DIRA GANDHI DELHI TECHNICAL UNIVERSITY FOR WOMEN
(Established by Govt. of Delhi vide Act 9 of 2012)

Mater of Computer Applications (MCA)

First Semester

S. No.	Code	Subject	L-T-P	Credits	Category
1	MCA-101	Fundamentals of Information Technology	3-0-2	4	DCC
2	MCA-103	Problem Solving using C Programming	3-0-4	5	DCC
3	MCA-105	Discrete Mathematics	3-1-0	4	DCC
4	MCA-107	Computer Organization	3-0-2	4	DCC
5	HMC-101	Professional Skills	3-0-0	3	HMC
TOTAL				20	

Second Semester

S. No.	Code	Subject	L-T-P	Credits	Category
1	MCA-102	Data Structures	3-0-4	5	DCC
2	MCA-104	Object Oriented Programming with C++	3-0-4	5	DCC
3	MCA-106	Software Engineering	3-0-2	4	DCC
4	MCA-108	Operating Systems	3-0-2	4	DCC
5	HMC-102	Human Values and Professional Ethics	3-0-0	3	HMC
TOTAL				21	

Third Semester

S. No.	Code	Subject	L-T-P	Credits	Category
1	MCA-201	Design and Analysis of Algorithms	3-0-2	4	DCC
2	MCA-203	Cloud Computing	3-0-2	4	DCC
3	MCA-205	Database Management Systems	3-0-2	4	DCC
4	MCA-207	Web Technologies	3-0-2	4	DCC
5	GEC-201	Generic Open Elective-1	0-0-4	2	GEC
6	HMC-201	Principles of Management	3-0-0	3	HMC
7	MCA-253	Industrial Training/Internship	-	1	DCC
TOTAL				22	

Fourth Semester

S. No.	Code	Subject	L-T-P	Credits	Category
1	MCA-202	Java Programming	3-0-2	4	DCC
2	MCA-204	Artificial Intelligence	3-0-2	4	DCC
3	MCA-206	Data Communications and Computer Networks	3-0-2	4	DCC
4	DEC-2xx	Departmental Elective-1	3-1-0	4	DCC
5	HMC-202	Disaster Management	2-0-0	2	HMC
6	HMC-204	Organizational Behavior	3-0-0	3	HMC
TOTAL				21	

Fifth Semester

S. No.	Code	Subject	L-T-P	Credits	Category
1	MCA-301	Software Testing	3-0-2	4	DCC
2	DEC-303	Machine Learning and Data Analytics	3-0-2	4	DCC
3	DEC-3xx	Departmental Elective -2	3-0-2	4	DEC
4	DEC-3xx	Departmental Elective-3	3-0-2	4	DEC
5	GEC-301	Generic Open Elective-2	0-0-4	2	GEC
6	MCA-351	Minor Project	3-0-0	3	DCC
7	MCA-353	Industrial Training/Internship	1-0-0	1	DCC
TOTAL				22	

Sixth Semester

S. No.	Code	Subject	L-T-P	Credits	Category
1	MCA-352	Major Project	-	20	DCC

List of Departmental Elective Courses

Category	Course Code	Subject	Credits
Departmental Elective Course-1	MCA-208	Computer Graphics and Multimedia Technologies	3-0-2
	MCA-210	Soft Computing	3-0-2
	MCA-212	Cyber Security and Forensics	3-1-0
	MCA-214	Software Project Management	3-0-2
Departmental Elective Course-2	MCA-305	Network Security	3-0-2
	MCA-307	Advanced DBMS	3-0-2
	MCA-309	E-Commerce	3-0-2
	MCA-311	Software Quality Assurance	3-1-0
Departmental Elective Course-3	MCA-313	Internet of Things (IoT)	3-0-2
	MCA-315	Advanced Data Structures	3-0-2
	MCA-317	Theory of Computation	3-1-0
	MCA-319	Mobile Computing	3-1-0

DESIGN AND ANALYSIS OF ALGORITHMS	
Course Code: MCA-201 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 3

Introduction:

Algorithms play a crucial and fundamental role in computer science. Given that algorithms are present in all domains of computer science, it is important for students to learn techniques to analysis a given algorithm. In addition, different approaches to design algorithms are important to write one's own algorithm.

Course Objectives:

- Understand the techniques for analysis of algorithms
- Study design approaches to write algorithm

Pre-requisites:

Knowledge of data structures and programming

Course Outcomes:

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

- Analyze any given algorithm
- Design a new algorithm for existing and new problems

Pedagogy:

Lecture delivery via discussions, whiteboard, slideshows, online learning material. Emphasis will be on lab practical by implementing algorithm in programming language

Contents

UNIT I	10 Hours
Introduction to Algorithms: Need for algorithm, Growth of Functions, Exercises based on Asymptotic Notations, Solving Recurrence Relations – Iterative method, Substitution method & Master method. Space vs Time Complexity Tradeoff. **Divide and Conquer Technique:** Merge Sort, Quick Sort, Median and Order Statistics, Maximum-subarray Problem, Strassen's Matrix Multiplication.	
UNIT II	12 Hours
Dynamic Programming: Elements of Dynamic Programming, Matrix Chain Multiplication, Longest Common Subsequence, 0/1 Knapsack and Optimal Binary Search Tree problems. **Greedy Algorithms:** Elements of Greedy strategy, Activity Selection problem, Huffman Codes, 0/1 Fractional Knapsack, Task Scheduling problem.	
UNIT III	10 Hours
Graph Algorithms: Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithm for Kruskal's and Prim's for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd – Warshall algorithm for all pair shortest paths.	
UNIT IV	10 Hours
String Matching: The naïve String Matching algorithm, The Rabin-Karp Algorithm, String Matching with finite automata, The Knuth-Morris Pratt algorithm. **NP-Completeness:** Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP-Complete problems.	
Text Books	
1	T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms" PHI, 3rd Ed., 2009.
2	Jon Kleinberg and Eva Tardos, "Algorithm Design", Pearson Edition, 2006.
3	Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Fundamental of Computer Algorithms", Orient Longman, 2006.
Reference Books	
1	Johnsonbaugh, "Algorithms", Pearson, 2004.
2	Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education, 2003.
3.	Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education, 2003.
4.	A.V. Aho, J. E. Hopcroft and J.D.Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 2003
5.	R. S. Salaria, Khanna, "Data Structure & Algorithms", Book Publishing Co. (P) Ltd., 2002

CLOUD COMPUTING	
Course Code: MCA-203 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 3

Introduction:

The course aims to familiarize the students with the fundamental concepts of Cloud Computing, an emerging technology in today's world and its relevance in business as it provides services such as data security, scalability, easy accessibility and sharing of data, zero maintenance, and easy data recovery. It is a practice that allows use of shared resources through a network of remote servers, which store and manage the data on the Internet.is an emerging technology in today's world. The course is designed as a stepping stone for students to access the important services provided by a cloud computing platform viz. inexpensive software, infrastructure, and platform through very simple APIs that are based on a pay-per-use model.

