Multimedia Computing, Pearson Education, Latest Edition ,
2. Ralf Steinmetz and Klara Nahrstedt, Multimedia Computing Communications and Applications By Pearson Educations
3. Prabhat K. Andleigh, Kran Thakkar, Multimedia System Design, PHI, Latest Edition
4. Fred Halsall Multimedia Communications, Pearson Education, Latest Edition
5. NewRiders, "3dsmax7 Fundamentals", BPB, 2005
6. Isaac Kerlow, "The Art of 3D Computer Animation and Effects", 4th edition, Wiley, 2009
7. The Encyclopedia of Animation Techniques, Richard Taylor, 1996 (India)
8. Experimental Animation: An Illustrated Anthology by Robert Russet and Cecile Starr Pub. Van Nostrand Reinhold Compa Pub.1976 (U.S.A)
9. A Banerji & A M Gosh, "Multimedia Technologies", Tata Mc Graw Hill

CPE-212   **E-COMMERCE**

L	T	P	Cr
3	0	0	3.0

Course Objectives:

- To introduce the concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general. In addition, we will study the development of websites using relevant software tools.
- Acquaint students with a fundamental understanding of the environment and strategies in the New Economy.
- Provide a fundamental understanding of the different types and key components on business models in the New Economy.
- Provide guiding principles behind the design and strategy of the customer web interface.
- Understand the traditional and new communication/marketing approaches that create competitive advantage in the New Economy.
- Provide insights on how to implement strategy in the New Economy.

SECTION-A

Introduction: Definition of Electronic Commerce, E-Commerce: technology and prospects, incentives for engaging in electronic commerce, needs of E-Commerce, advantages and disadvantages, framework, Electronic commerce and Electronic Business(C2C) (2G , G2G , B2G , B2P ,B2A,P2P,B2A,C2A,B2B,B2C), Impact of E-commerce on business, E-Commerce Models.

Network Infrastructure for E- Commerce: Internet and Intranet based E-commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY). Building own website :Reasons for building own website, Benefits of website, Cost , Time , Reach, Registering a Domain Name, Web promotion, Target email , Banner Exchange , Shopping Bots.

SECTION-B

Mobile Commerce: Introduction to Mobile Commerce, Mobile Computing Application, Wireless Application Protocols, WAP Technology, Mobile Information Devices, Web Security. Introduction to Web security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, firewalls & Network Security.

Electronic payment System, Introduction, Types of Electronic payment system, Payment types, Traditional payment, Value exchange system, Credit card system, Electronic funds transfer, Paperless bill, Modern payment cash, Electronic cash , online Banking. EDI Application in business, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda.

Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e – Commerce- Governance for India E- Governance of India, Indian customer EDI system, Service centre, Imports, Exports.

References:

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison- Wesley.
2. Pete Lohsin , John Vacca "Electronic Commerce", New Age International
 3. Goel, Ritendra "E-commerce", New Age International
4. Laudon, "E-Commerce: Business, Technology, Society", Pearson Education
5. Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH
6. Turban, "Electronic Commerce 2004: A Managerial Perspective", Pearson Education

CPE-213   **BUILDING ENTERPRISE APPLICATIONS**

	L	T	P	Cr
	3	0	0	3.0

Course Objectives:
- The course provides students
- With the basic concepts of ERP systems for manufacturing or service companies, and the differences among (Material Requirement Planning) MRP, MRP II, and ERP systems
- Apply the principles of ERP systems, their major components, and the relationships among these components
- With the knowledge of typical ERP systems, and the advantages and limitations of implementing ERP systems.
- To comprehend the technical aspects of ERP systems
- To be able to map business processes using ERP concepts and techniques.

SECTION-A

Introduction to ERP: Definition of ERF, characteristics of ERP, Impact of ERP

Functioning of ERP System: Value chain and supply chain, predecessor of ERP, ERP System and its Extensions.

ERP Architecture: Logical architecture, Physical IT architecture, mainframe architecture, cliet-server architecture, browser architecture.

SECTION-B

ERP Implementation: phases of ERP cycle, Model building strategy, functional fit analysis, Significance and methods of Risk analysis, Significance and methods of cost-benefit analysis.

Introduction - ERP and open source software, ERP and Corporate Governance, ERP and shared services, ERP criticism

Recommended Books:
1. "A Guide to ERP Benefits, Implementation and Trends", Prof. dr. Lineke Sneller RC
2. "ERP: The Implementation Cycle", Stephen Harwood
3. "Enterprise Resource Planning Systems: Systems, Life Cycle, Electronic", Daniel Edmund O'Leary
4. "Enterprise Resource Planning", Mary Sumner

ENVIRONMENT & ROAD SAFETY AWARENESS

	L	T	P	Cr
	2	0	0	0.0

Time Allotted: 3 hours   Total Marks : 100

Total Lectures: 50   Pass Marks : 35

Written Paper : 75 Marks

Field Work : 25 Marks

Instructions

The written paper will have two parts. First part will be of 25 marks it will contain 10 questions, the students will attempt 5 questions of five marks out of this part. The answer to these questions should non-exceed 50 words each.

Part second will be of 50 marks and will contain 10 essay type questions. The candidates will attempt 5 questions out of this part and the answer to each question should not exceed 500 words. Each question will carry ten marks**.**

Unit 1: The Multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness   (2 Lectures).

Unit 2 Natural Resources :

Renewable and non renewable resources:

Natural resources and associated problems.

a) Forest resources: Use and over - exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people, b) Water resources: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems, c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, ease studies, d) Food Resources : World Food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging; salinity, case studies, e)   Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies, F) Land resources: Land as a resource, land degradation, man included landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems

Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and functions of the following ecosystem:-Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)   (6 lectures)

Unit 4: Biodiversity and its conservation

introduction - - Definition: species and ecosystem diversity, Biogeographically classification of India, Value of biodiversity: consumptives use, productive, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot spots of biodiversity, Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.   (8 Lectures)

Unit 5: Environmental Pollution

Definition : Causes, effects and control measures of:-Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear Hazards, Solid waste Management Causes, effects and control meausers of urban and industrial wastes., Role of and individual in prevention of pollution, Pollution case studies, Disaster management : floods, earthquake, cyclone and landslides.   (8 Lectures)

Unit 6: Social Issues and the Environment

From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns Case studies, Environmental ethics: Issues and possible solutions - Climate change, global warning, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies Wasteland reclamation, Consumerism and waste products., Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water

(Prevention and control of pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.

                                                                        (7 Lectures)

Unit 7: Human Population and the Environment

Population growth, variation among nations, Population explosion - Family Welfare Programme, Environment and human health, Human Rights, Value Education, HIV/ AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health, Case Studies (6 Lectures)

Unit 8: Field Work

Visit to a local area to document environmental areas, river/ forest/ grassland/ hill/ mountain, Visit to a local polluted site - Urban/ Rural/ Industrial/ Agriculture, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 Lecture hours)

B. TECH THIRD YEAR
COMPUTER SCIENCE & ENGINEERING

(Batch 2018)
Session (2020-21)

SCHEME OF PAPERS

FIFTH SEMESTER (COMPUTER SCIENCE & ENGINEERING)

S. No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-301	Theory of Computation	3	0	0	3.0
2.	CPE-302	Database Management System	3	0	0	3.0
3.	CPE-303	Computer Graphics	3	0	0	3.0
4.	CPE-304	Java Programming	3	0	0	3.0
5.	CPE-305	Software Engineering	3	0	0	3.0
6.		Elective – II*	3	0	0	3.0
7.	CPE-352	Database Management System Lab	0	0	2	1.0
8.	CPE-353	Computer Graphics Lab	0	0	2	1.0
9.	CPE-354	Java Programming Lab	0	0	2	1.0
10.	STG-351	Summer Training **	-	-	-	6.0
11.	***	Drug Abuse: Problem, Management And Prevention (Qualifying Course)	2	0	0	0.0
Total			**20**	**0**	**6**	**27**
Total Contact Hours = 26						

ELECTIVE SUBJECTS – II*

S. No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-306	Artificial Intelligence	3	0	0	3.0
2.	CPE-307	Software Project Management	3	0	0	3.0
3.	MBA-5011	Foundation of Financial Accounting	3	0	0	3.0

*Choose any one from the list. Elective under Massive Open Online Courses (MOOCS) available on SWAYAM platform of Govt. of India offered through online mode. The subjects which students can opt from MOOCS will be notified by the department semester wise time to time

CPE-352, CPE-353 and CPE-354 are practical papers only. There will not be any theory examination for these papers.

** Summer Training will be of 4 to 6 weeks duration in Industry / In House.

*** In addition to above mentioned subjects, there will be an additional course on 'Drug Abuse: Problem, Management and Prevention' as a qualifying subject

Department of Computer Science & Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters
(Common for B.Tech. in Computer Science & Engineering, Electronics and Communication Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech/MBA Branches)

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50
Pass Marks   : 20
Note:- Section C is compulsory. Attempt any six questions selection three questions from each section A & B.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5……………………………………………..

Section-B (From Section B of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9. ....   3x5
Q10…………………………………………….

Section-C (From whole syllabus)
Q11
a)..
b)..
c)..
d)..
e)..
f)..
g)..
h)..
i)..
j)…………………………………………………….   10x2=20

Note for the paper setter:

1. Total numbers of questions to be set are Eleven (11) as per the above format.

2. There will be five questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.

3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.

4. The maximum limit on numerical problems to be set in the paper is 35%.

5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.

6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.

7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.

