

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE**

MCA (6 Years)

VIII SEMESTER



Jan. 2017 - May 2017

Sub. Code	Sub. Name	L	T	P	C
IC-801A	Computer Networks	3	1	0	4
IC-802A	Optimization Techniques	3	1	0	4
IC-804B	Advanced Database Management System	3	1	0	4
IC-811	Software Engineering	3	1	0	4
IC-812	Theory of Computation	3	1	0	4
IC-810A	ADBMS Lab	0	0	4	2
IC-807	Comprehensive Viva	0	0	0	4
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INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) VIII SEMESTER
IC-801A: Computer Networks

Aim of Course: To provide a theoretical foundation of computer network and equip the students with an in-depth knowledge of fundamental techniques involved in computer network, which helps the students to understand the actual working of computer network.

Objectives:

The course is designed to make students:

- Gain an understanding of the principles of operation of a wide variety of network technologies.
- Develop an appreciation of how network services are developed and knowledge of their uses.
- Apply knowledge of computers, software, networking technologies, and information assurance to an organization's management, operations, and requirements.
- Understand data compression and data security techniques.

Course Contents:

UNIT I

Introduction: - Computer Network, Goals and Applications, Reference models – OSI and TCP/IP. A Comparative study. Network hardware – LAN, MAN and WAN and topologies, Network Software – protocol hierarchies, design issues for the layers, Connection Oriented and connection less services, Switching Techniques – Circuit Switching, Message switching, Packet Switching.

UNIT II

Data Link Layer :- Design Issues : Framing, Error Control, Flow Control, , Elementary Data Link Protocols, Sliding window protocol, Example Data link protocols :HDLC, SLIP and PPP.

UNIT III

MAC Sub layer :- Multiple access protocols: Aloha, CSMA Protocols, Collision-Free Protocols, Binary Exponential Back-off algorithm ,Ethernet MAC Sub layer Protocols: IEEE802.3, IEEE802.4, IEEE802.5 , High speed LANs – Fast Ethernet, FDDI, Wireless LANs, Bridges.

UNIT IV

Network Layer :- Design issues, Routing Algorithms: Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing , Hierarchical Routing, Broadcasting Routing, Multicast Routing, Congestion control algorithms, Internetworking, The Network Layer in the Internet: Internet Protocol, Internet addressing and Internet Control protocols.

UNIT V

Transport Layer :- Services, The Internet Transport Protocols : TCP and UDP, performance issues

Application layer :- DNS Name Space, Name Servers, FTP, TELNET, WWW, SNMP, HTTP, SMTP , Network Security : Cryptography, Symmetric- key Algorithms, Public- key Algorithms, Digital Signatures, E-mail Security

Reference Books:

1. A.S. Tanenbaum, Computer Network (III Edition).
2. B.A. Forouzan, Data Communication and Networking (II Edition).
3. William Stallings, Data and Computer Communication.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
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IC-802A: Optimization Techniques

Aim of Course: The principle aim of this course is to make the students aware of organizational behavior of management-process and importance of decision-making in real life situations.

Objectives:

The course is designed to make students:

- Understand different techniques of optimization, which help in analyzing the process of decision-making.
- To learn problem formulation of optimization.
- To realize the methods of optimization.
- To know the applications of optimization.
- Understand basic concepts of Linear programming and Dynamic Programming

Course Contents:

UNIT I

Organizational behavior and management. Introduction to O.R. Techniques. Models: - Meaning and classifications.

UNIT II

Linear Programming Problems (L.P.P.), Graphical solutions, Simplex algorithm, Principle of Duality, post optimality analysis. Transportation problem, Initial basic feasible solutions, MODI'S optimality analysis, Degeneracy.

UNIT III

Assignment Problem, traveling Salesmen problem, Branch and Berend techniques. Integer program: - Necessity of Integer programming, use of Branch and Berend Technology for solving Integer Programming problem.

UNIT IV

Queue-theory: - Importance of waiting-line in networking Q-models. Dynamic programming problems.