Course Objectives:

- To comprehend the importance of Cloud Computing technology in Industry 4.0
- To create a foundation for understanding significance of Virtualization in today's IT Sector
- To learn Cloud Computing architecture, its service models and deployment techniques
- To work on a real-time use case of a Business Enterprise

Pre-requisites:

Basic understanding of Operating System, Internet, Parallel and Distributed Computing, Computer Organization and Architecture

Course Outcome:

Upon completion of the course, students will have

- Conceptual understanding of virtualization at different levels
- Conceptual clarity of Cloud Computing architecture and its variants
- Logical insight for comprehending and exploring Amazon AWS
- A Business Case Study exploring distinct service models of Cloud Computing

Pedagogy:

Subject lectures would be delivered via class discussions, tutorials, slide-shows, white board and online quizzes. Students would be encouraged to take an individual case study from Industry 4.0.

Contents

Unit - I	11 Hours
Introduction: Introduction of Cloud Computing, NIST definition of Cloud Computing, Essentials and Need of Cloud Computing, Client-Server Technology, Peer-to-Peer Approach, Parallel and Distributed Computing, Cluster and Grid Computing, Evolution of Cloud Computing from Grid Computing, Autonomic and Utility Computing, Platform Virtualization, Service Oriented Architecture, Significance of Cloud Computing Paradigm in Industry 4.0, Characteristics, Advantages, Disadvantages and Limitations of Cloud Computing, Green Cloud Computing, Elastic Computing, Enterprise Cloud Computing.	
Unit - II	**11 Hours**
Cloud Architecture and Service Models: Grid Computing, Characteristics of Grid and Cloud Computing, Differentiate Grid and Cloud Computing Architecture, Cloud Dynamic Infrastructure, Service Models of Cloud Computing: Software-as-a-Service, Infrastructure-as-a-Service, Platform-as-a-Service, Cluster-as-a-Service, Cloud Computing Sub-Service Models, Deployment Models of Cloud: Public, Private, Community Clouds, Linthicum Cloud Deployment Model, Jericho Cloud Cube Model, Benefits of Models, CloudStack	
Unit – III	**10 Hours**
Virtualization: Virtualization Reference Model, Types of Virtualization, Advantages and Limitations of Virtualization, Server/Compute Virtualization (at Server) and its Components, Logical Partitioning, Hypervisor Taxonomy, Introduction of Network Virtualization and Features of Network Components: Virtual Switches and Virtual LAN, Traffic Management and its Techniques, Virtual Machine Migration Services, Features of Desktop Virtualization Drivers, Techniques and Components for Desktop Virtualization, Hardware Virtual Machine, Virtual Machine Provisioning and Migration Services Mgt.	
Unit – IV	**10 Hours**
Security Issues & Advanced Technologies: Security Concerns-Threats to Infrastructure, Data and Access Control, Cloud Information Security Objectives, Cloud Security Design Principles, Input Validation and Content Injection, Database Integrity Issues, Network Intrusion and Session Hijacking Attacks, Fragmentation Attacks, Secure Cloud Software Testing, Identity Management and Access Control, VM Security Techniques, Information Privacy, Laws and Legal Matters in Cloud Computing, Mobile Cloud Computing, Cloud Computing Environment Open-Stack, Cloud Usage for Big Data Analytics and IoT.	
Text Books	
1. Barrie Sosinsky, "Cloud Computing Bible", Wiley-India 1st edition, 2011	
2. Austin Young, Cloud Computing: A Comprehensive Guide to Cloud Computing, Independently Published, July-2019	
3. Ray J. Rafaels, Cloud Computing: From Beginning to End, Independently Published, 2015	
Reference Books	
1. Gautam Shroff, "Enterprise Cloud Computing Technology Architecture Applications" Cambridge University Press 1st edition, 2010	
2. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, "Cloud Computing: Principles and Paradigms", Wiley-India , 2011	
3. Miller Michael, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Pearson Education India ,1st edition, 2008	

DATABASE MANAGEMENT SYSTEM	
Course Code: MCA-205 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 3

Introduction:
Database Management System (DBMS) is used for creating and managing the databases. The main aim of a DBMS is to supply a way to store-up and retrieve the desired database information as per the application requirement, which is both convenient and efficient.

Course Objectives:

- Describe the fundamental elements of relational database management systems, relational data model, entity-relationship model, relational database design, relational algebra and SQL.
- To design of relational databases by applying normalization techniques to normalize the database
- Strong practice in SQL programming through a variety of database problems.
- Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Pre-requisites: Basic concepts of set theory

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

- To have a high-level understanding of major DBMS components and their functions.
- To model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
- To build, populate, and document a normalized database that meets business requirements using industry standards and best practices
- To develop structured query language (SQL) queries to create, read, update, and delete relational database data
- To understand the concept of Transaction, concurrency and Query processing.

Pedagogy:
Lecture delivery via discussions, whiteboard, slideshows, online learning material. Lab-work with exercises on SQL

Contents

UNIT I	10 Hours
Introduction: Database system concepts and its architecture, Data models schema and instances, Data independence and database language and interface, Data definition languages, DML. Overall database structure. **Data modeling using Entity Relationship Model:** ER model concept, notation for ER diagrams mapping constraints, Keys, Concept of super key, candidate key, primary key generalizations, Aggregation, reducing ER diagrams to tables, extended ER model. **Relational Data Model and Language:** Relational data model concepts, integrity constraints, Keys domain constraints, referential integrity, assertions, triggers, foreign key.	
UNIT II	12 Hours
Relational algebra, relational calculus, SQL Queries, SQL Functions, Nested Queries, Joins, Advanced Queries, Views, Indexing, Sequence, Grant and Revoke, Materialized View, Introduction to PL/SQL	
UNIT III	10 Hours
Data Base Design: Functional dependencies, normal forms, 1NF, 2NF, 3NF and BCNF, multi-valued dependencies fourth normal form, join dependencies and fifth normal form. Inclusion dependencies, lossless join decompositions, normalization using FD, MVD and JDs, Denormalization.	
UNIT IV	10 Hours
Transaction processing concepts: Transaction processing system, schedule and recoverability, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recovery from transaction failures, deadlock handling. **Concurrency Control Techniques:** Locking Techniques for concurrency control, time stamping protocols for concurrency control, concurrency control in distributed systems. Multiple granularities and multi-version schemes.	
Text Books	
1	Elmasri Ramez and Navathe Shamkant, Fundamentals of Database System, Pearson, 7th Ed. (June 2017)
2	Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, McGraw Hill, 7th Ed(2019)
3	Ramakrishna, Gehkre, “Database Management System”, McGrawHill, 3rd Ed. 2007
Reference Books	
1	Ceri and Pelagatti, Distributed Databases : Principles & Systems, McGraw-Hill, 2017.
2	Conolly & Begg, Database Management Systems, Pearson Education Asia., 5th Edition, 2010