8. Use of Scientific calculator should be clearly specified.

CPE-301   **THEORY OF COMPUTATION**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

Course Objective:
- The goal of this course is to provide students with an understanding of basic concepts in the theory of computation.
- To construct finite state machines and the equivalent regular expressions
- To prove the equivalence of languages described by finite state machines and regular expressions.
- To construct pushdown automata, Turing machine and the equivalent context free grammars.
- To prove the equivalence of languages described by pushdown automata and context free grammars.

SECTION-A

Sets, Relations and Languages: Sets, Relations and functions, finite and infinite sets, Closures and algorithms, alphabets and languages

Finite Automata: Deterministic Finite Automata (DFA), Non Deterministic Finite Automata (NDFA), Moore and Mealy Machine, Application of finite automata, Conversion of NDFA to DFA, Mealy to Moore and Moore to Mealy

Grammar: Definition of Grammars, Derivation & Language generated by Grammars, Chomsky Classification of Languages

Regular Expression and Languages: Regular expression, finite Automata and Regular expression, Properties of Regular Languages, Pumping lemma for regular languages, application of pumping lemma, Closure properties of regular languages, Minimization of finite Automata.

SECTION-B

Context free Grammar and Languages: Context free grammar: Parse Trees, Ambiguity in Grammar and Languages, Construction of Reduced Grammars

Properties of Context free languages – Normal forms for context free grammars, Chomsky Normal Form (CNF), Greibach Normal Form (GNF)

Pushdown Automata: Pushdown Automata: Deterministic Push down Automata, Equivalence of Push Down automata and Context free Grammar.

Turing Machines: Definition of Turing Machine, Application of Turing Machine in language accepting and computing.

Cellular Automata: Formal Language aspects, Algebraic Properties Universality & Complexity Variants.

Recommended Books:

1. K.L.P. Mishra, N. Chandrasekaran, "Theory of Computer Science, Automata, Languages and Computation", PHI
2. J.E .Hopcroft, R. Motwani and J.D. Ullmn, "Introduction to Automata Theory, Language and Computation", Pearson Education Asia, 2nd Edition.
3. B.M. Moret, "The Theory of Computation", Pearson Education Asia.
4. H.R. Lewis and C.H. Papa dimitriou, "Elements of the theory of Computation", Pearson Education Asia, 2nd Edition.

CPE-302   **DATABASE MANAGEMENT SYSTEM**

L	T	P	Cr
3	0	0	3.0

Course Objectives:

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
- To understand and use data manipulation language to query, update, and manage a database
- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS

SECTION-A

Introduction to Database Concepts: Difference between Database and non database system, Data independence, DBMS Architecture, components of a database system, Advantages and disadvantages of Database system, Intended Uses of a DBMS, Schemas, and Instances, Database Languages and Interfaces.

Data Models: Relational Model, Network Model, Hierarchical Model, ER Model: Design, issues, Mapping constraints, keys, ER diagram, weak entity sets, extended ER features, Design of an ER Database schema, Reduction of an ER Schema to tables, Comparison of Models.

Query Processing: in Relation Algebra: Fundamental and Additional Relational Algebra operators. Relational Calculus: Tuple and Domain Relational Calculus.

Relational Query Languages: SQL: Basic SQL Select Statements. Table Creation and Management: Create, Alter, Drop and Rename. Constraints: Primary key, Foreign key, Unique, Not null and Check. Data Manipulation: Insert, Update and Delete. Restricting rows in Select using Where clause, Comparison operators, Logical Operators, Order by clause.

SECTION-B

Database Design: Integrity Constraints: Domain constraints, Referential integrity, entity integrity, specify these constraints in SQL, specification of Additional Constraints as assertions and triggers.

Functional dependencies: Functional dependencies, Decomposition, Normalization using FD's MVD's and JD's Domain key normal form.

Query Optimization: Translating SQL Queries into Relational Algebra, Notation for Query Trees and Query Graphs, Heuristic Optimization of Query Trees, Transformation Rules for Relational Algebra Operations, Heuristic Algebraic Optimization Algorithm, Converting Query Trees into Query Execution Plans. Cost Components in Query Optimization, Using cost estimates in query optimization.

Joining Data from Multiple Tables: Equi, Non-Equal, Self and Outer Joins. Single-row and Group functions. Sub-queries. Introduction to Oracle Server and Data Dictionary. Additional Database Object: Sequences, Synonyms and Views.

Recommended Books:

1. Navathe and Elmasri, Fundamentals of Database Systems, Pearson education
2. Korth and Silberschatz Abraham, Database Concepts, McGraw Hall, 1991.
3. An introduction to database system by C.J.Date (Addison Welsey, Publishing house).
4. Bipin Desai, Database System, TMG
5. Prateek Bhatia, Database Management system, Kalayani Publishers

CPE-303   **COMPUTER GRAPHICS**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

Course objectives:

- To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations.
- To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations.
- The computer graphics course prepares students for activities involving in design, development and testing of modeling, rendering, shading and animation.

SECTION-A

Graphics Hardware: Raster CRTs, Raster and Random Scan Displays, Display Controllers and Processors, Graphics Input Devices, Applications of Computer Graphics.

Raster Scan Conversion Algorithms: Line Drawing Algorithms (DDA & Bresenham's), Circle Drawing Algorithms (Mid Point and Bresenham's).

Two-Dimensional Geometric Transformations: Basic Transformations, (Translation, Rotation and Scaling) Matrix Representation and Homogenous Coordinates, Shear and Reflection Transformations, Composite Transformations.

Filling: Region filling Algorithms (Boundary Fill and Flood Fill).

SECTION-B

Windowing And Clipping: Viewing pipeline, viewing transformations. 2-D Clipping algorithms-Line clipping algorithms (Cohen Sutherland, Liang Barsky algorithm) Polygon clipping (Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping).

Three-Dimensional Geometric Transformations: Basic Transformations: (Translation, Scaling, Rotation) Composite transformations.

Projections: Parallel and Perspective.

Visible Surface Detection Methods: Depth Buffer Method, A-Buffer Method, Scan Line Method, Area Subdivision Method.

Shading: Gouraud and Phong Shading Algorithms, Properties of Bezier and B-Spline Curves.

Recommended Books:

1. Computer Graphics: By Donald Hearn, M. Pauline Baker
2. Computer Graphics (Schaum Series) by Lipschutz (MC Graw Hill)
3. Principles of Interactive Computer graphics: By W.M. Newman, R.Sproull
4. Fundamentals of Interactive Computer Graphics: By J.D. Foley, A. Van Dam
5. Computer Graphics Using OPEN GL: By F.S. Hill Jr.
6. Computer Graphics: Roy A. Plastock, Gordon Kalley.

CPE-304   **JAVA PROGRAMMING**

		L	**T**	**P**	**Cr**
		3	0	0	3.0

Course Objectives:
- The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism
- Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections
- How to take the statement of a business problem and from this determine suitable logic for solving the problem; then be able to proceed to code that logic as a program written in Java.
- How to test, document and prepare a professional looking package for each business project using javadoc.

SECTION-A

Introduction to Java : Features of Java, difference between Java and C++, JVM, Bytecode, data types, Wrapper types, variables, arrays, operators-arithmetic, bit-wise, relational, Boolean, various control statements.

Introduction to Classes: Class fundamentals, declaring objects, methods, constructors, garbage collection, passing parameters to methods, recursion.

Inheritance: types of inheritance, Access Modifiers (Private, Public, Protected, Default), Polymorphism (Overloading, Overriding, Super & This Keyword), Final Variable, Final Classes & Methods, Static variable Static method, Abstract methods and classes , Packages and interfaces, importing packages.

Exception Handling: Exception types, try, catch, finally, throw and throws, creating exception subclasses.

SECTION-B

Multithreading: Multithread programming, thread priorities, synchronisation, interthread communication, Thread class methods, runnable interface,

I/O: Input/Output, streams, reading and writing console input/output, reading and writing files,

Applets and Graphics: Applet fundamentals; Applet class; Applet initialization and termination; event handling; keyboard and mouse events; AWT class; Layout managers; panels; canvases; Frame windows; drawing lines, rectangles, ellipses.

JDBC programming: Commonly used classes and interfaces of java.sql package, connecting java application to a database, prepared statements.

Advance Concepts: Introduction to Java Beans, Java Swings, Java Server Pages.

Recommended Books :

1.Dietel and Dietal, Java: How to Program, 6th Edition, Pearson Education
2.Herbert Schildt The Complete Reference Java2, TMH
3.James Edward Keogh, Jim Keogh J2EE: The complete Reference, McGraw-Hill

CPE-305   **SOFTWARE ENGINEERING**

	L	T	P	Cr
	3	0	0	3.0

Course Objectives

- The program will prepare our students to be successful professionals in the field with solid fundamental knowledge of software engineering.
- Be successful professionals in the field with solid fundamental knowledge of software engineering
- Utilize and exhibit strong communication and interpersonal skills, as well as professional and ethical principles when functioning as members and leaders of multi-disciplinary teams
- Apply their foundations in software engineering to adapt to readily changing environments using the appropriate theory, principles and processes

SECTION-A

Introduction to Software Engineering: Software Problem, Software Engineering, Approach, Software process, Characteristics of Software Engineering Process, software Development models.

Software Requirement Analysis and Specification: Software Requirement Specification, Problem Analysis, Requirement Specifications.

Software Project Planning: Cost estimation, cost estimation models, Project scheduling, Software Configuration management, Team Structure, Risk Management.

SECTION-B

Function oriented design: Design principles, Coupling Cohesion, Structured Design Methodologies

Object Oriented Design: OOAD, Classes and objects, inheritance and polymorphism, design notation and specification

Brief introduction to various standards related to Software Engineering

Coding: Top Down, bottom up approaches, structured programming, information hiding programming style, documentation,

Testing: Testing Fundamentals, White box testing, Black box testing, Functional testing, boundary value testing, cause effect, graphing.