UNIT V

Theory of Games: - Introduction, pay-off matrix, Minimum-Maximum principle, Saddle-point principle of Dominance. Introduction to Inventory Analysis

Reference Books:

4. Dr. S.D. Sharma, Text Book of Operations Research.
5. N.D. Vora, Quantitative Techniques in management.
6. Kanti Swarup, P.K. Gupta and M.M. Singh , Operations Research..
7. H.A. Taha, Introduction to Operations Research.

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IC-804B: Advanced Database Management System

Aim of Course: To learn advanced features of DBMS and build capacity to implement and maintain an efficient database system using emerging trends.

Objectives:

The course is designed to make students:

- Be able to master the concepts and design with proficiency databases under the relational model.
- Proficiency in the choice of DBMS platform to use for specific requirements
- Be proficient with a broad range of data management issues including data integrity and security, transaction processing and others.
- Be familiar with the fundamentals of distributed DBMS and object database management, data warehousing and data mining

Course Contents:

UNIT I

Introduction with DBMS and ER Model : Advantage of DBMS approach, various view of data, data independence, schema and sub-schema, primary concepts of data models, Database languages, transaction management, Storage management Database administrator and users, overall system architecture.

Basic concepts of ER model, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema.

UNIT II

Functional Dependencies and Normalization: Domains, relations, keys, super key, candidate, primary, alternate and foreign keys, Functional dependence, Full Functional dependence, trivial dependencies, transitive dependencies, Mutual independence, closure set of dependencies, non loss decomposition, FD diagram. Introduction to normalization, first, second, third Normal forms, dependency preservation, BCNF, Multivalued dependencies and fourth normal form.

UNIT III

PL/SQL fundamentals: Variables, reserve words, identifiers, anchored data types, blocks, labels, use of DML in PL/SQL, commits, rollback, savepoint, conditional control: if, case, nullif, coalesce, iterative processing with loops: Loop basics , simple loops, while, for loop.

UNIT IV

Database Integrity, Transaction, concurrency and Recovery: Basic idea of Database Integrity, Integrity rules, assertions, integrity Constraints, triggers.

Basic concepts of Transaction, ACID properties, Transaction states, implementation of atomicity and durability, concurrent executions, Serializability, Conflict serializability, View serializability, basic idea of concurrency control, Concept of locking, types of locks, basic idea of deadlock, deadlock handling.

UNIT V

Distributed Database and Emerging Fields in DBMS: Basic idea of Distributed database, distributed data storage, data replication, data fragmentation- horizontal vertical and mixed fragmentation.

Object oriented Databases-basic idea and the model, object structure, object class, inheritance, multiple inheritance, object identity.

Data warehousing- terminology, definitions, characteristics, data mining and it's overview, Database on www, multimedia Databases- introduction, similarity based retrieval, continuous

media data, multimedia data formats, video servers.

Reference Books:

1. A Silberschatz, H.F Korth, Sudersan “Database System Concepts” , MGH Publication.
2. Modern Database Management (5th Edition) (Hardcover) by Fred R. McFadden, Jeffrey A. Hoffer, Mary B. Prescott
3. Elmasri & Navathe “Fundamentals of Database systems” – III ed.
4. B.C. Desai. “An introduction to Database systems” BPB.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
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IC-811: Software Engineering

Aim of Course: To gain a broad understanding of the discipline of software engineering and its application to the development of and management of software systems.

Objectives:

The course is designed to make students:

- Understand the various activities undertaken for a software development project.
- Develop and write a software project proposal
- Develop and write a Software Requirements Specification and design document.
- Learn to work within a team and understand team dynamics
- Be able to effectively communicate the work (Presentation skills)

Course Contents:

UNIT I

Introduction to Software Engineering: Software problem, Software engineering problem, Software engineering approach, Software characteristics and Applications.

Software Processes: Software processes and its components, characteristics of software processes, Software development processes: Linear Sequential model, Prototyping model, RAD model, Iterative Enhancement model, Spiral model, Component based development, Comparative study of various development models

UNIT II

Project management process: The people, product, process and project, Phases of project management process, the W5HH principle. Software configuration management process, Process management process: Capability Maturity Model (CMM).

UNIT III

Software Requirement Analysis and Specification: Software requirements, Problem analysis, Requirements specifications, Validation and Verification, Metrics.