WEB TECHNOLOGIES	
Course Code: MCA-207 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 3

Introduction:
This course aims at introducing the fundamental of internet and concepts of web technology

Course Objectives:

- To understand the basics of Internet and the Web phenomena.
- To create the web pages and essential areas of developing the website.
- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data
- To introduce Client side scripting with Javascript and AJAX

Pre-requisites: Basic knowledge of programming.

Course Outcome
Upon successful completion of the course, students will be able to:

- Gain knowledge of client side scripting, validation of forms and AJAX programming
- Have understanding of server side scripting with PHP language
- Have understanding of what is XML and how to parse and use XML Data with Java
- Develop web applications by using PHP and other technologies

Pedagogy
Students will design web pages using static and dynamic pages, with the introduction on client side and server side programming. Emphasis on developing web applications

Contents

UNIT-I	10 Hours

Web Basics- Introduction, Concept of Internet- History of Internet, World Wide Web, URL, Understanding websites and Web Server, Web Browser.
Introduction to HTML: HTML overview, Basics of HTML Document, HTML tags, HTML Elements, HTML Attributes, Tables, Frames, Creating Forms, Images, Multimedia, Links, Application of HTML, HTML examples
Separating style from structure with style sheets: Inline style specification and internal style specifications within html, external linked style specification using CSS.

UNIT-II	10 Hours

Introduction to XML: XML vs. HTML, uses of xml, simple xml, xml key components, DTD and schemas, well formed, XML trees, XML Namespace, XML examples, using xml with application, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT
Client side programming: Introduction to JavaScript, JavaScript programming, variables, functions, conditions, loops, JavaScript object model, event handling, forms handling, cookies, hidden fields, images, applications.

UNIT-III	10 Hours

DHTML: Combining HTML, CSS and Javascript, DHTML document object model (DOM)
Server side programming: PHP introduction, Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

UNIT-IV	10 Hours

Introduction to AJAX: Introduction, AJAX Database, Working of AJAX with PHP, Ajax PHP Database Form, AJAX PHP MySQL Select Query
Web services: components and working of web services, web services architecture, introduction to service oriented architecture, overview of web analytics and web mining

Text Books

1	Deitel and Deitel, Internet and World Wide Web, How to Program, Pearson Edu., 5th Ed., 2011
2	Luke Welling and Laura Thomson, PHP and MySQL Web Development, Pearson Education; Fifth Edition (2016)
3	Raj Kamal, Internet and Web Technologies, McGraw Hill, 2017

Reference Books

1	Wendy Willard, HTML: A Beginner's Guide, McGraw-Hill Education; 5th Edition (2013)
2	Anders Moller, Michael Schwartzeach, An Introduction to XML and Web Technologies, Pearson, 2009

PRINCIPLES OF MANAGEMENT	
Course Code: HMC-201 Contact Hours: L-3 T-0 P-0 Course Category: HMC	Credits: 3 Semester: 3

Introduction:
To give a preview of basics of management to engineering students, this course discusses about the basic nature of management and describes the functions of management, the specific roles of contemporary management, different approaches to designing organizational structures. This will help the students to understand the role of personality, learning and emotions at work, discover and understand the concept of motivation, leadership, power and conflict, understand the foundations of group behavior and the framework for organizational change and development.

Course Objectives:

- To acquaint the students with the fundamentals of managing business
- To make them understand individual and group behavior at workplace so as to improve the effectiveness of an organization.
- The course will use and focus on Indian experiences, approaches and cases.

Pre-requisite: None

Course Outcomes: After completion of the course, the students should be able to:

- Understand the nature of management and describe the functions of management·
- Understanding the specific roles of contemporary management.
- Develop understanding of different approaches to designing organizational structures.
- Understand the role of personality, learning and emotions at work.
- Discover and understand the concept of motivation, leadership, power and conflict.
- Understand the foundations of group behavior and the framework for organizational change and development.

Pedagogy: The teaching pedagogy will be a blend of teaching and learning techniques including:

- Lectures and Case studies
- Project works and assignments
- Group works and Interactive discussions.

Contents

UNIT-I	10 Hours
Introduction: Concept, Nature, Process and Significance of Management; Managerial levels, skills, Functions and Roles; Management vs Administration; Coordination as Essence of Management; Development of Management Thought: Classical, Neo-Classical, Behavioral, Systems and Contingency Approaches.	
UNIT-II	11 Hours
Planning: Nature, Scope and Objectives of Planning; Types of plans; Planning Process; Business Forecasting; MBO: Concept, Types, Process and Techniques of Decision-Making; Bounded Rationality. Organizing: Nature, Process and Significance; Principles of an Organization; Span of Control; Departmentation; Types of an Organization; Authority-Responsibility; Delegation and Decentralization; Formal and Informal Organization.	
UNIT-III	10 Hours
Staffing: Concept, Nature and Importance of Staffing. Motivating and Leading: Nature and Importance of Motivation; Types of Motivation; Theories of Motivation: Maslow, Herzberg, X, Y and Z; Leadership: Meaning and Importance; Traits of a leader; Leadership Styles – Likert's Systems of Management, Tannenbaum& Schmidt Model and Managerial Grid.	
UNIT IV	11 Hours
Controlling: Nature and Scope of Control; Types of Control; Control Process; Control Techniques– Traditional and Modern; Effective Control System. Communication: Basic Forms of Communication, Process of Communication, Principles of Effective Business Communication, 7Cs; Media of Communication: Types of Communication: Barriers of Communication.	
Text Books	
1	S.P. Robbins, "Fundamentals Management: Essentials Concepts Applications", Pearson Education, 2014.
2	Gilbert, J.A.F. Stoner and R.E. Freeman, "Management", Pearson Education, 2014. H. Koontz, "Essentials of Management", McGraw Hill Education, 2012.
3	C. B. Gupta, "Management Concepts and Practices", Sultan
Reference Books	
1	W. Ghillyer, "Management- A Real World Approach", McGraw Hill Education, 2010.
2	K. Mukherjee, "Principles of Management", McGraw Hill Education, 2012.