Recommended Books:

1. Software Engineering Approach, By R. S Pressman
2. Software Engineering, SOMMERVILLE Pearson Education
3. An Integrated Approach to software Engineering. PANKAJ JALOTE

CPE-352   **DATABASE MANAGEMENT SYSTEM LAB**

L	T	P	Cr
0	0	2	1.0

OBJECTIVE:-

The students are required to do exercises / projects in database design like:

1. Creation of tables, virtual tables and views in SQL,

2. Viewing the contents of data dictionary

3. Changing of schema

4. Insert, update, delete of rows tables in SQL

5. Specification of various constraints in SQL: Integrity Constraints: Domain constraints, Referential integrity, entity integrity etc

6. Specification of Additional Constraints as assertions and triggers

7. Query processing in SQL

CPE 353   **COMPUTER GRAPHICS LAB**

L	T	P	Cr
0	0	2	1.0

OBJECTIVE

The students are required to do exercises on various computer graphics algorithms in either C/C++

Language. Implement following using various algorithms:

1. Line drawing

2. Line clipping

3. circle drawing

4. area clipping

5. drawing of some 2-D pictures

6. 2-D transformations: rotation, translation etc

7. Shading

8. Line Hiding

Finally design some Ads., Game etc using all the above or built in commands.

CPE-354   **JAVA PROGRAMMING LAB**

	L	**T**	**P**	**Cr**
	0	0	2	1.0

LIST OF PRACTICAL

1. WAP to implement constructors and overloading.

2. WAP to implement recursion, functions and arrays.

3. WAP to implement Inheritance, interfaces and packages.

4. WAP which will explain the concept of try, catch and throw.

5. WAP to demonstrate threads and animations.

6. WAP to explain I/O streams and files and socket programming.

7. WAP to implements Applets and use of it on internet.

8. WAP to describe AWT Class, Frames, Panels and Drawing.

9. WAP to demonstrate JDBC and build an application.

10. WAP to implements use of JSP.

Punjabi University, Patiala   Four Year B.Tech (Computer Sc. & Engg.) Batch 2018

BOS: 2019

CPE - 306   **ARTIFICIAL INTELLIGENCE**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

Course Objectives:

- To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements.
- To have an appreciation for the engineering issues underlying the design of AI systems.
- To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.
- To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning.

SECTION-A

Artificial Intelligence Techniques, levels of models, understand the importance, functions, advantages, as well as the limitations of artificial intelligence. Use of Artificial Intelligence and intelligent agents

State, space, search, control strategies, heuristic search, problem characteristics, production system characteristics. Mapping between facts and representations, approaches to knowledge representation, semantic sets, frame, conceptual depending, scripts, predictive logic, resolution in predicate logic

SECTION-B

Procedural Vs declarative knowledge, matching, conflict resolution, Non-monotonic reasoning, default reasoning, statistical reasoning, knowledge extraction. Investigate the roles and development methods of artificial intelligence in decision making processes. Neural network resources, cognitive science, role of neural network in computer science.

Characteristics of AI language, LISP-symbol manipulation- basic lisp function, predicated, condition, recursion, iteration, Array-lambda functions, input-output statements. AI problems : pattern recognition, voice recognition, Feature Extraction

Recommended Books :

1. Artificial Intelligence by Rich and Kinght, TMH
2. Introduction to Artificial Intelligence by Charniak and Mcdermott. Addison-Wesley, 1985.
3. Essentials of Artificial Intelligence by Ginsburg. Morgan Kaufmann, 1993.
4. Artificial Intelligence by Winston 3rd Edition, Addison Wesley, 1992.
5. Artificial Intelligence by Padhy, Oxford Press

CPE - 307   **SOFTWARE PROJECT MANAGEMENT**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

SECTION A

Introduction to Software Project Management: Introduction, Software, Difference between software and Program, Characteristics of Software, What is a Project? Why Software Project Management? Activities Covered by Software Project Manager, Structure of Software Project Management Document, Software Project Management Life Cycle, Role of Metrics and Measurement.

Project Size Measurement using KLOC and Function Point Metric, Cost Estimation Analysis, COCOMO Model, PERT, Gantt chart and Critical Math Management for Project Scheduling.

Software Project Development Models: Waterfall Model, Prototype Model, Spiral Model and RAD Model, Merits and Demerits of different models.

SECTION B

Managing and Evaluating the Project: Managing the task: Project Monitoring and control, managing the plan, reviews, feedback and reporting mechanisms, configuration management, quality control and quality assurance, managing change, readjusting goals and milestones, risk management, testing phases, formalized support activities;

Managing the team: Team organizations, recruiting and staffing-picking the right people, technical leadership, avoiding obsolescence-training etc.

Risk Management : What is risk management and why it is important Risk Management Cycle, Risk Identification; Common Tools and Techniques, Risk quantification, Risk Monitoring, Risk mitigation.

Recommended Books :
1. Tom Demarco, Controlling Software Project Management, Measurement, Prentice Hall, New Jersey.
2. Tom Glib, Finzi Susannah, Principles of Software Engineering Management, Addison Wesley, England.
3. Bob Hughes and Mike Cotterell; Software Project Management, third edition, Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Pankaj Jalote; Software Project Management in Practice, Pearson Education Asia.
5. Watts S. Humphrey; Winning with Software ? An Executive Strategy, Pearson Education Asia.
6. Software Project Management, Walker Royce: Pearson Education, 2005.
7. Software Project Management, Joel Henry, Pearson Education.

MBA 5011   **FOUNDATIONS OF FINANCIAL ACCOUNTING**

L	**T**	**P**	**Cr**
3	0	0	3.0

Introduction to Financial Accounting

Financial Statements: Balance Sheet, Income Statement, Statement of cash flows. Mechanics of Accounting: Transaction Analysis, Journal Entries, Trial of Balance. **Completing the Accounting Cycle:** Accrual Accounting, Adjusting Entries, Preparing Financial Statements. **Ensuring the Integrity of Financial Information:** Problems, Safeguards. Selling a Product or a Service: Revenue Recognition, Cash Collection, Accounts Receivable. Inventories: Nature of Inventories, Valuation Methods.

Recommended Books:

1. Khan and Jain, Financial Management, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 4th Edition.
2. Robert Anthony, David F. Hawkins and Kenneth A. Merchant, Accounting-Text and Cases, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 12th Edition, 2007.

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION

(FOR ALL UNDERGRADUATE COURSES)

Note: This is a compulsory qualifying paper, which the students have to study and qualify during three years of their degree course.

REGULAR STUDENTS

Max Marks: 70   Max Time: 3hrs.
Internal Assessment: 30
Total Marks 100   Lectures per week 2

INSTRUCTIONS FOR THE PAPER SETTERS

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus. Each question shall carry 7 marks. Section C will consist of 14 short answer type of 2 marks each.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt any three questions from section A and any three questions from section B. Section C is compulsory.

PRIVATE STUDENTS

Max Marks: 100   Max Time: 3hrs.
                                                                         Lectures per week 2

INSTRUCTIONS FOR THE PAPER SETTERS

The question paper will consist of three sections A, B and C. Each of sections A and B will have three questions from the respective sections of the syllabus. Each question shall carry 15 marks. Section C will consist of 20 short answer type of 2 marks each.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt any two questions from section A and any two questions from section B. Section C is compulsory.

SECTION A

UNIT: I – Problem of Drug Abuse: Concept and Overview; Types of Drug Often Abused

   (a) **Concept and Overview**
        What are drugs and what constitutes Drug Abuse?; Prevalence of menace of Drug Abuse; How drug Abuse is different from Drug Dependence and Drug Addiction?; Physical and psychological dependence- concepts of drug tolerance

   (b) **Introduction to drugs of abuse: Short Term, Long term effects & withdrawal symptoms**
        Stimulants: Amphetamines, Cocaine, Nicotine
        Depressants: Alcohol, Barbiturates- Nembutal, Seconal, Phenobarbital Benzodiazepines –Diazepam, Alprazolam, Flunitrazepam
        Narcotics: Opium, morphine, heroin
        Hallucinogens: Cannabis & derivatives (marijuana, hashish, hash oil)
        Steroids Inhalants

UNIT: II –Nature of the Problem

   Vulnerable Age Groups. Signs and symptoms of Drug Abuse: (a)- Physical indicators; (b)- Academic indicators; (c)- Behavioral and Psychological indicators

SECTION B

UNIT: III – Causes and Consequences of Drug Abuse

        a) **Causes:** Physiological; Psychological; Sociological
        b) **Consequences of Drug Abuse:** For individuals, For families; For society & Nation

Unit: IV- Management & Prevention of Drug Abuse

Management of Drug Abuse, Prevention of Drug Abuse. Role of Family, School, Media, Legislation & Deaddiction Centers

Suggested readings

   1. Kapoor. T. (1985) Drug Epidemic among Indian Youth, New Delhi: Mittal Pub
   2. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention,Jaipur: Rawat Publication.
   3. Ahuja, Ram,(2003), Social Problems in India, Rawat Publications: Jaipur
   4. 2003 National Household Survey of Alcohol and Drug Abuse. New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
   5. World Drug Report 2011, United Nations Office of Drug and Crime.
   6. World Drug Report 2010, United nations Office of Drug and Crime.
   7. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
   8. The Narcotic Drugs and Psychotropic Substances Act, 1985, (New Delhi: Universal, 2012)

Pedagogy of the Course Work:

The pedagogy of the course work will consist of the following: 70% lectures (including expert lectures); 30% assignments, discussion and seminars and class tests.
Note: A visit to drug de-addiction centre could also be undertaken.

