Second Semester

Distributed Database Management System (MCA-121)

Professional Core (PC); 4 Credits (3-0-2)

Objectives:

1. To understand difference between storing data in FMS and DBMS and advantages of DBMS.
2. To understand conceptual and physical design of a database.
3. To understand RDBMS and queries to design database and manipulate data in it.
4. To know basic database backup and recovery

Unit	Contents	No. of Lectures
Unit 1	**Database Management System:** Introduction, Definition of DBMS, File processing system Vs DBMS, Limitation of file processing system, Comparison of File processing system and DBMS, Advantages and Disadvantages of DBMS, Users of DBMS - Database Designers, Application programmers, Sophisticated Users, End Users, Capabilities of good DBMS, Overall System structure	**06**
Unit 2	**Data Models:** Introduction, Data Models, Object Based Logical Model, Record Base Logical Model - a. Relational Model, b. Network Model, c. Hierarchical Model, Entity Relationship Model, Entity Set, Attribute, Relationship Set, Entity Relationship Diagram (ERD), Extended features of ERD	**03**
Unit 3	**Relational Databases:** Introduction, Terms - a. Relation, b. Tuple, c. Attribute, d. Cardinality, e. Degree, f. Domain, Keys - Super Key, Candidate Key, Primary Key, Foreign Key - Relational Algebra, Operations - a. Select, b. Project, c. Union, d. Difference, e. Intersection, f. Cartesian Product, g. Natural Join	**06**
Unit 4	**Relational Database Design:** Introduction, Anomalies of un normalized database, Normalization - Normal Form, 1NF, 2 NF, 3 NF.	**10**
Unit 5	**SQL (Structured Query Language):** Introduction, History Of SQL, Basic Structure, DDL Commands, DML Commands, Simple Queries,	**08**

	Nested Queries, Aggregate Functions, Clauses.	
Unit 6	**Transactions and Concurrency Control:** ACID Property,Serializability, time stamp, locking protocol, granuality.	**06**
Unit 7	**Tree Structured Indexing:** Introduction, Index Sequential Access Method (ISAM), Structure of index sequential File, B+ Tree : A Dynamic Index Structure, Operations on B+ Tree - a. Search, b. Insertion, c. Deletion	**05**
		44

References/Text Books:

1. Henry korth and A. Silberschatz, Database System Concepts, McGraw Hill
2. Bipin Desai, An Introduction to Database Systems, Galgotia
3. Michael J. Folk, Greg, Riccardi, File Structure, Pearson Education
4. Jeff Parkins and Bryan Morgan, Teach Yourself SQL in 14 days,
5. SAMS Publishing C.J. Date, An Introduction to Database Systems

Java Programming (MCA-122)

Professional Core (PC); 4 Credits (3-0-2)

Objective:

1. This course will introduce the basic learning of Java and Programming concepts.

Unit	**Contents**	**No. of Lectures**
Unit 1	Introduction to Java programming: The Java Virtual Machine , Variables and data types ,Conditional and looping constructs ,Arrays	**9**
	Object-oriented programming with Java Classes and Objects: Fields and Methods ,Constructors ,Overloading methods ,Garbage	

Unit 2	collection ,Nested classes	**7**
Unit 3	Inheritance :Overriding methods ,Polymorphism, Making methods and classes final ,Abstract classes and methods , Interfaces	**12**
Unit 4	The Object class :Cloning objects ,The JDK LinkedList class ,Strings ,String conversions, Working with types: Wrapper classes ,Enumeration interface, Basics of AWT and Swing : Layout Managers ,Event Handling ,The Action Listener interface ,Panels , Classes for various controls, such as label, choice, list, Checkbox, etc. ,Dialogs and frames Using menus ,Using the adapter classes ,Graphics	**9**
Unit 5	Threads :Synchronization ,The I/O Package ,InputStream and OutputStream classes ,Reader and Writer classes Chapter 12: Basic concepts of networking ,Working with URLs, Concepts of URLs , Sockets, Database connectivity with JDBC , Java security	**8**
		45

Reference/Text Books:

1. Java, the complete reference by Herbert Schildt

2. Learning Java by Jonathan Knudsen and patrick Neimeyer

Theory of Computation (MCA-123)
Professional Core (PC); 4 Credits (3-1-0)

Objective:

1. The objective of the course is to develop a formal notation for strings, languages and machines.
2. Design finite automata to accept a set of strings of a language.
3. Prove that a given language is regular and apply the closure properties of languages.
4. Design context free grammars to generate strings from a context free language

5. convert them into normal forms. Prove equivalence of languages accepted by Push Down Automata and languages
6. generated by context free grammars Identify the hierarchy of formal languages, grammars and machines.
7. Distinguish between computability and non-computability and Decidability and undecidability.