JAVA PROGRAMMING	
Course Code: MCA-202 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 4

Introduction:
Java Programming is one of the most widely used programming language among developers and are preferred over other languages. This course introduces students to object-oriented design methods and GUI like Applet, swing, AWT etc. The objective is to provide students with the use of the Java programming language for writing complex and stand-alone applications at the Intermediate level.

Course Objectives:

- To provide knowledge of Object Oriented programming features and fundamentals of program development using java.
- To write, test, and debug Object-Oriented programs using Java.
- To understand importance of Multi-threading and different exception handling mechanisms
- To use of Java in a variety of technologies and on different platforms.

Prerequisite:
The student may have experience in a high level programming language such as C/C++.

Course Outcome:
Upon successful completion of the course, students will be able to

- Design and implement programs in the Java programming language that make strong use of classes and objects
- Achieve reusability using inheritance, interfaces and packages resulting in faster application development
- Design GUI in Java using Applet & AWT along with response to events

Pedagogy: Emphasis on developing applications by writing programs.

UNIT-I	10 Hours
Overview of java: Class Fundamentals :introduction of classes, objects and methods using program example , creating objects and object reference, object lifetime and garbage collection, Arrays and String: Creating an array, one and two dimensional arrays, String, String Buffer and String Builder classes, Constructors, Class inheritance, use of super, Multilevel hierarchy, Abstract Class and final classes, Object class **Packages and interfaces:** Extending Interfaces, Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, CLASS PATH Setting for Packages. **Exception Handling:** Exception types, uncaught exceptions, try-catch, throw, throw and finally, Built in exception, Creating your own exceptions Multithreaded Programming: **Life Cycle of Thread, Creating and running thread, Multiple thread synchronization, Thread communication, Thread group, Thread priorities, Daemon Thread, suspending, resuming and stopping threads.**	
UNIT-II	11 Hours
The Collection Framework (java.util): The Collection Interface, Collection Classes, Working with Maps & Sets, Wrapper classes **Networking (java.net) :** Networking concepts, using java.net package, networking classes and interfaces,, socket programming, TCP/IP client and server sockets **RMI (Remote Method Invocation):** Introduction, Steps in creating a Remote Object, Generating Stub & Skeleton, RMI Architecture, RMI packages Input/Output Programming and file operations (java.io) : **Java.io,, Byte and Character Stream, predefined streams, Reading and writing from console and files**	
UNIT-III	10 Hours
Applet, Event handling and AWT: Applet design, parameters to applets, Event Handling: Different Mechanism, the Delegation Event Model, Event Classes, Event Listener Interfaces, Applet event handling, Adapter and Inner Classes, AWT packages, Components and Containers, using AWT controls, Layout managers, AWT components, Adding menu to window Swing: **Introduction to JFC (Java Foundation Classes), Features of Swing and Comparison with AWT, Advanced Control in swing (JTree and JTable)**	
UNIT IV	11 Hours
JDBC packages: Introduction to JDBC, Types of JDBC drivers, Obtaining a Connection, Connection, statement, ResultSet, Prepared Statement, Callable Statement, Program example using JDBC. **Servlets:** Using Servlets - Servlet Package - Servlet lifecycle - init() , method - service() method , doGet() method, doPost() method **Java Bean:** Introduction, Bean Architecture, Using the Bean Development Kit, Creating simple bean-properties, methods and events, Packing beans- the manifest & the jar, Java bean package, Introduction to NetBean.	
Text Books	
1	Herbert Schildt, The Complete Reference Java, McGraw Hill, McGraw-Hill Education; 11th Edition (2018)
2	Bruce Eckel, Thinking in Java, Prentice Hall, 4th Edition (2006)
Reference Books	
1	Ken Arnold, The Java Programming Languages, Addison-Wesley Professional; 4th

	Edition (2005)
2	Paul Dietel and Harvey Deitel, Java How to Program, PHI, 8th Ed., 2010.
3.	Benjamin, Java in Nutshell, O'Reilly Media; 6th Edition (2014)

ARTIFICIAL INTELLIGENCE	
Course Code: MCA-204 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 4

Introduction

"AI is the new electricity" -Andrew Ng. This course aims to give the fundamental knowledge and practical skills needed to design, build, and apply AI systems in one's chosen area of specialization.

Course Objectives:

- To learn the meaning behind common AI terminology
- To understand what AI realistically can--and cannot--do
- To spot opportunities to apply AI to problems in your own organization

Pre-requisite

- Probability and statistics
- Automata and languages

Course Outcomes:

On successful completion of this course, the students should be able to:

- Choose the appropriate representation for an AI problem or domain model, and construct domain models in that representation
- Choose the appropriate algorithm for reasoning within an AI problem domain
- Implement and debug core AI algorithms in a clean and structured manner
- Design and analyse the performance of an AI system or component

Pedagogy:

Students will analyze and design AI applications in Python using hands-on, engaging activities. At the end of each Unit, example application/case study will be discussed and relevant research paper reading will be carried out.

Contents

UNIT-I	8 Hours
AI terminology, data, workflow of a data science project, what makes a company good at AI, Bias in AI, adversarial attacks on AI, AI application areas, tools and techniques, what AI can and cannot do, AI and developing economies, AI team and job functions, case studies: smart speaker and self-driving car	
UNIT-II	12 Hours
Search: Formalism, BFS, DFS, Uninformed Search, A* and Heuristics, Adversarial Search, CSP: Constraint Satisfaction, Local Search, and Optimization, Logic: Ontology, Propositional Logic, First order predicate logic, resolution, fuzzy logic, case study: restaurant tip planner	
UNIT-III	12 Hours
Uncertainty, Probabilistic Reasoning Systems, Making Simple Decisions, Making Complex Decisions, Markov Decision Processes: Bayesian Networks: Representation, Independence, Inference, Markov Models, Hidden Markov Models, case study: search string completion	
UNIT-IV	10 Hours
Learning: Learning from Observations, inductive learning, active learning, decision trees, statistical learning: learning with complete data (naïve Bayes), instance-based learning (nearest neighbour), learning with hidden variables (clustering), learning in Neural and Belief Networks, Reinforcement Learning, case study: malware detection	
Text Books	
1	Elaine Rich, Kevin Knight, Shivashankar B Nair: Artificial Intelligence, McGraw Hill 3rd Edition. 2017
2	Parag Kulkarni, Prachi Joshi, Artificial Intelligence: Building Intelligent Systems, Prentice Hall India Learning Private Limited; 1st Edition (2015)
Reference Books	
1	S. Russell and P. Norvig, Artificial Intelligence: A modern approach, Pearson Education, 3rd Edition, 2015
Online resources	
1	AI for everyone, Andrew Ng, Coursera, https://www.coursera.org/learn/ai-for-everyone