B. TECH THIRD YEAR
COMPUTER SCIENCE & ENGINEERING

(Batch 2018)
Session (2020-21)

SCHEME OF PAPERS

SIXTH SEMESTER (COMPUTER SCIENCE & ENGINEERING)

S. No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-308	RDBMS Using PL/SQL	3	0	0	3.0
2.	CPE-309	Mobile Apps Development	2	0	0	2.0
3.	CPE-310	Compiler Design	3	0	0	3.0
4.	CPE-311	Network Security	3	0	0	3.0
5.	CPE-312	Machine Learning	3	0	0	3.0
6.		Elective-III *	3	0	0	3.0
7.	CPE-358	RDBMS Using PL/SQL Lab	0	0	2	1.0
8.	CPE-359	Mobile Apps Development Lab	0	0	4	2.0
9.	CPE-362	Machine Learning Lab	0	0	2	1.0
10.	HSS-351	Communication Skills Lab	0	0	2	1.0
Total			**17**	**0**	**10**	**22**
Total Contact Hours = 27						
		Open Elective**	3	0	0	0.0

ELECTIVE SUBJECTS – III*

S. No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-313	System Simulation & Modeling	3	0	0	3.0
2.	CPE-314	Internet of Things	3	0	0	3.0
3.	CPE-315	Digital Forensics	3	0	0	3.0
4.	MBA-5012	Foundations of Managerial Accounting	3	0	0	3.0

***Choose any one from the list. Elective under Massive Open Online Courses (MOOCS) available on SWAYAM platform of Govt. of India offered through online mode. The subjects which students can opt from MOOCS will be notified by the department semester wise time to time**

OPEN ELECTIVE FOR SIXTH SEMESTER (Offered By Computer Sc. & Engg.)**

S. No.	Subject Code	Subject Name	L	T	P	Cr.
1.		Essentials of Computers (To other departments of the University)	3	0	0	0.0

CPE-358, CPE-359, CPE-362 and HSS-351 are practical papers only. There will not be any theory examination for these papers.

** The list of Open Elective Subjects will be notified by the department to the students. The Open elective course is optional and not mandatory. Students can opt for this course as an additional subject.

Department of Computer Science & Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters
(Common for B.Tech. in Computer Science & Engineering, Electronics and Communication Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech/MBA Branches)

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50
Pass Marks   : 20
Note:- Section C is compulsory. Attempt any six questions selection three questions from each section A & B.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5…………………………………………..

Section-B (From Section B of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9. ....   3x5
Q10…………………………………………….

Section-C (From whole syllabus)
Q11
a)...
b)...
c)...
d)...
e)...
f)...
g)...
h)...
i)...
j)………………………………………………….   10x2=20

Note for the paper setter:

1. Total numbers of questions to be set are Eleven (11) as per the above format.

2. There will be five questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.

3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.

4. The maximum limit on numerical problems to be set in the paper is 35%.

5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.

6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.

7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.

8. Use of Scientific calculator should be clearly specified.

CPE-308   **RDBMS USING PL/SQL**

	L	T	P	Cr
	3	0	0	3.0

Course Objectives:
- Describe basic concepts of database system
- Design a data model and schemas in RDBMS
- Use RDBMS for developing industry applications
- Be competent in use of PL/SQL
- Implement transactions, concurrency control, and be able to do Database recovery.

SECTION-A

Introduction of DBMS:
DBMS architecture, Enhanced-ER (EER) Model Concepts: Specialization and Generalization, Union type, Constraints on Specialization and Generalization, Concept of Hierarchy and Lattice, EER-to-Relational Mapping.

Distributed Databases and Client-Server Architecture: Introduction to Distributed DBMS Concepts, Client-Server Architecture Overview, Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design, Types of Distributed Database Systems.

PL/SQL: Block Structure, Data Types, Creation of Variable, Scope, Nested Blocks, Control Structures. Records and Collections. Using SQL with PL/SQL: Cursors and its types. Subprograms: Stored and Local Procedures and Functions, Procedure vs Function.

Packages: Specification and Body, Triggers and its types. Introduction to Objects: Creating, Storing and Manipulating Objects.

SECTION-B

Database Security: Types of Security, Control Measures, DB security and DBA, Access protection, Discretionary Access Control based on Granting and Revoking privileges. User Creation and Management in SQL: Creating a user, Assigning and Removing User Privileges, Creating and Assigning Roles.

Transaction processing: Introduction, Concurrency, Problems due to concurrency, ACID Properties, Schedule, Serializability. Serial, Non-serial and Conflict-Serializable Schedule

Concurrency control: Locks, Types of Locks: Binary and Two Phase Locking, Variations of Two Phase Locking. Deadlock: Deadlock Prevention Techniques, Deadlock Detection and Recovery. Database Recovery Concepts.

Big Data: Types of data, elements, role of parallel and distributed computing

Recommended Books :

1. Navathe and Elmasri, Fundamentals of Database Systems, Pearson education
2. Korth and Silberschatz Abraham, Database Concepts, McGraw Hall, 1991.
3. An introduction to database system by C.J.Date (Addison Welsey, Publishing house) Latest edition.
4. Bipin Desai, Database System, TMG
5. Prateek Bhatia, Database Management system, Kalyani Publishers

CPE-309   **MOBILE APPLICATIONS DEVELOPMENT**

	L	T	P	Cr
	2	0	0	2.0

Course Objectives:
- Describe those aspects of mobile programming that make it unique from programming for other platforms,
- Critique mobile applications on their design pros and cons,
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced phone features, and
- Deploy applications to the Android marketplace for distribution.

SECTION - A
Getting started with Mobility: Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development
Building blocks of mobile apps: App user interface designing – mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity- states and life cycle, interaction amongst activities.
App functionality beyond user interface - Threads, Async task, Services – states and life cycle, Notifications, Broadcast receivers, Telephony and SMS APIs

SECTION – B
Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet)
Testing mobile apps: Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk
Taking apps to Market: Versioning, signing and packaging mobile apps, distributing apps on mobile market place

Recommended Books :

1. "Programming Android", G. Blake Meike, Laird Dornin, Masumi Nakamura, and Zigurd Mednieks.
2. "Android Programming for Beginners", John Horton.
3. "Learning Android", Marko Gargenta.
4. "The Busy Coder's Guide to Advanced Android Development", Mark L. Murphy.
5. "Head First Android Development", Anthony J.F. Griffiths and David Griffiths.

CPE-310   **COMPILER DESIGN**

	L	**T**	**P**	**Cr**
	3	1	0	3.5

Course Objectives:
- To understand the theory and practice of compiler implementation.
- To learn finite state machines and lexical scanning.
- To learn context free grammars, compiler parsing techniques, construction of abstract syntax trees, symbol tables, intermediate machine representations and actual code generation

SECTION-A

Introduction To Compiling:
Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens. Cross compiler .Introduction to LEX

Syntax Analysis And Semantic Analysis: Role of the parser –Writing Grammars –Context-Free Grammars – Role of Parser and Parse Tree, Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing –Handle, Handle Pruning, Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser. Error .Recovery Techniques for different Parsers. Introduction to YACC.

Symbol tables and their data structures. Synthesized and inherited attributes, Construction of syntax trees.

SECTION-B

Intermediate Code Generation: Intermediate languages – Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples).Short Circuit Code , Back patching .

Code Generation: Issues in the design of code generator – The target machine – Runtime Storage management — Issues in efficient code generation , instruction costs, register utilization and evaluation order. Basic Blocks and Flow Graphs – Next-use Information A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

Code Optimization And Run Time Environments: Introduction– Principal Sources of Optimization – Optimization of basic Blocks ,Loop Optimization– Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local name Parameter Passing.

 Recommended Books :

1.   Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools Pearson Education Asia, 2003.

2.   Allen I. Holub "Compiler Design in C", Prentice Hall of India, 2003.

3.   C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", Benjamin Cummings, 2003.

4.   J.P. Bennet, "Introduction to Compiler Techniques", Second Edition, Tata McGraw-Hill, 2003.

5.   Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001.

6.   Kenneth C. Louden, "Compiler Construction: Principles and Practice", Thompson Learning, 2003

CPE-311   **NETWORK SECURITY**

	L	T	P	Cr
	3	0	0	3.0

Course Objectives:
- To understand the fundamentals of Cryptography
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand the various key distribution and management schemes.
- To understand how to deploy encryption techniques to secure data in transit across data networks
- To design security applications in the field of Information technology

SECTION-A

Basic Encryption And Decryption: Attackers and Types of threats, challenges for information security, Encryption Techniques, Classical Cryptographic Algorithms: Monoalphabetic Substitutions such as the Caesar Cipher, Cryptanalysis of Monoalphabetic ciphers, Polyalphabetic Ciphers such as Vigenere, Vernam Cipher, Stream and Block Ciphers.

Secret Key Systems: The Data encryption Standard (DES), Analyzing and Strengthening of DES, Introduction to Advance Encryption Standard (AES)

Public Key Encryption Systems: Concept and Characteristics of Public Key Encryption system, Introduction to Merkle-Hellman Knapsacks, Rivets – Shamir-Adlman (RSA) Encryption.

SECTION-B

Hash Algorithms: Hash Algorithms, Message Digest Algorithms such as MD4 and MD5, Secure Hash Algorithms such as SH1 and SHA2.

Network Security: Network Security Issues such as Impersonation, Message Confidentiality, Message Integrity, Code Integrity, Denial of Service, Firewalls, DMZs, Virtual Private Networks, Network Monitoring and Diagnostic Devices.

