Integral University, Lucknow
Department of Computer Application

COURSE STRUCTURE
Master of Computer Applications

Year –III, Semester – V

<table>
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G. Total
WEB TECHNOLOGY

MCA-501

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V
Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VBScript, Active Server Pages (ASP).

Text Book:
UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V


REFERENCES
ERP SYSTEMS

(MCA 502(2))

UNIT-I
Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering and Information Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP, ERP Drivers, Decision support system.

UNIT-II

UNIT- III
Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendors evaluation criterion, ERP Implementation approaches and methodology, ERP implementation strategies, ERP Customization, ERP-A manufacturing Perspective.

UNIT- IV
Critical success and failure factors for implementation, Model for improving ERP effectiveness, ROI of ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations.

UNIT- V
Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units through Soft System approaches or qualitative Analysis tools, Learning and Emerging Issues, ERP and E-Commerce.

REFERENCES
UNIT-I
Introduction to Storage Technology
Data proliferation and the varying value of data with time & usage, Sources of data and States of data creation, Data center requirements and evolution to accommodate storage Needs, Overview of basic storage management skills and activities, the five pillars of Technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.

UNIT-II
Storage Systems Architecture
Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure Components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end management, Array caching properties and algorithms, Front end Connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity Protocols.

UNIT-III
Introduction to Networked Storage

UNIT-IV
Introduction to Information Availability
Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques.

UNIT-V
Managing & Monitoring
Management philosophies (holistic vs. system & component), Industry management Standards (SNMP, SMI-S, CIM), Standard framework applications, Key management Metrics (thresholds, availability, capacity, security, performance), Metric analysis Methodologies & trend analysis,
Reactive and pro-active management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and Handling techniques, Management tools overview.

REFERENCES

1. Fiber Array Storage Technology A FAST Introduction by Barry Mellish; Jure Arzensek; Christian Demmer; Noam Rosen Publisher: IBM Redbooks.

REAL TIME SYSTEM

(MCA 502(4))

UNIT-I

UNIT-II

UNIT-III
Characterizing Real Time Systems and Task, Task Assignment & Scheduling Theory, Fixed and Dynamic Priority Scheduling Uniprocessor (RM and EDF), Multiprocessor (Utilization Balancing, Next-fit for RM & Bin-Packing Assignment for EDF) Scheduling

UNIT-IV

UNIT-V

REFERENCES
.NET FRAMEWORK AND C#

MCA 503

UNIT-I

UNIT-II
C# Basics: Introduction, Data Types, Identifiers, variables & constants, C# statements, Object Oriented Concept, Object and Classes, Arrays and Strings, System Collections, Delegates and Events, Indexes Attributes, versioning.

UNIT-III

UNIT-IV
Advanced Features Using C#: Web Services, Windows services, messaging, Reflection, COM and C#, Localization.

UNIT-V
Advanced Features Using C#: Distributed Application in C#, XML and C#, Unsafe Mode, Graphical Device Interface with C#, Case Study (Messenger Application)

TEXT BOOKS
2. Shildt, “C#: The Complete Reference”, TMH

REFERENCE BOOKS
4. Balagurusamy, “Programming with C#”, TMH
DIGITAL IMAGE PROCESSING

(MCA 504(1))

UNIT-I

Image Enhancement in Spatial Domain: Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions; Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.

UNIT-II
Image Enhancement in Frequency Domain: Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filtering – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

Image Restoration: A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT-III
Color Image Processing: Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation.


UNIT-IV
Registration: Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth

UNIT-V
Feature Extraction: Representation, Topological Attributes, Geometric Attributes
Description: Boundary-based Description, Region-based Description, Relationship.
Object Recognition: Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching

REFERENCES
DATA COMPRESSION

(MCA 504(2))

Unit - I

Unit – II

Unit-III

Unit – IV
Mathematical Preliminaries for Lossy Coding: Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.

Unit-V

References:
1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers
SOFTWARE TESTING AND QUALITY ASSURANCE

MCA 504(3)

UNIT-I

UNIT-II
Software Testing Strategies: - Unit testing: unit test considerations, unit test procedures; Integration Testing: top down, bottom up, regression testing, smoke testing, integration test documentation; Validation Testing : validation test criteria, configuration review, alpha and beta testing ; System Testing: recovery testing, security testing, stress testing, performance testing ; Debugging: Debugging Process, psychological considerations, debugging approaches.

UNIT-III
Building Test Cases: White-box Test Cases and Test Procedures, Test Data Selection and Outputs, Black-box test cases and test procedures

UNIT-IV

UNIT-V
Quality Assurance and Standards: Quality concepts: quality, quality control, quality assurance, cost of quality; software quality assurance: background issues and SQA activities; software reviews, formal technical reviews, formal approaches to SQA, Software Reliability: measures of software reliability and availability, software safety; ISO 9000 Quality standards: ISO approach to quality assurance system, ISO 9001 standards, SQA plan, Software Testing and QA, Configuration Management

REFERENCES
1. W.M Perry, "Effective methods for Software Testing"
2. R. Pressman, "Software Engineering"
3. A. Behforooz and F. Hudson, "Software Engineering Fundamentals"
MOBILE COMPUTING

(MCA 504(4))

UNIT – I
Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

UNIT - II

UNIT – III
Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

UNIT - IV
Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

UNIT – V
Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

REFERENCES
1. J. Schiller, Mobile Communications, Addison Wesley.
2. A. Mehrotra, GSM System Engineering.
ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

MCA-505

UNIT -I
Introduction to AI, Application of AI.
Problem, Problem Space & Searches:-
Problem Characteristics, Simple Problem Solving, Examples, Searching for Solution.
Uninformed Search Strategies:- Breadth-First Search, Depth-First Search, Depth Limited Search and Iterative Deepening Search.
Constant Satisfaction Problem, Mean-End-Analysis, Optimal Decision in Games.