DATA COMMUNICATIONS AND COMPUTER NETWORKS	
Course Code: MCA-206 Contact Hours: L-3 T-0 P-2 Course Category: DCC	Credits: 4 Semester: 4

Introduction:
Data communications refers to the transmission of this digital data between two or more computers and a computer network or data network is a telecommunications network that allows computers to exchange data. The physical connection between networked computing devices is established using either cable media or wireless media. The best-known computer network is the Internet.

Course Objectives:

- The students should understand the layers of networking devices.
- They should be familiar with a few networking protocols.
- They should study the different types of networks and topologies of networks.

Pre-requisite: Data Structures and Algorithms

Course Outcome:
Upon successful completion of this course, students will be able:

- To distinguish the importance of different networking components.
- To understand the functionalities of each networking layers and standards.
- To write networking based programs at real and simulator level.

Pedagogy:
The teaching-learning of the course would be organized through lectures, tutorials, assignments, projects/ presentations and quizzes. Students would be encouraged to develop an understanding of the existing real life cyber security issues and how they are solved. Emphasis would be given on assignments where students will be given numerical/ programming assignments based on topics studied in previous lectures. Course will have a blend of theory and practice for the benefit of students. Use of ICT, web based sources as well as blackboard teaching will be adopted.

Contents

UNIT-I	10 Hours
Introduction: Goals and Applications of Networks, Layering Concept, OSI Reference Model, TCP/IP Protocol Suite, Networks Topology, **Physical Layer:** Signals, Digital Transmission – Analog to Digital & Digital to Digital, Analog Transmission – Digital to Analog & Analog to Analog, Multiplexing – FDM & TDM, Media – Guided and Unguided, Switching – Packet based & Circuit based, Shannon Capacity; Network Topologies, Connecting Devices	
UNIT -II	11 Hours
Data Link Layer: Addressing, Error Detection & Correction, Checksum & CRC; Medium Access – ALOHA, CSMA, CSMA/CD & CA; Protocols – Ethernet, ARP & RARP; Switching Techniques. **Network Layer:** Need for internetworking, IP Addressing, Subnetting, Supernetting, Basic Routing (or Forwarding) Mechanism; IPv4 frame format and functions; Key features of IPv6, ICMP, IGMP, Routing protocols – RIP, OSPF & BGP and algorithms – Distance Vector and Link State. Linux Network Commands: arp, route, ifconfig, netstat, traceroute, ping.	
UNIT-III	11 Hours
Transport Layer: Port Addresses; ARQ - Simple, Stop and Wait, Go Back-N, Selective Repeat; UDP – Services & Applications; TCP – header format, connection setup & termination, state transition diagram, flow control, error control, Congestion Control: causes for congestion, effects of congestion, various open-loop and close-loop congestion control techniques: The leaky bucket algorithm, The token bucket algorithm	
UNIT -IV	10 Hours
Application Layer: Web & HTTP, FTP, Email, Telnet, SSH, DNS, RPC. Advanced Protocols: SNMP, RTP, SIP, BitTorrent.	
Text Books	
1.	L. L. Peterson and B. S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Elsevier, 2011.
2.	A. S. Tanenbaum and D.J. Wetherall, Computer Networks, Fifth Edition, Pearson, 2013.
3.	B. Forouzan, Data Communications and Networking, Fifth Edition, Mcgraw Hill, 5th Edition, 2017
References Books	
1.	Respective Internet Drafts and RFCs of IETF.
2.	William Stallings, “Data and Computer Communications”, PHI 6th Edition

COMPUTER GRAPHICS AND MULTIMEDIA TECHNOLOGIES	
Course Code: MCA-208 Contact Hours: L-3 T-0 P-2 Course Category: DEC	Credits: 4 Semester: 4

Introduction:
Computer graphics is an art of drawing pictures, lines, charts, etc. using computers with the help of programming. Computer graphics is made up of number of pixels. Pixel is the smallest graphical picture or unit represented on the computer screen. In this course, students will learn fundamental concept and algorithms of computer graphics and multimedia.

Course Objectives:

- To learn the fundamental concepts of graphics and multimedia.
- To gain and apply the acquired knowledge pertaining to 2D and 3D concepts in graphics programming.
- To understand the basic 3D modeling and rendering techniques.
- To realize the importance of multimedia towards building the virtual environment and communication.

Pre-requisites: Nil

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

- Enumerate the functionalities of pixels and coordinate systems pertaining to graphics manipulation.
- Design and demonstrate the 2D and 3D objects using graphics algorithms.
- Have the ability to model and render 3D objects by comprehending the complexities of illumination in virtual scenes.
- Appraise and interpret the various multimedia communication standards, applications and basic principles.

Pedagogy:
Lecture delivery via discussions, whiteboard, slideshows, online learning material. Lab-work with exercises