Web Security: Web Servers, Secure Electronic Mail, Enhanced Email, Pretty Good Privacy, Public Key Cryptography Standards

Ethical Hacking: Introduction to Ethical Hacking, Terminology, Hackers, Crackers, and Other Related Terms, Hactivism, Threats, Hacking History ,Ethical Hacking Objectives and Motivations. .

Recommended Books:

1. Principles of Cryptography, William Stallings, Pearson Education
2. "Security in Computing (Second Edition)', Charles P.Pfleeger, 1996, Prentice Hall International, Inc.
3. Cryptography & Network Security, Atul Kahate, TMH

CPE-312   **MACHINE LEARNING**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

Course Objective:

- Introduce the fundamental problems and applications of machine learning.
- Provide understanding of techniques and mathematical conceptsused in machine learning to facilitate further study in this area.
- Provide understanding to evaluate performance of machine learning algorithms.
- Practice software implementation of different concepts and algorithms covered in the course using PYTHON&SCIKIT-LEARN library.

<div align="center">SECTION – A</div>

Introduction to Pandas: DataFrame, Data Loading, Extracting rows &columns from dataframe,Broadcasting, Handling Null, missing, duplicate and categorical values.

Introduction to Machine Learning: Applications,Challenges, Model Representation, Basic introduction to Scikit-Learn.

Supervised Learning: Linear regression (with one variable and multiple variables), Cost Function, Gradient Descent, Polynomial Regression, Decision Trees, Classification (Logistic Regression, Overfitting, Regularization), SVM

<div align="center">SECTION – B</div>

Unsupervised Learning: K-means Clustering, Hierarchical clustering

Dimensionality Reduction: Dimensionality reduction using PCA,Dimensionality reduction using LDA, K-fold cross validation

Neural Networks: Multilayer Neural network, Activation Function, Back propagation algorithm, Gradient Checking, Multiclass Classification.

Recommended Books

1. William Mckinney, "Python for Data Analysis:Data wrangling with Pandas, NumPy, and Ipython", 2nd edition, O'Reilly.
2. Aurelien Geron, "Hands-on Machine Learning with Scikit-Learn & TensorFlow", O'Reilly.
3. Raul Garreta, "Learning scikit-learn: Machine Learning in Python", Packt.

CPE-358   **RDBMS USING PL/SQL LAB**

L	T	P	Cr
0	0	2	1.0

LIST OF PRACTICLES

1. Write a PL/SQL code to print first 50 even numbers. Also insert the list in Temp table. Temp table contains only one column of number data type.
2. Using the conditional controls and case statement in PL/SQL, execute the following queries:
   a. Calculate the average salary from table 'Employee' and print"Increase the salary" if the average salary is less thanRs. 10,000.
   b. Print the deptno from the 'Employee' table using the case statement; if the deptname is 'Technical' then deptno is 1, if the deptname is 'HR' then the deptno is 2 else deptno is 3.
3. Write a PL/SQL code to insert all the details of employee no. 7698 to a new table which has same structure as emp table.
4. Write a PL/SQL code to update the commission of the employee number 7369 to Rs. 300, if it is null; else raise his commission by 25%.
5. Declare records to hold employee detail and department information. Write a program that displays total salary including commission of empno 7369. It should also display employee name, his department details and his old and new salary.
6. Write a PL/SQL code to load the employee names and salaries into PL/SQL table and then display the contents of the table.
7. Using cursors display the details of all those employees from EMP table whose sum of salary and commission is more than Rs. 3000.
8. Create a procedure by the name INCR to increase the salary of an employee. The employee number and the amount to be incremented is passed as parameters.
9. Write a user defined function TCASE to display all the employee names in title case. Execute a SQL statement using the function TCASE to show the employee name and job.
10. Write a trigger total_salary to maintain a derived column totsal that stores the total salary of all members in a department.
11. Create an INSTEAD_OF trigger on view V1 which contains columns DNAME, ENAME and SALARY from tables Dept and Emp joined on the basis of DEPTNO. If salary on an Employee is updated in the view, it should be updated in the EMP table.
12. Write a PL/SQL program (which includes declaration section, executable section and exception handling section) such that:
    a) Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found.
    b) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

CPE-359   **MOBILE APPS DEVELOPMENT LAB**

L	T	P	Cr
0	0	4	2.0

LIST OF PRACTICLES

1) Create an application that display "Hello word".

2) Create an application using the concept of "Screen Orientation".

3) Create an application using Date Picker UI Widget.

4) Create an application with the use of Button.

5) Developing an application with the use of ProgressBar.

6) Create an application with the use of Intents.

7) Developing an application with the use of RadioButton.

8) Developing an application with the use of CheckBoxes.

9) Creation of Option Menus in application.

10) Developing an application with the use of Fragments.

11) Developing an application with the use of Telephony Services.

12) Use of Web View during the creation of application.

CPE-362   **MACHINE LEARNING LAB**

	L	**T**	**P**	**Cr**
	0	0	2	1.0

List of Experiment

1. Write a program to extract a subset of data from a dataframe.

2. Write a program to handle missing values and duplicate values.

3. Write a program to handle categorical data.

4. Write a program to create a cross validation set.

5. Write a program for simple and multiple linear regression.

6. Write a program for logistic regression to perform classification of the data.

7. Write a program to reduce the number of features using the dimensionality reduction technique.

8. Write a program to compare the performance between using the complete feature set and the reduced feature set on the same set of data.

HSS – 351   **COMMUNICATION SKILLS LAB**

L	**T**	**P**	**Cr**
0	0	2	2.0

List of Experiment

1. Recognizing and articulating speech sounds, mock dialogue/conversation.

2. Making an oral presentation, class seminars, paper reading.

3. Participating in a group discussion.

4. Holding a mock meeting.

5. Developing skills related to Business Corrospondence

6. Preparation for participating in a mock interview for a job etc.

7. Developing skills for conducting a meeting; attending telephonic calls.

8. Listening to a recorded conversation and reviewing/discussing its contents and style.

CPE – 313   **SYSTEM SIMULATION & MODELING**

L	**T**	**P**	**Cr**
3	0	0	3.0

Course Objectives:
- To the simulation and modeling techniques
- Provide students with opportunities to develop basic simulation and modeling skills with respect to carrying out research projects using any simulation method on the computer.

SECTION – A

Introduction: Systems, modeling, general systems theory, Concept of simulation, Simulation as a decision making tool, types of simulation. Simulation Terminologies- Application areas – Model Classification –Types of Simulation- Steps in a Simulation study- Concepts in Discrete Event Simulation - Simulation Examples.

Statistical Models – Concepts: – Discrete Distribution- Continuous Distribution – Poisson Process- Empirical Distributions- Queueing Models – Characteristics- Notation – Queueing Systems – Markovian Models- Properties of random numbers- Generation of Pseudo Random numbers- Techniques for generating random numbers-Testing random number generators- Generating Random-Variates- Inverse Transform technique – Acceptance- Rejection technique – Composition & Convolution Method.

SECTION-B

Design of Simulation Experiments: Problem formulation, data collection and reduction, time flow mechanism, key variables, logic flow chart, starting condition, run size, experimental design consideration, output analysis and interpretation validation, input modeling, Data collection, Assessing sample independence, Hypothesizing distribution family with data, Parameter Estimation, Goodness-of-fit tests, Selecting input models in absence of data, Output analysis for a Single system, Terminating Simulations, Steady state simulations.

Development of simulation models using simulation language studied for systems like queuing systems, Production systems, Inventory systems, maintenance and replacement systems and Investment analysis. Simulation Tools – Model Input, High level computer system simulation, CPU –Memory Simulation, Comparison of systems via simulation – Simulation Programming techniques - Development of Simulation models. Simulation programming languages – simulation suitability with characteristics, Comparison and selection of simulation languages, study of any one simulation language.

Recommended Books:

1. Jerry Banks and John Carson, " Discrete Event System Simulation", Fourth Edition, PHI, 2005.
2. Geoffrey Gordon, "System Simulation", Second Edition, PHI, 2006.
3. Narsingh Deo, "System Simulation with Digital Computer, "Prentice Hall, India, 2001.
4. Frank L. Severance, " System Modeling and Simulation", Wiley, 2001.
5. Jerry Banks, "Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice", Wiley, 1998.

CPE – 314   **INTERNET OF THINGS**

	L	T	P	Cr
	3	0	0	3.0

Course Objectives:
- Able to understand the application areas of IoT
- Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
- Able to understand building blocks of Internet of Things and characteristics.

SECTION-A

Introduction & Concepts: Introduction to Internet of Things, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels.

M2M to IoT: The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. A Market Perspective- Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.
M2M and IoT Technology Fundamentals: Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management
IoT Architecture: State of the Art - Introduction, State of the art
IoT Reference Architecture: Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

SECTION-B

Domain Specific IoTs: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.

Industrial Automation: Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things

IoT Physical Devices & Endpoints: What is an IoT Device, Exemplary Device, Board, Linux on Raspberry Pi, Interfaces, and Programming & IoT Devices.

References:

1. Vijay Madisetti, Arshdeep Bahga," Internet of Things A Hands-On- Approach",2014
2. Adrian McEwen, "Designing the Internet of Things", Wiley Publishers, 2013
3. Daniel Kellmereit, "The Silent Intelligence: The Internet of Things". 2013

CPE – 315   **DIGITAL FORENSICS**

L	**T**	**P**	**Cr**
3	0	0	3.0

Course Objectives:
- Introducing basic concepts of digital forensic science
- Exploring the specific areas of media, network and code forensics
- Examining the role of digital forensics in public and private investigations
- Examining the potential benefits, limitations and risks of digital forensics
- Increasing awareness of managerial issues raised by the use of digital forensics

SECTION-A

Computer Forensics Fundamentals: What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists

Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement — Computer Forensic Technology — Types of Business Computer Forensic Technology Computer Forensics Evidence and Capture: Data Recovery Defined — Data Back-up and Recovery — The Role of Back-up in Data Recovery — The Data-Recovery Solution.

Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options —Obstacles — Types of Evidence — The Rules of Evidence — Volatile Evidence — General Procedure — Collection and Archiving — Methods of Collection

SECTION-B

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene — Computer Evidence Processing Steps — Legal Aspects of Collecting and Preserving Computer Forensic Evidence Computer Image Verification and Authentication: Special Needs of Evidential Authentication — Practical Consideration —Practical Implementation.

Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

Recommended Books:
1. Guide to Computer Forensics and Investigations 5th Edition, Nelson, Phillips, Steuart, Cengage Learning, 2015

MBA 5012   **FOUNDATIONS OF MANAGERIAL ACCOUNTING**

                                              L   T   P   Cr
                                               3   0   0   3.0

Management Accounting and Cost Concepts. Investing Activities: Nature of Long-Lived Assets, Depreciation methods. Long-term Liabilities. Equity Financing: Nature of equities, Accounting for Equities, Retained Earnings. Investments in Debt and Equity Securities: Trading Securities, Available-for-sale Securities, Held-to-maturity securities. Statement of Cash Flows: Purpose, Classification. Financial Statement Analysis: Ratios, Common-Size Financial Statements. Activity-Based Costing. Cost Behavior and Decisions using C-V-P analysis: Importance of C-V-P, Analysis of Mixed costs, Methods of C-V-P analysis. Capital Investment Decisions: Nondiscounted Capital Budgeting Techniques, Discounted Capital Budgeting Techniques.

Recommended Books:

1. Charles T. Horngren, George Foster and Srikant M. Datra, *Cost Accounting: A Managerial Emphasis,* Prentice-Hall of India, New Delhi, 12th Edition.
2. Charles T. Horngren, *Introduction to Management Accounting,* Prentice-Hall of India, New Delhi, 12th Edition, 2007.

OPEN ELECTIVE: **ESSENTIALS OF COMPUTERS**

	L	**T**	**P**	**Cr**
	3	0	0	0.0

Prerequisites: none

Objectives: Thorough understanding of Computer Basics and Information Technology.

Instructions for paper-setter: The question paper will consist of three sections A, B and C. Each section A and B will have five questions from the respective sections of the syllabus (05 marks each).   Section C will have one question with 10 short answer objective type parts (02 marks each), which will cover the entire syllabus uniformly.

Instructions for candidates: Candidates are required to attempt seven questions selecting three questions each from sections A and B of the question paper and the entire section C.

Section A

Introduction to computer: Characteristics of computers, Basic applications of computer, Components of computer system, Classifications of computers, Concepts of hardware/software, data/Information, basic data types, and storage of data/Information as files.

Introduction to windows: Basics of operating system, User interface: Using Mouse and moving icons on the screen, Recycle bin, Viewing of file, Folders and Directories, Creating and Renaming of files and folders. Windows Setting: Control panels, Wall paper and Screen savers, Setting the date and sound. Advanced Windows: Basics of Window setup, Creating short cuts, Notepad.

Elements of Word Processing: An Introduction to Word processing, Opening and closing documents, Using the Page setup, Menu bar and Help option, Printing of documents, Display/Hiding of paragraph marks and inter word space, Scrolling, Text creation and manipulation, Formatting the text, Handling multiple documents, Table manipulation.

Section B

Spread Sheet: Elements of Electronics Spread Sheet, Manipulation of cells, Providing Formulas, Spread sheets for Small accountings.

Computer Communication and Internet: Basic of Computer networks, Internet, Service on Inter Net: WWW and web-sites, Electronic mails, Communication on Internet.

WWW and Web Browsers: Web browsing software, Surfing the Internet, Chatting on Internet.

Email: Basic of electronic mail, Using e-mails, Document handling.

Making Presentations: Basics, Creation of presentation, Preparation of slides, Providing aesthetics, Slide manipulation and Slide show, Presentation of the slides.

Reference Books:

1. Guy Hart-Davis "The ABCs of Microsoft Office Professional edition", BPB Publications,
                    2. P.K Sinha `Computer Fundamentals`, BPB Publications, 1992.

B. TECH FOURTH YEAR
COMPUTER SCIENCE & ENGINEERING

(Batch 2018)
Session (2021-22)
SCHEME OF PAPERS

SEVENTH SEMESTER (COMPUTER SCIENCE & ENGINEERING)

S. No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-401	Cloud Computing	3	0	0	3.0
2.	CPE-402	Data Mining & Warehousing	3	0	0	3.0
3.	CPE-403	Information Security and Cyber Law	3	0	0	3.0
4.		Elective- IV*	3	0	0	3.0
5.	CPE-450	Project Work	0	0	12	6.0
6.	CPE-452	Data Mining & Warehousing Lab	0	0	2	1.0
7.	CPE-453	Information Security and Cyber Law Lab	0	0	2	1.0
Total			**12**	**0**	**16**	**20**
Total Contact Hours = 28						

ELECTIVE SUBJECTS – IV*

S. No.	Subject Code	Subject Name	L	T	P	Cr.
1.	CPE-404	Web Technologies	3	0	0	3.0
2.	CPE-405	Soft Computing	3	0	0	3.0
3.	CPE-406	Digital Image Processing	3	0	0	3.0
4.	CPE-407	Embedded System	3	0	0	3.0
5.	MBA-5013	Foundation of Finance	3	0	0	3.0
6.	MBA-5033	Foundation of International Business	3	0	0	3.0

*Choose any one from the list. Elective under Massive Open Online Courses (MOOCS) available on SWAYAM platform of Govt. of India offered through online mode. The subjects which students can opt from MOOCS will be notified by the department semester wise time to time

CPE-450, CPE-452 and CPE-453 are practical papers only. There will not be any theory examination for these papers.

Department of Computer Science & Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters
(Common for B.Tech. in Computer Science & Engineering, Electronics and Communication
Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech/MBA Branches)

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….

Maximum Marks: 50
Pass Marks   : 20

Note:- Section C is compulsory. Attempt any six questions selection three questions from each section A & B.

Section-A (From Section A of the syllabus)

Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5……………………………………………………..

Section-B (From Section B of the syllabus)

Q6. ....
Q7. ....
Q8. ....
Q9. ....   3x5
Q10………………………………………………….

Section-C (From whole syllabus)

Q11
a)...
b)...
c)...
d)...
e)...
f)...
g)...
h)...
i)...
j)……………………………………………………….   10x2=20

Note for the paper setter:

1. Total numbers of questions to be set are Eleven (11) as per the above format.

2. There will be five questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts. Candidates will be required to attempt SIX questions by selecting three Questions from each Sections A & B.

3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.

4. The maximum limit on numerical problems to be set in the paper is 35%.

5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.

6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.

7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.

8. Use of Scientific calculator should be clearly specified.

CPE 401   **CLOUD COMPUTING**

	L	T	P	Cr
	3	0	0	3.0

Course Objectives:
- To learn how to use Cloud Services.
- To implement Virtualization
- To implement Task Scheduling algorithms.
- Apply Map-Reduce concept to applications.
- To build Private Cloud.
- Broadly educate to know the impact of engineering on legal and societal issues involved.

SECTION-A

Overview of Computing Paradigm- Recent trends in Computing: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud computing; Evolution of cloud computing Business driver for adopting cloud computing

Cloud Computing Architecture- Cloud computing stack: Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services; Service Models (XaaS), Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), Deployment Models: Public cloud, Private cloud, Hybrid cloud, Community cloud

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

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

SECTION-B

Introduction to Big Data- Distributed file system–Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce.

Introduction to Hadoop and Hadoop Architecture: Data – Apache Hadoop & Hadoop EcoSystem, Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce -Data Serialization

NoSQL- What is it?, Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL

Data Base for the Modern Web- Introduction to MongoDB key features, Core Server tools, MongoDB through the JavaScript's Shell, Creating and Querying through Indexes, Document-Oriented, principles of schema design, Constructing queries on Databases, collections and Documents , MongoDB Query Language.

Recommended Books

1. *Cloud Computing Bible,* Barrie Sosinsky*, Wiley-India,* 2010
2. *Cloud Computing: Principles and Paradigms,* Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski*, Wiley,* 2011
3. *Cloud Computing: Principles, Systems and Applications, Editors:* Nikos Antonopoulos, Lee Gillam*, Springer,* 2012
4. *Cloud Security: A Comprehensive Guide to Secure Cloud Computing,* Ronald L. Krutz, Russell Dean Vines*, Wiley-India,* 2010
5. Boris lublinsky, Kevin t. Smith, AlexeyYakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
6. Chris Eaton,Dirk derooset al. , "Understanding Big data ", McGraw Hill, 2012.
7. BIG Data and Analytics , Sima Acharya, Subhashini Chhellappan, Willey

CPE-402   **DATA MINING & WAREHOUSING**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

Course Objectives:
- To introduce students to the basic concepts and techniques of Data Mining
- To develop skills of using recent data mining software for solving practical problems.
- To gain experience of doing independent study and research.
- To study the methodology of engineering legacy databases for data warehousing and data mining to derive business rules for decision support systems
- Develop and apply critical thinking, problem-solving, and decision-making skills.
- Develop and apply enthusiasm for learning. Class participation is encouraged in this course. Enriching

SECTION-A

Introduction: Introduction to RDBMS, data warehouse, transactional databases, data mining functionalities, classification of data mining system, major issues in data mining

Data Preprocessing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation

Data Warehouse And OLAP: Need for Data Warehousing, Difference from Traditional Databases, Data Warehouse Architecture, Multidimensional Data Model, Schemas for Multi-Dimensional Model: Star, Snowflake & Fact Constellation, OLAP Operations, Types Of OLAP Servers: ROLAP Versus MOLAP Versus HOLAP.