UNIT-II
Knowledge Representation
Knowledge Concept: Representation and Mapping, Approaches to Knowledge Representation.
First Order Predicate Logic: Representing Simple Facts in Logic, Computable Functions and Predicates, Rules of Interface, Resolution, Unification & Lifting, Forward and Backward Chaining. Introduction to PROLOG.
Weak Slot-and-Filler Structure: Semantic Nets, Petitioned Nets, Minskey Frames.

UNIT -III

UNIT -IV

UNIT-V
Associative Models: Hopfield Network, Brain-State-in-a-Box Network, Boltzmann Machines.

REFERENCES
1. Rich & Knight, “Artificial Intelligence” TMH.
2. DAN W. Patterson, “Introduction to AI & Expert Systems”, PHI.
4. K. Mehrotra, Mohan, Ranka “ELEMENTS OF Artificial Neural Networks” Penram International Publishing.
SOFTWARE ENGINEERING
(MCA - 506)

UNIT-I

UNIT-II

UNIT-III
Software Coding: Programming Practice, Top Down And Bottom Up Structured Programming, Information Hiding, Programming Style, Internal Documentation, Size Measures, Complexity Metrics, Style Metrics

UNIT-IV

UNIT-V
REFERENCE

2. Rajib Mall “Fundamental of Software Engineering”, PHI.
1. Design a HTML page to display your CV
2. Design a HTML form to reserve a railway ticket.
3. Write a Java Script program that finds the greatest common divisor of two numbers.
4. In the form mentioned in problem 2 to reserve a railway ticket add the following validations using java Script.
   - From city and to city are two different cities.
   - Age of passengers should not be greater than 150.
   - Name of the passenger should be a string of a maximum length 20.
5. Write a program for illustrating client/server side scripting with help of ASP.
6. Write a piece of code in XML for creating DTD, which specifies set of rules.
7. Create style sheet in CSS/XSL and display the document in Internet Explorer.
8. **Mini Project**: Develop a web portal.
Basic of the .Net framework: .Net architecture, managed code, assemblies, clr, execution of assemblies code, il, jit, net framework class library, common type system, common language specification, interoperability with unmanaged code.

Introduction to VB.Net and C#:
VB.Net : Net features, Data Types 
C# : Data Types, Operators, Garbage Collection, Jagged Array, Collection (Array list, Hash table), Indexer(One Dimension) and property, Delegates and events(Multicasting , Multicasting Event), Exception Handling, Window forms.

ADO.Net & Object Oriented Concepts (Using VB.Net Or C#): Basic window control, Architecture of ADO.Net, Comparison with ADO, .Net Data provider, Data Adapter, Data Set, Data Row, Data Column, Data Relation, command, Data Reader, Data Grid Constructor, Destructor, Abstraction, interface, polymorphism (Over loading and over ridding).

Practical
1. A program of binary operator Over loading
2. A program using delegation in which addition and subtraction of two integer value possible
3. A program-using Interface.
4. A program to display the caption, height of command button into label.
5. A window program for list box give the facility for adding, removing and clearing the list with conformation and store the deleted file in another list box.
6. Creating a window form through which user can enter details of employee: empid, empname, basic salary, sex, date of birth, date of joining, Designation, total income, total deduction and gross salary will be calculated automatically.
7. Also in above program all details of employee will be appear in Grid and depending upon selection particular actual record will be appear in form.

ASP.Net : Anatomy of ASP.NET Page, Server Controls : label, dropdown list box, validation controls, list box, text box, radio button, check box, State Management : session, caching, Authentication (window,.Net Passport, Forms Based), Authorization, web services, Advance Grid Manipulation.

Practical
1. Create an ASP.Net web page using different validation controls.
2. Create an ASP.Net Web page that lists the customer from customers database table in a sortable Data Grid with paging option. The Data Grid should display three columns, one for the customers’ ids, one for the customer’s names and one for the customer’ phone numbers. The user should be able to sort the Data Grid by customer ID.
3. Create simple web service.
SOFTWARE ENGINEERING LAB

MCA – 573

1. Program for Configuration Management.
2. Perform SA/SD for the following software.
   - Hotel Automation System
   - Book Shop Automation Software.
   - Word processing Software.
   - Software Component Cataloguing Software.
3. Design and development of test cases for testing.
5. Writing program in C++ for Halstead Analysis.
6. Perform Cost/Benefit analysis.
7. Illustration of various activities of Software development using MS Project 2000.