Contents

UNIT I	10 Hours
Scan Conversion Algorithms: Scan Converting Lines (DDA, Bresenham), Scan Converting Circles (Mid-point, Bresenham), Scan Converting Ellipses (Midpoint). Clipping: Two-Dimensional Clipping, Sutherland-Cohen Subdivision Line-Clipping Algorithm 2D-Transformation: Representation of Points, Transformations and Matrix, Transformation of Straight Line, 2-D - Rotation, Reflection, Scaling, Combined Transformations, Translation and Homogeneous Coordinates, Translation, Rotation about an Arbitrary Point, Reflection through an Arbitrary Line, window-to-viewport transformation	
UNIT II	12 Hours
3D-Transformation: Representation of Points, 3D- Scaling, 3D- Shearing, 3D- Rotation, Three Dimensional Translation, 3D- Reflection, Multiple Transformations, Rotation about an Axis Parallel to a Coordinate Axis, Rotation about an Arbitrary Axis in Space. The Dimensional Perspective Geometry: Geometric Projection, Orthographic Projections, Oblique Projections, Perspective Transformations, Single-Point Perspective Transformation, Two-Point Perspective Transformation, Three-Point Perspective Transformation. Solid Modeling: Representing Solids, Regularized Boolean Set Operation primitive Instancing Sweep Representations, Boundary Representations, Spatial Partitioning Representations, Constructive Solid Geometry, Comparison of Representations.	
UNIT III	10 Hours
Representing Curves & Surfaces: Polygon meshes, parametric, Cubic Curves, geometric and parametric continuities, Hermite, Bezier (4-point, 5-point, general), B-Spline, Quadric Surface Illumination and Shading: Modeling light intensities, ambient light, diffused light, specular reflection, attenuation factor, Reflection vector, Shading Models: constant shading, flat shading, gouraud shading, phong shading. Hidden-Surface Removal: Hidden Surfaces and Lines, Back-Face Detection, A-buffer, ZBuffers Algorithm, Scan-line Algorithm, The Painter's Algorithm, Area subdivision Introduction to Multimedia: Multimedia, Multimedia Terms, Introduction to making multimedia – The Stages of project, the requirements to make good multimedia, Multimedia Applications.	
UNIT IV	10 Hours
IV Multimedia – making it work – Multimedia Hardware, Software and Authoring Tools, Graphics File Formats: TIFF, MIDI, JPEG, MPEG, RTF. Multimedia building blocks – Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects, Data Compression: Different Compression algorithms concern to text, audio, video and images etc.	

Text Books	
1.	Steve Marschner, Peter Shirley, Fundamentals of Computer Graphics, CRC Press, 4th Ed. (2015)
2.	D.Hearn & Baker: Computer Graphics, Prentice Hall of India, 1986
3.	Foley, Van Dam, Feiner, Hughes, “Computer Graphics Principles & Practice”, 2000
4.	Tay Vaughan, “Multimedia: Making it Work”, TMH, 2000.
Reference Books	
1.	K. Andleigh and K. Thakkar, “Multimedia System Design”, PHI, PTR, 2000
2.	Rogers & Adams, “Mathematical Elements for Computer Graphics”, McGraw Hill, 1989

SOFT COMPUTING	
Course Code: MCA-210 Contact Hours: L-3 T-0 P-2 Course Category: DEC	Credits: 4 Semester: 4

Introduction:
Soft computing is an emerging approach to computing which parallel the remarkable ability of the human mind to reason and learn in an environment of uncertainty and imprecision. Soft computing is based on some biological inspired methodologies such as genetics, evolution, ant's behaviors, particles swarming, human nervous systems, etc. Now, soft computing is the only solution when we don't have any mathematical modeling of problem solving (i.e., algorithm), need a solution to a complex problem in real time, easy to adapt with changed scenario and can be implemented with parallel computing. It has enormous applications in many application areas such as medical diagnosis, computer vision, hand written character recondition, pattern recognition, machine intelligence, weather forecasting, network optimization etc.

Course Objectives:
- To develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory.
- To introduce students to artificial neural networks and fuzzy theory from an engineering perspective
- To solve single-objective optimization problems using GAs.
- To solve multi-objective optimization problems using Evolutionary algorithms (MOEAs).
- Applications of Soft computing to solve problems in varieties of application domains.

Pre-requisites: Basic linear algebra and calculus

Course Outcomes:
Upon completion of the course, the student should be able to:
- Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
- Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
- Understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations
- Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
- Reveal different applications of these models to solve engineering and other problems

Pedagogy:
The teaching-learning of the course would be organized through lectures, tutorials, assignments, projects/ presentations and quizzes. Emphasis would be given on assignments where students will be given numerical/ programming assignments based on topics studied in previous lectures. Course will have a blend of theory and practice for the benefit of students. Use of ICT, web based sources as well as blackboard teaching will be adopted.

Contents

UNIT 1	**11 hrs**
Introduction to Soft Computing, "Soft" computing versus "Hard" computing, Characteristics of Soft computing. Introduction to Fuzzy logic, Fuzzy membership functions, Operations on Fuzzy sets. Fuzzy relations, Fuzzy proposition, Fuzzy implications, Fuzzy inferences, Defuzzyfication Techniques, Fuzzy logic controllers	
UNIT 2	**11 hrs**
Solving optimization problems, Concept of "Genetics" and "Evolution" and its application to probabilistic search techniques, Basic GA framework and different GA architectures, GA operators: Encoding, Crossover, Selection, Mutation, etc., Solving single-objective optimization problems using GAs.	
UNIT 3	**10 hrs**
Concept of multi-objective optimization problems (MOOPs) and issues of solving them, Multi-Objective Evolutionary Algorithm (MOEA), Non-Pareto approaches to solve MOOPs, Pareto-based approaches to solve MOOPs Some applications with MOEAs.	
UNIT 4	**10 hrs**
Introduction to ANN, Biological neurons and its working, Simulation of biological neurons to problem solving, Different ANNs architectures, Training techniques for ANNs, Applications of ANNs to solve some real life problems. Introduction to hybrid soft computing.	
TEXT BOOKS	
1. Simon Haykin, Neural Networks and Learning Machines, (3rd Edn.), PHI Learning, 2011.	
2. S. N. Sivanandam and S.N.Deepa, Principles of Soft Computing, Wiley India Pvt Ltd, 2011.	
3. N.P. Padhy and S.P. Simon, Soft Computing: With Matlab Programming, Oxford University Press, 2015	
REFERENCE BOOKS	
1. Vojislav Kecman, Learning and Soft Computing: Support Vector Machines, Neural Networks, and Fuzzy Logic Models (Complex Adaptive Systems), MIT Press, 2001	
2. S. Rajasekaran, G. A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications, Prentice Hall India Learning Private Limited, 2003	

CYBER SECURITY AND FORENSICS	
Course Code: MCA-212 Contact Hours: L-3 T-1 P-0 Course Category: DEC	Credits: 4 Semester: 4

Introduction:

Cyber Security and Forensics is the application of investigation and analysis techniques to gather and preserve evidence from a particular computing device in a way that is suitable for presentation in a court of law. This course provides for a broad introduction of cyber security and forensics concepts, industry best practices for information security and key security concepts that will protect an organization against fraud, data breaches and other vulnerabilities. It enables the students to gain in-depth knowledge in the field of Computer forensics & Cyber Crime.