Project Planning: Project estimation (Size & Cost), Project Scheduling, Staffing and personnel planning, Software configuration management plans, Quality assurance plans, Project monitoring plans, Risk management.

UNIT IV

Software Design: Design principles: Problem partitioning and hierarchy, Abstraction, Modularity, Top-down and Bottom-up strategies. Effective Modular design: functional independency, Cohesion, Coupling. Structured design methodology.

UNIT V

Software Quality Assurance: Quality concept, Quality management system, movements and assurance, Software reviews: formal and technical, Formal approaches to SQA, Statistical software quality assurance, Software reliability, ISO 9000, SQA plan.

Software Testing: Software testing techniques: Testing fundamentals, White box testing, Black box testing, testing for specialized environments, architectures and applications. Software testing strategies: A strategic approach to software testing, Strategic issues, Unit testing, Integration testing, Validation testing and system testing, the art of debugging

Reference Books:

1. Dr. Ugrasen Suman, Software Engineering: Concepts and Practices, Published by Cengage Learning.
2. Ian Sommerville, Software engineering, Ninth edition Pearson
3. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publishing

House.

4. R. S. Pressman, Software Engineering-A practitioner's approach, Tata McGraw-Hill International Editions, New York.
5. Richard E. Fairly, Software Engineering Concepts, Tata McGraw Hill Inc. New York.
6. W. S. Jawadkar, Software Engineering: Principle & Practice, Tata McGraw-Hill, New York

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
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IC-812: Theory of Computation

Aim of Course: To make students know about the basic concepts of Computation and learn to work with mathematical abstractions of computers called a model of computation.

Objectives:

The course is designed to make students:

- Understand regular expressions, which are used to specify string patterns in many contexts, from office productivity software to programming languages.
- Study finite automata, another formalism mathematically equivalent to regular expressions, Finite automata are used in circuit design and in some kinds of problem-solving.
- Learn Context-free grammars that used to specify programming language syntax.
- Understand computability theory and decision problems.

Course Contents:

UNIT I

Formal languages: Introduction to Computation & Languages: Natural Languages, Computer Programming Languages and Formal Languages. Language Concepts: alphabet, strings, properties of Strings, Kleene closure. Properties of Formal Languages.

Grammar: Chomsky Hierarchy of grammar, languages represented by type 0,1,2,3 grammars.

UNIT II

Regular languages and finite automata-recursive definition, regular expression and corresponding languages, Pumping Lemma for non-regular languages. Finite automata, Kleene's theorem, non-deterministic finite automata. Equivalence of FAs and NFAs. Minimal state finite automata, Mealy machine and Moore machine, Regular grammar and their equivalence to finite automata.

UNIT III

Context free languages Parsing, ambiguity, parse trees, parsing methods: Bottom up and top down, Simplification of grammar. Normal form of CFGs: Chomsky Normal Form and Greibach Normal Form, CKY algorithm, Closure Properties of CFLs

UNIT IV

Push Down Automata: definition, examples, deterministic PDA, non-deterministic PDA, Parsing and PDAs, PDA and Context Free Languages

UNIT V

Turing machines – models of computations, definition, Representation of Turing Machines, TMs as language acceptors, Techniques for TM construction, Church - Turing thesis, Universal Turing machines, Variants of Turing machine.

Unsolvable Decision Problems- Decidability, Decidable Languages, Undecidable Languages Halting Problem of Turing Machine.

Reference Books:

8. Hopcraft and Ullman, Introduction to Automata Theory, Languages and Computation, Narosa Publishing House.
9. K.L.P. Mishra, N. Chandrasekaran, Theory of Computer Science (Automata, Languages and Computation), Prentice Hall of India.
10. Peter Linz, An Introduction to Formal Languages and Automata, Narosa Publishing House.
11. Cohen Daniel I.A., Introduction to Computer Theory, John Wiley and Sons, inc

New York

12. Martyn John C, Introduction to Languages and Theory of Computation, McGraw Hill, N.Y. (Internal Edition McGraw Hill)
13. Mandrioli Dino, Ghezzi Carlo, Theoretical Fundamentals of Computer Science, John Weley and Sons, Inc , New York.