Introduction to Data Mining: Basics of data mining, Data mining techniques, KDP (Knowledge Discovery Process), Application and Challenges of Data Mining, Security Issue, Privacy Issue.

SECTION-B

Mining Association Rules in Large Databases: Association Rule Mining, Apriori Algorithm, Fp-Growth Algorithm, latest trends in association rules mining.

Classification and Clustering: classification and prediction, issues regarding classification and prediction, decision tree induction algorithm, rule based classification: using if-then rules for classification, prediction: linear &non linear regression, cluster analysis, type of data for cluster analysis, introduction to Categorization of Major Clustering Methods, Classical Partitioning Method: k-Means.

Introduction to Mining Complex Types of Data: Complex data objects, Mining spatial databases, Multimedia databases, Time Series and sequence databases, Text databases and World Wide Web.

BOOKS RECOMMENDED
1. Jiawei Han and MichelineKamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2000 (ISBN: 1-55860-489-8).
2. Ian H. Witten and Eibe Frank, "Data Mining: Practical Machine Learning Tools and Techniques with   Java implementations", Morgan Kaufmann Publishers, San Fransisco, CA (2000).
3. Dorian Pyle, "Data Preparation for Data Mining", Morgan Kaufmann, (1999)
4. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
5. Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley

CPE-403   **INFORMATION SECURITY & CYBER LAW**

	L	**T**	**P**	**Cr**
	3	0	0	3.0

Course Objectives:
- To provide an understanding Computer forensics fundamentals
- To analyze various computer forensics technologies
- To provide computer forensics systems
- To identify methods for data recovery.
- To apply the methods for preservation of digital evidence.

SECTION-A

Introduction to Internet, Cyber Space and threats, Computer Storage, Cell Phone / Mobile Forensics, Computer Ethics and Application Programs.

Electronic and Digital Signatures -Intellectual Property – Data Protection and Privacy. Need for cyber law and forensics, Jurisprudence of Indian Cyber Law.

Footprinting, WHOIS and DNS enumeration, network reconnaissance, Email spoofing, Email bombing, Data diddling, Denial of service attack, Virus / worm attacks- trojans and keyloggers, Internet time theft, Web jacking, Phishing-Smishing-Vishing-Identity theft, Cyber terrorism- use of encryption by terrorists, Human trafficking.

SECTION-B

The Legal Perspective – The IT Act, Challenges faced by IT Act and its amendments, Sections Under IT Act- Section 43,65,66,67,68,69,70.   Section relevant to cyber crime under IPC(Indian Penal Code).

Ehical hacking: Need, penetration testing: Information gathering tools like nmap, vulnearibility detection scanners like nessus, nexpose, information analysis and planning, attack and penetration tools like metasploit, results analysis and reporting.

Recommended Books

1. Cyber Security - Understanding cyber crimes,computer forensics and legal perspectives by Nina Godbole and Sunit Belapure.

2. System Forensics by Ankit Fadia.

3. hacking Exposed: network security secrets and solutions by Stuart mcclaure, Scambray and Kurtz. Tata Mc Graw hill.

CPE 450   **PROJECT WORK**

L	**T**	**P**	**Cr**
0	0	12	6.0

Objectives of the Project work
- Students will be able to solve problems working in group settings. This translates to the following outcomes. Students will demonstrate:
- Knowledge of basic SW engineering methods and practices, and their appropriate application.
- Knowledge and application of collaborative tools for SW development.
- Successful implementation of teamwork behavior and policies in a large class project.

Students will demonstrate the ability to give presentations and write technical reports. This translates to the following outcomes. Students will:

1. Demonstrate adequate oral presentation delivery.
2. Provide adequate oral presentation content.
3. Observe presentation time limitations.
4. Provide adequate written technical content.
5. Demonstrate adequate written organization.
6. Observe good practice with regard to spelling and grammar

CPE-452   **DATA MINING & WAREHOUSING LAB**

L	T	P	Cr
0	0	2	1.0

LIST OF EXPERIMENTS

1.   Introduction to Data Mining Tools and its installation.

2.   Exploring Data Mining Tool.

3.   Understanding files formats supported by the tool.

4.   Demonstration of preprocessing.

5.   Demonstration of Association rule process on dataset using apriori algorithm.

6.   Demonstration of classification rule process on dataset using id3 algorithm.

7.   Demonstration of clustering rule process on dataset using simple k-means.

Punjabi University, Patiala   Four Year B.Tech (Computer Sc. & Engg.) Batch 2018

BOS: 2019

CPE 453   **INFORMATION SECURITY & CYBER LAW LAB**

L	T	P	Cr
0	0	2	1.0

LIST OF EXPERIMENT

1. Learn to install Kali Linux or any other Linux distribution using Virtual Box/ VM Ware or any other equivalent Virtual machine software on the Host OS.
2. To learn the basic working of different tools like Wireshark, tcpdump.
3. To capture and analyze the network traffic by using Wireshark.
4. To understand the working of Network Mapper (nmap) for security auditing.
5. To install Network Simulator(NS2) and run basic simulation using TCL.
6. To implement different Ciphers (Monoalphabetic, Caesar etc in C).
7. Implementation of different algorithms for encryption
   a) DES algorithm in C.
   b) Triple DES algorithm in C.
   c) Deffie Hellman algorithm in C.
   d) Blow fish algorithm in C.

CPE-404   **WEB TECHNOLOGIES**

L	**T**	**P**	**Cr**
3	0	0	3.0

Course Objective:
- Students are able to develop a dynamic webpage by the use of java script and DHTML.
- Students will be able to write a well formed / valid XML document.
- Students will be able to write a server side java application.
- Students will be able to know of CSS, JQuery and AJAX

SECTION-A

Basic HTML and Overview: HTML Tag Reference, Global Attributes, Document Structure Tags, Formatting Tags, Text Level formatting, Block Level formatting, List Tags, Hyperlink tags, Image and Image maps, Table tags, Form Tags, Frame Tags, Executable content tags

DHTML: Creating Forms, Form Top of Form tag, Named Input fields, Input tag, Multiple lines text windows, Drop down and list boxes, Hidden, Text, Text Area, Password, File Upload, Button, Submit, Reset, Radio, Checkbox, Select, Option, Forms and Scripting, Action Buttons, Labeling input files, Grouping related fields, Disabled and read-only fields, Form field event handlers, Passing form data

SECTION-B

Style Sheets: What are style sheets, Why are style sheets valuable, Different approaches to style sheets, Using Multiple approaches, Linking to style information in s separate file, Setting up style information, Using the tag, embedded style information, Using

Overview of XML, XHTML, JavaScript and JQuery, AJAX

Recommended Books :

1. Head First HTML with CSS & XHTML by Elisabeth Freeman and Eric Freeman
2. HTML5 for Web Designers by Jeremy Keith
3. HTML5 & CSS3 For The Real World by Alexis Goldstein, Estelle Weyl, and Louis Lazaris
4. The Essential Guide to CSS and HTML Web Design by Craig Grannell
5. The Truth About HTML5 by Luke Stevens and RJ Owen
6. XML black book by Natanya Pitts-Moultis
7. XML for Dummies by Ed Tittel and Lucinda Dykes
8. JavaScript & JQuery: The Missing Manual by David McFarland
9. Ajax: The Complete Reference by Thomas Powell

CPE-405   **SOFT COMPUTING**

L	T	P	Cr
3	0	0	3.0

Course Objective:
- It deals with Introduction and different architectures of neural network
- It deals with the Application of Neural Networks
- It deals with Genetic Algorithms and Hybrid Systems

SECTION-A

Introduction: What is Soft Computing? Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing.

Neural Networks: What is Neural Network, Learning rules and various activation functions, Single layer Perceptrons, Back Propagation networks, Architecture of Backpropagation(BP) Networks, Backpropagation Learning, Variation of Standard Back propagation Neural Network, Introduction to Associative Memory, Adaptive Resonance theory and Self Organizing Map, Recent Applications.

SECTION-B

Genetic Algorithm: History of Genetic Algorithms (GA), Working Principle, Various Encoding methods, Fitness function, GA Operators- Reproduction, Crossover, Mutation, Convergence of GA, Bit wise operation in GA, Multi-level Optimization.
GA based Backpropagation Networks: GA based Weight Determination, K - factor determination in Columns.

Hybrid Systems: Sequential Hybrid Systems, Auxiliary Hybrid Systems, Embedded Hybrid Systems, Neuro-Fuzzy Hybrid Systems, Neuro-Genetic Hybrid Systems, Fuzzy-Genetic Hybrid Systems.

Recommended Books :

1. Rao, Vallinu B.,and Rao, Hayagriva . Neural networks and fuzzy Logic, second edition, BPB Publication
2. Berkan C. Riza, Trubatch L, Sheldon, Fuzzy Systems design Principlea. IEEE Press , standard publishers
3. Freeman A. James, Skapura M. David- neural networks algorithms, applications and programming.
4. Soft Computing by Fred Aminzadel & Jamshich, Prentice Hall

CPE 406   **DIGITAL IMAGE PROCESSING**

	L	T	P	Cr
	3	0	0	3.0

Course Objectives:
- Understand what MFAs do and how they work
- Understand the fundamentals of diplomatic negotiations
- Understand bilateral and multilateral diplomacy
- Understand subject-specific diplomacy
- Understand what makes a document a "treaty"
- Be aware of historical cases relevant to various diplomatic methods

SECTION-A

Introduction and Digital Image Fundamentals: Digital Image representation, Fundamental steps in Image processing, Elements of digital Image processing, Sampling and quantization, some basic relationships like neighbor's connectivity, distance measure between pixels, Image geometry.