Course Objectives:

- To maintain an appropriate level of awareness, knowledge and skill to allow students to minimize the occurrence and severity of information security incidents.
- To learn techniques used to detect, respond and prevent network intrusions.
- To identify and apply appropriate forensics tools to acquire, preserve and analyze system image.
- To protect information and information systems from unauthorized access, use, disclosure, disruption, modification or destruction in order to provide confidentiality, integrity and availability.
- Identify sources of evidentiary value in various evidence sources including network logs, network traffic, volatile data.

Pre-requisites:

Knowledge of Computer Networking, Linux, UNIX, Understanding of Web Application Architecture and HTTP/HTTPS communication.

Course Outcomes:

After completion of the course the students will be able to:

- Learn investigation tools and techniques, analysis of data to identify evidence, Technical Aspects & Legal Aspects related to cyber crime.
- Employ fundamental computer theory in the context of computer forensics practices.
- Adhere to the ethical standards of the profession and apply those standards to all aspects of the study and practice of digital forensics.
- Know how to apply forensic analysis tools to recover important evidence for identifying computer crime.
- Evaluate the effectiveness of available digital forensics tools and use them in a way that optimizes the efficiency and quality of digital forensics investigations.
- Explain the role of digital forensics in the field of information assurance and cyber security and recognize the opportunities to benefit from and support the goals of those fields.

Pedagogy:
The teaching-learning of the course would be organized through lectures, tutorials, assignments, projects/ presentations and quizzes. Students would be encouraged to develop an understanding of the existing real life cyber security issues and how they are solved. Emphasis would be given on assignments where students will be given numerical/ programming assignments based on topics studied in previous lectures. Course will have a blend of theory and practice for the benefit of students. Use of ICT, web based sources as well as blackboard teaching will be adopted.

Contents

UNIT-I	12 hrs
Introduction to Incident Response Process, Computer Security Incident, Goals of Incident response, Who is involved in Incident response, Incidence Response Methodology, Pre Incident preparation, Detection of Incidents, Initial response, Formulate a response strategy, Investigate the incident, Reporting and Resolution. Computer Forensics Fundamentals, Benefits of Computer Forensics, Computer Crimes, legal concerns and private issues. Live data collection from Windows systems. Live data Collection from Unix systems.	
UNIT-II	11 hrs
Data Acquisition of digital evidence from electronic media, Acquisition tools, Evidence collection and preservation, Sources of Digital/Electronic Evidence, Computer Forensic Analysis and Validating Forensics Data, **System Forensics:** File signatures, volatile/non-volatile data, File formats, Metadata, existing system forensics tools. **Network Forensics**: Firewalls, Intrusion Detection System. **Database Forensics**.	
UNIT-III	10 hrs
Windows Forensics: malware forensics**. Mobile Device Forensics**: Evidence in Cell Phone, PDA, Blackberry, iPhone, iPod, and MP3. Evidence in CD, DVD, Tape Drive, USB, Flash Memory, Digital Camera. **Google Forensics**: Analysis of search data/information gathered from various google services. **Internet Forensics**.	
UNIT-IV	10 hrs
Email Analysis: investigating email crime and violations. **Messenger Analysis**: AOL, Yahoo, MSN, and Chats. **Web investigation**: IP tracking, Server logs, Domain records. **Current Computer Forensics Tools**: Software/Hardware Tools. **An Indian perspective on digital forensics**: Indian IT act, Cyber laws.	
Text Books	
1. K Mandla, C. Prosise , Matt Pepe, " Incident Response and Computer Forensics", McGraw Hill, 2nd Edition, 2003	
2. Chad Steel, "Windows Forensics", Wiley India, 1st Edition, 2006	
3. Nelson, B, Phillips, A, Enfinger, F, Stuart, C., "Guide to Computer Forensics and Investigations, Thomson Course Technology, 4th Edition, 2009	
Reference Books	
4. Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Real Digital Forensics, Pearson Education, 1st Edition, 2005	
5. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi	

SOFTWARE PROJECT MANAGEMENT			
Course Code	: MCA-214	Credits	: 4
Contact Hours	: L-3 T-0 P-2	Semester	: 4
Course Category	: DEC		

Introduction:
This course is designed to enable students to learn successful development of the software project's procedures of initiation, planning, execution, regulation and closure as well as the guidance of the project team's operations towards achieving all the agreed upon goals within the set scope, time, quality and budget standard.

Course Objectives:

- To learn Software Project management phases.
- To establish a project plan and then executing that plan to accomplish the project objective.
- To Create a work breakdown structure, assign responsibility, define specifi activities and sequencing them for a software project
- To learn planning and estimation and scheduling of software project activity components, resources and durations.

Pre-requisite: None

Course Outcome:
Upon successful completion of this course, students will be able to:

- Identify the different project contexts and suggest an appropriate management strategy.
- Practice the role of professional ethics insuccessful software development.
- Identify and describe the key phases of project management.
- Determine an appropriate project management approach through an evaluation of the business context and scope of the project.

Pedagogy
Lectures will be imparted along with hands on lab sessions and Project Planning for case study(ies).

Contents

UNIT-I	11 Hours
Introduction: Introduction to software project management activities, Attributes of a project, Project life cycle, Project Management process, Project selection, Preparing a request for proposal, Soliciting proposals, Proposal preparation, Pricing considerations, Proposal submission and follow up, Customer evaluation of proposals	
UNIT-II	10 Hours
Project Management Organizational Structures - Functional type organization, Project type organizations, Matrix-type organization, Project Planning - Project objective, Work breakdown structure, Developing the network plan, Network principles, Preparing the network diagram, Critical path analysis, PERT ,Project Scheduling- Activity duration estimates, Project schedule calculations	
UNIT-III	10 Hours
Schedule Control- Project control process, Effects of actual schedule performance, Incorporating project changes into the schedule, Updating the project schedule, Approaches to schedule control, Resource Considerations- Resource constrained planning, Planned resource utilization, Resource leveling, Resource limited scheduling	
UNIT-IV	11 Hours
Risk Management – Risk, Categories of risk, A framework for dealing with risk, Evaluating risks to the schedule, Monte Carlo simulation and critical chain concepts. Project Cost Planning and Performance – Project cost estimates, Project budgeting, Determining the actual cost, Determining the value of work performed, Cost performance analysis, Cost forecasting, Cost control, Software project metrics, Project control and closure, Project Management Issues with regard to New Technologies, Case Study & use of software project management tool	
Text Books	
1	Pankaj Jalote, “Software Project Management in Practice”, Pearson Education, 2015
2	Jack Gido, Jim Clements, Rose Baker, “Successful Project Management”, Cengage Learning 7th Edition, 2018
3	Hughes, Software Project Management, McGraw Hill Education; 5th Edition, 2017
Reference Books	
1	Bob Hughes, Mike Cotterell, Rajib Mall “Software Project Management”, Fifth Edition, McGraw Hill, 2013

DISASTER MANAGEMENT	
Course Code: HMC-202 Contact Hours: L-2 T-0 P-0 Course Category: HMC	Credits: 2 Semester: 4

Introduction:
Natural and technological hazards affect the everyday life as well as long-term development plans. For many decades the prevailing approach in dealing with disasters was focus on response and recovery, however lately pre-disaster actions to minimize the disaster risks are getting importance. The course introduces Disaster Management, focusing on natural disasters.

