INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

MCA (6 Years)

VIII SEMESTER

JANUARY – MAY 2013

Subject Code	Subject Name	Credits
IC-801A	Computer Networks	4
IC-802	Design & Analysis of Algorithm	4
IC-804B	Advanced Database Management Systems	4
IC-811	Software Engineering	4
IC-805	Control Systems	4
IC-806C	Project	6
IC-807	Comprehensive Viva	4

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE

MCA (6 Years) VIII SEMESTER

IC-801: 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: OptimalityPrinciple, Shortest Path Routing, Flooding, Distance Vector Routing, LinkState Routing , Hierarchical Routing, Broadcasting Routing, MulticastRouting,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. Tanebaum, Computer Network (III Edition).
2. B.A. Forouzen, Data Communication and Networking (II Edition).
3. William Stalling, Data and Computer Communication.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) VIII SEMESTER
IC-802: Design & Analysis of Algorithm

Aim of Course: Aim of Course: This course aims to introduce the classic algorithms in various domains, and techniques for designing efficient algorithms.

Objectives:

The course is designed to make students:

- Learn to analyze the running time of the algorithms
- Understand the application of algorithms and design techniques to solve problems.
- Learn to analyze the complexities of various problems in different domains and design efficient algorithms.
- Understand asymptotic notation to provide a rough classification of algorithms
- Study algorithms for fundamental problems in computer science and engineering work and compare with one another.
- Understand the problems for which it is unknown whether there exist efficient algorithms or even algorithm

Course Contents:

UNIT I

Introduction to Algorithms: Definition, Algorithm Specification, Performance analysis. Review of Data Structures: Stacks, Queues, Trees and Graphs.

UNIT II

Divide and Conquer: General Method, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Selection Sort, radix short.

Dynamic Programming:- The General Method, Matrix Chain Multiplication, Memoisation, Memoised Fibonacci series computation. 0/1 Knapsack, Traveling Salesperson Problem.

UNIT III

The Greedy Strategy: General Method, Knapsack Problem, Job Sequencing with deadlines, Minimum Cost Spanning Trees - Prim's Algorithm, Kruskal's Algorithm

UNIT IV

Basic Traversal and Search Techniques:- Techniques for Binary Trees and Graphs

Back Tracking:- The General Method, The 8-Queens Problem

Branch And Bound:- The General Method, Traveling Salesperson Problem.

UNIT V

NP-Hard and NP-Complete Problems:- The Basic Concepts, Non-Deterministic Algorithms, The Classes NP-Hard & NP-Complete.

Reference Books:

1. Thomas H. Cormen, Charles E.Leiserson, Donald L.Rivest. Introduction to Algorithms. Indian Edition Published.
2. Ellis A. Horowitz, Sartaj Sahni, Fundamentals of Computer Algorithm, Computer Science Press.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) VIII SEMESTER
IC-803: 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

Relational Algebra & SQL: Relational algebra with extended operations, modifications of Database, Relational database, basic idea of SQL, data types, data definition language, Data manipulation language, Transaction control and data control language, Operators in SQL, Arithmetic operators, Comparison operators, Logical operators, set operators, Temporary tables, null values, Joins and Sub queries, views.

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, failure classification, storage structure types, stable storage implementation, data access, basic idea of recovery.

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
MCA (6 Years) VIII SEMESTER
IC-804: 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. Ian Sommerville, Software engineering, Ninth edition Pearson.

2. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publishing House.
3. R. S. Pressman, Software Engineering-A practitioner's approach, Tata McGraw-Hill International Editions, New York.
4. Richard E. Fairly, Software Engineering Concepts, Tata McGraw Hill Inc. New York.
5. W. S. Jawadekar, Software Engineering: Principle & Practice, Tata McGraw-Hill, New York
6. Rajib Mall, Fundamentals of Software Engineering, PHI, New Delhi.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) VIII SEMESTER
IC-805: Control Systems

Aim of Course: Aim of Course: To study mathematical modeling of physical control systems in form of differential equations and transfer functions.

Objectives:

The course is designed to make students:

- To study the concept of time response and frequency response of the system
- To understand the basics of stability analysis of the system
- To learn basic control system design methods, including root locus diagrams and frequency response methods.
- Understand the principles and objectives underlying feedback control.

Course Contents:

UNIT I

Open loop and closed loop control systems, criteria specification of closed loop systems and methods to solve them. Fundamental concepts of servomechanisms Missile launching and guidance system automatic aircraft landing systems and rocket autopilot system.

UNIT II

Mathematical modeling standard and state space analysis of mechanical and electrical systems Transient and steady state response of systems. Effects of proportional integral and derivative control actions on system performance. Steady state error in unity feedback control systems

UNIT III

Control system design using root locus method. Bode diagram ; all pass and minimum phase systems. Polar plots log magnitude Vs phase plots experimental determination of transfer function.

Correlation between time and frequency response. Nyquist stability criterion and assessment of relative stability gain margin and phase margin

UNIT IV

Realization of basic compensators cascade compensation time domain and in frequency domain tuning of PID controllers

UNIT V

Fundamentals of digital control systems the Z transform and its applications in digital control system.

Reference Books:

1. I. J. Nagrath and M. Gopal, Control Systems Engineering, (Third Edition)
2. K Ogata, Modern Control Engineering. Fourth Edition, PHI