Unit	Contents	No. of Lectures
Unit1	Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages. Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata.	**10**
Unit2	Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.	**10**
Unit3	Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG.	**10**
	Turing machines: The basic model for Turing machines (TM), Turing-recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators. Undecidability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice s theorem, undecidable problems about languages.	
		30

Reference/Text Books:

1. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F.
2. Let us C by YashwantKanitkar
3. C Programming by Dennis Richie.

Software Engineering (MCA-124)

Professional Core (PC); 4 Credits (3-1-0)

Objectives:

1. At the end of the Subject, students should have a basic idea of SDLC, design and modelling, implementation and testing techniques and basic project management methodologies.

Unit	Contents	No. of Lectures
Unit 1	**Software Engineering Basics:** SDLC, Characteristics, Applications, Software Process Models: Waterfall, Spiral.	04
Unit 2	**Software Modelling:** ***Overview of Software Modelling*** ***Structured Analysis and Design:*** Principles of Structured Analysis, Requirement analysis, DFD, Entity Relationship diagram, Data dictionary. ***OO Analysis and Design :***Objectives, Principles, Concepts, Design methodologies: Data design, Architectural design, procedural design, Object -oriented concepts.	16
Unit 3	**Software Implementation:** Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style and review of correctness and readability.	10
Unit 4	**System Testing fundamentals**: Objectives, principles, testability, Test cases: White box & Black box testing,Testing strategies: verification & validation, unit test, integration testing, validation testing, system	10

	testing	
Unit 5	**Project Planning and Management:** Prototyping, Concepts of Project Management, Role of Metrics & Measurements. S/W Project Planning: Objectives, Decomposition techniques: S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Models: COCOMO Model,	**08**
		44

References/Text Books:

1. Roger. S. Pressman, "Software Engineering - A Practitioner's Approach", Third Edition, McGraw Hill, 1992
2. R.E. Fairley, "Software Engineering Concepts", McGraw-Hill, 1985.

Jalota, "An Integrated Approach to Software Engineering", Narosa Publishing House, 1992

Organizational Behavior (MCA-125)
Professional Core (PC); 4 Credits (3-1-0)

Objectives:

1. Organizational behaviour is the study of how people act, think, and feel in organizational settings.
2. The behavioural challenges managers face today are exacerbated by the increasing complexity of the work environment and the fast pace of demographic and technological changes.

Unit	Contents	No. of Lectures
Unit 1	**Focus and Purpose:** Definition, need and importance of organizational behavior, Nature and scope, Frame work Organizational behavior models.	**06**
	Individual Behaviour: Personality- types, Factors influencing personality, Theories, Learning, Types of learners, The learning process, Learning theories, Organizational behavior modification.	

Unit 2	Misbehavior- Types, Management Intervention. Emotions- Emotional Labor, Emotional Intelligence, Theories. Attitudes- Characteristics, Components, Formation, Measurement, Values. Perceptions, Importance, Factors influencing perception, Interpersonal perception- Impression Management. Motivation, importance, Types, Effects on work behavior.	**10**
Unit 3	**Group Behavior:** Organization structure, Formation, Groups in organizations, Influence, Group dynamics, Emergence of informal leaders and working norms, Group decision making techniques, Team building, Interpersonal relations,Communication, Control.	**08**
Unit 4	**Leadership And Power:** Meaning, Importance, Leadership styles, Theories, Leaders vs Managers, Sources of power, Power centers, Power and Politics.	**10**
Unit 5	**Dynamics of Organizational Behavior:** Organizational culture and climate, Factors affecting organizational climate, Importance. Job satisfaction, Determinants, Measurements, Influence on behavior. Organizational change, Importance, Stability vs Change, Proactive vs Reaction change, the change process, Resistance to change, Managing change. Stress, Work Stressors, Prevention and Management of stress, Balancing work and Life. Organizational development, Characteristics, objectives. Organizational effectiveness	**10**
		44

References/Text Books:

1. Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education,11th edition, 2008.
2. Fred Luthans, Organisational Behavior, McGraw Hill, 11th Edition, 2001.

Schermerhorn, Hunt and Osborn, Organisational behavior, John Wiley, 9th Edition, 2008.