Course Objectives:
The objective of the course is to acquaint the students about the concept of information system in business organizations, and also the management control systems

Pre-requisite: None

Course Outcome:
After completion of the course, the students should be able

- To gain and integrate knowledge, to analyze, evaluate and manage the different public health aspects of disaster events at local and global levels
- To describe, analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects, minimize risk, prepared community and develop capacities to mitigate disasters.
- To understand theoretically and practically different step of disaster management and relate their interconnections, with psychosocial, livelihood, logistics and Public Health aspects of the disasters
- To build capacity to work at the time of need, support community.

Pedagogy: The teaching pedagogy will be a blend of teaching and learning techniques including Lectures and Case studies, Project works and assignments and Group works and Interactive discussions.

Contents

UNIT-I	4 Hours
Concepts and Definitions of Disaster - hazard, vulnerability, resilience, risks, rehabilitation, reconstruction, search and rescue before, during and after disasters. Disaster Profile of India – Mega Disasters of India and Lessons Learnt.	
UNIT-II	10 Hours
Categories of disasters -Natural disasters – earthquake, cyclone, landslide, flood, tsunami, heatwaves, coldwaves, avalanches, Man-made disasters – fire, urban fire, forestfire, Chemical, biological, radiological and nuclear disasters, armed conflict and civil strife, oiland Gas leakage, Transport disasters Factors affecting Vulnerabilities, impact of Development projects such as dams, high rise constructions etc.	
UNIT-III	6 Hours
Geo-informatics in Disaster Management (RS, GIS, GPS and RS), Disaster Communication System (EarlyWarning and Its Dissemination), Use of ICT, mobile technology, alarmsetc, Application of Drone.	
UNIT IV	8 Hours
Disaster ManagementAct 2005, Disaster Management National Policy, Disaster Management Cycle, Role of Government (local, stateandnational),Non-Government, Inter-Governmentaland UN Agencies	
Demonstration/Drills of · Cardiopulmonary Resuscitation (CPR) · Search and Rescue Operations · Earthquake Evacuation Drill · Demonstration of Fire Drill	

Text Books	
1	https://ndma.gov.in/en/
2	Alexander David, Introduction in Confronting Catastrophe, Oxford University Press, 2000.
3	Kapur, Anu&others,Disasters in India Studies ofgrimreality,RawatPublishers, Jaipur, 2005
4	MuktaGirdhar, NaturalDisasters, Amy publication,Dariyaganj, NewDelhi, 2019.
Reference Books	
1	Andharia J. Vulnerability in Disaster Discourse, JTCDM,Tata Institute of Social SciencesWorkingPaperNo. 8, 2008.
2	Govt. of India:DisasterManagement Act 2005, Government of India, New Delhi.

ORGANIZATIONAL BEHAVIOR	
Course Code: HMC - 204 Contact Hours: L-3 T-0 P-0 Course Category: HMC	Credits: 3 Semester: 4

Introduction:
The course covers individual, group, and organizational levels of behavior drawing on concepts and practices from the field of Organizational Behavior (OB). It also examines the interrelationship of behavioral phenomena among these levels. It enhances one's ability to communicate and work effectively with others. OB helps in strengthening people management skills to become a successful leader in any field.

Course Objectives:

- To enable the students with cutting edge thinking on a variety of organizational behavior and management topics
- To develop skills for solving organizational problems and think appropriate solutions for contemporary management and practices.

Pre-requisite: None

Course Outcomes:
Having successfully completed this course, the student will be able to

- Develop understanding of different approaches to designing organizational structures.
- Understand the role of personality, learning and emotions at work.
- Discover and understand the concept of motivation, leadership, power and conflict.
- Understand the foundations of group behavior and the framework for organizational change and development.

Pedagogy: The teaching pedagogy adopted here would a perfect blench of teaching and learning techniques including:

- Lectures and Case studies
- Project works and assignments
- Group works and Interactive discussions

Contents

UNIT-I	11 Hours
Meaning and concept of organizational behavior; Personality: meaning, factors affecting personality, Big five model of personality; Learning: concept and theories of learning (Classical conditioning, operant conditioning and social learning theory), concept of reinforcement; Perception: concept, factors affecting perception, process of perception, perceptual errors.	
UNIT-II	11 Hours
Motivation: Concept, importance, Content theories (Maslows need theory, Alderfers ERG theory (Existence, Relatedness and Growth), Mc Cllelands theory of needs, Herzbergs two factor theory) and Process theories (Adams equity theory, Vrooms expectancy theory); Leadership: Concept, Theories (Trait, Behavioral, Contingency, Charismatic, Transactional and Transformational Leadership; Emotional Intelligence: Concept, Importance, Dimensions.	
UNIT-III	10 Hours
Groups: Definition, Stages of Group Development, Group Cohesiveness; Analysis of Interpersonal Relationship: Transactional Analysis, Johari Window; Conflict: Concept, Sources, Types, Stages of Conflict, Management of Conflict; Organizational Power: Sources of Power and Dysfunctional uses of Power.	
UNIT IV	10 Hours
Organizational Change: Concept, Resistance to change, Managing resistance to change, Kurt Lewin Theory of Change; Organizational Development (OD): Meaning and types of OD Interventions.	
Text Books	
1	Robbins, Stephen P and Judge, T.A. (2013). Organizational Behavior (15th Edition). Pearson.
2	Stephen, P. Robbins and Mary, Coulter (2010). Management (9 th Edition). Pearson.
Reference Books	
1	Kaul, Vijay Kumar (2012). Business Organization and Management - Text and Cases. Pearson.
2	Singh, Kavita, Organizational Behavior (3 rd Edition), Vikas Publication.