Image Transforms: Discrete Fourier transform, Some properties of two-dimensional Fourier transform, Fast Fourier transform, Inverse FFT.

Image Enhancement: Point Operations, Histograms, Spatial Domain methods, Frequency domain methods, Enhancement by point processing, Spatial filtering, low pass filtering, High pass filtering, Homomorphic filtering, Colour image processing.

Image Restoration Degradation model, Algebraic approach to Restoration, Inverse filtering, Wiener filter, Constrained least square restoration, Interactive restoration, Restoration in spatial domain.

SECTION-B

Image Compression: Coding Inter-pixel and Psycho visual redundancy, Image Compression models, Error free compression, Lossy Compression, Image Compression standards.

Image Segmentation: Detection of discontinuities, Edge linking and boundary detection, Thresholding, Region Orientation Segmentation, Motion based segmentation.

Representation and Description: Representation schemes like chain coding, Polygonal approximation, Signatures, Boundary Segments, Skeleton of region, Boundary Description, Regional descriptors, Morphology.

Recognition and Interpretation: Elements of Image Analysis, Pattern and pattern classes, Decision Theoretic methods, Structural methods, Interpretation.

Recommended Books:

1. A.K. Jain," Fundamentals of Digital Image Processing", Pearson Education.
2. Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", AWL.
3. W. K. Pratt," Digital Image Processing".
4. Ramesh Jain, Brian G. Schunck, "Machine Vision", TMH.

CPE-407   **EMBEDDED SYSTEM**

L	T	P	Cr
3	0	0	3.0

Course Objectives:
- To have knowledge about the basic working of a microcontroller system and its programming in assembly language.
- To provide experience to integrate hardware and software for microcontroller applications systems.

SECTION-A

Introduction to Embedded Systems Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

Arm Processor Architecture : Architecture, Registers, Interrupts & Vector Table, I/O Ports, ARM Processor family, JTAG, I2C bus

SECTION-B

Arm Programming Instructions: Instruction Set: Data processing instructions, Addressing modes, Load Store Instructions, PSR (Program Status Register) Instructions, Conditional Instructions, Interrupt Instructions

Real World Interfacing: LCD, ADC and sensors, stepper motor, keyboard, DAC and external memory. Introduction

Recommended Books:

1. Embedded System Design by Frank Vahid and Tony Givargus.
2. Andrew N. Sloss, Dominic Symes, Chris Wright, John Rayfield, ―ARM System Developer's Guide Designing and Optimizing System Software‖, Elsevier 2008. 2.
3. Brooks, Cole, ―Embedded Microcontroller Systems, Real Time Interfacing‖, Thomson Learning 1999
4. Steve Furber, ―ARM system on Chip Architecture‖, Addision Wesley
5. Website www.arm.com

MBA 5013   **FOUNDATIONS OF FINANCE**

	L	**T**	**P**	**Cr**
	3	1	0	3.5

The main goal of this course is to develop a foundation of financial management concepts. This will enable the student to understand how corporations make important investment and financing decisions, and how they establish investment policies. This course in finance describes the corporation and its operating environment; it will help any future manager to understand how the finances of a company work, and how they will be interfacing with finance

SECTION-A

Financial Management: Meaning and nature; Financial goal–profit vs. wealth maximization; Finance functions–investment, financing, liquidity and dividend decisions. Sources of Finance: long and short term. Capital Structure Theories: Conceptual framework. Net income approach, Net operating income approach, Intermediary approach and M.M. Hypotheses. Leverage: Operating and Financial and combined. Management of Working Capital: Meaning, significance and types of working capital; sources of working capital

SECTION-B

Capital Budgeting-process, importance, Basic Principles in Estimating Cost and Benefits of Investments -Appraisal Criteria: Discounted and Non-Discounted Methods (Pay-Back Period - Average rate of return - Net Present Value -Benefit Cost Ratio - Internal Rate of Return).Capital rationing. . Capital Structure Theories: Net Income Approach - Net Operating Income Approach - Traditional Approach - Modigliani-Miller Model (MM), Miller. Dividend Policies: Issues in dividend decisions; Theories of relevance and irrelevance of dividends; Bonus Shares.

RECOMMENDEDBOOKS:

1. Van Horne., "Financial Management & Policy", Pearson Education.

2. Chandra, P., "Financial Management", Tata McGraw–Hill

3. Pandey, I.M., "Financial Management",Vikas Publishing House.

4. J.J. Hamton, Financial Decision Making: Concepts, Problems and Cases, Prentice-Hall of India, New Delhi, 4th Edition.

5. Khan and Jain, Financial Management, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 4th Edition.

6. Stephan A. Ross, Randolph W. Waterfield and Jeffery Jaffe, Corporate Finance, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 7th Edition.

MBA 5033   **FOUNDATIONS OF INTERNATIONAL BUSINESS**

	L	**T**	**P**	**Cr**
	3	1	0	3.5

SCOPE:-The Foundations of International Business course will provide students with an overall picture, theoretical principles and practices, of the international business field. It covers a wide range of topics such as the social/cultural, economic, political and legal aspects of the international business environment, the theories and institutions related to international trade and foreign investment, the world financial environment, the dynamics of international business-government relationships, and the strategies used to enter international markets.

SECTION-A

Understanding the nature and scope of International business / international trade, Origin of International trade. International Business Environment: Economic; Socio- Cultural, Political and Legal environment, Managing Diversities, Analyzing World Conditions and their impact on International trade.
Theories of International Business: Comparative Cost Theory, Opportunity Cost Theory, Adams Theory of Absolute Differences in Cost, Mills Theory of Reciprocal Demand. Modes of entering International Business. Government Intervention in International Business: Economic Rationale for Government Intervention, Non-economic Rationale for Government Intervention, Tariffs, Non-Tariffs Trade Barriers, Investment Barriers, Subsidies and Other Government Support Programs

SECTION-B

Regional Economic Integration: Types of Regional Integration; Factors Influencing Regional Integration. Leading Economic Blocs. .Foreign Investments: Foreign Institutional Investments (FIIs); Foreign Direct Investments (FDIs): Motives; Types; Costs and Benefits; Trends and Implications.
General Agreement on Tariffs and Trade (GATT) and Evolution of World Trade Organization (WTO); Agreements at The Uruguay Round: Plurilateral Agreements and Multilateral Agreements: Agreement on Agriculture (AOA); Trade Related Investment Measures (TRIMS); Agreement on Subsidies and Counter Availing Measures; Agreement on Trade Related Aspects of Intellectual Properties Rights (TRIPS) and General Agreement in Trade and Services (GATS). Ministerial Conferences of the WTO: Impact of WTO on Developing Countries.

Recommended Books:

1. International Business – A Strategic Management Approach by Alan N Rugman, R.M. Hodgetts, McGraw Hill.
2. Simai, Mihaly, The Future of Global Governance, Washington, D.C., United States Institute of Peace Process, 1994.
3. Cavusgil, S. Knight Gary and Riesenberger, John R(2009), International Business- Strategy Management and the New Realities, Pearson Education, Dorling Kindersley (India) Pvt. Ltd, Delhi.
4. Rao, M.B and Guru Manjula (1998), WTO and International Trade, Vikas Publishing House Pvt. Ltd, New Delhi.
5. All India Management Association (1998), Global Trends in Finance and Opportunity for India, Excell Books , New Delhi.
6. Rao, P. Subba (2008), International Business, Text and Cases, IInd edition, Himalaya Publishing House Pvt. Ltd. New Delhi.
7. Shailaja G, (2008), International Finance, University Press (India), Pvt. Ltd, Hyderabad, India.
8. Daniel, John D., Radebangh, Lee H. and Sulivan Daniel P., International Business – Environment and Operations, 19th Ed., New Delhi.
9. Czinkota Michael R., Ronbiben Iikka A. Ronkainen A. and Moffet Micheal H., International Business, 6th Edition, Thomson, South Western, Bangalore, 2005.
10. C. Paul Hallwood and Ronald Macdonald, International Money and Finance, Blackwell, Oxford U.K., 1995.
11. Sharan Vyuptakesh, International Business – Concept, Environment and Strategy, 2nd Edition, Pearson Education, Delhi, 2006.
12. Hill, Charles W.L. and Jain, Arun Kumar, International Business – Competing in the Global Market Place, 5th Edition, The McGraw Hill Publishing Co. Ltd., New Delhi, 2006.

B. TECH FOURTH YEAR
COMPUTER SCIENCE & ENGINEERING

(Batch 2017)
Session (2020-21)

SCHEME OF PAPERS

EIGHTH SEMESTER (COMPUTER SCIENCE & ENGINEERING)

Code	Title of Paper	Total Credits
PRJ-451	Project Based Industrial Training (One Semester Training in Industry)	20

Breakup of Marks:

Industrial Visit by Faculty Coordinator (150 Marks)
(Within 10—12 weeks of commencement of Training)

Presentation	: 60 Marks
Viva Voce	: 60 Marks
Report (Hard Copy)	: 30 Marks

Evaluation by Faculty Coordinator is consolation with Industrial Coordinator during industrial visit.

Evaluation by a Team of Faculty Members in the Institute (250 Marks)
(Within One Week of completion of Training)

Presentation	: 100 Marks
Viva Voce	: 100 Marks
Report (Hard Copy)	: 50 Marks

The Final Presentation and viva – voce will be conducted jointly by the faculty coordinator, external examiner and nominee of the Head to be appointed by the Head of the Department.

The Letter grade will be awarded to the students according to marks obtained by him/her out of total 400 marks.