BHARATHIAR UNIVERSITY, COIMBATORE.

M. Sc. COMPUTER SCIENCE *(Affiliated Colleges)*
(Effective for the candidates admitted from the academic Year 2015-2016)

SCHEME OF EXAMINATIONS – CBCS PATTERN

Sem.	Study Components	Course title	Ins. hrs/ week	Exam Dur.	CIA	Mark	Total Mark	Credit
	Semester I							
	Paper I Analysis & Design of Algorithms		5	3	25	75	100	4
	Paper II Object Oriented Analysis and Design & C++		5	3	25	75	100	4
	Paper III Advanced Networks		5	3	25	75	100	4
	Paper IV Advanced Software Engineering		5	3	25	75	100	4
	Practical I Algorithm and OOPS Lab		5	3	40	60	100	4
	Practical II Software Testing Lab		5	3	40	60	100	4
II	Paper V Data Mining and Warehousing		4	3	25	75	100	4
	Paper VI Advanced Operating Systems		4	3	25	75	100	4
	Paper VII Internet and Java Programming		4	3	25	75	100	4
	PaperVIII Artificial Intelligence & Expert Systems		4	3	25	75	100	4
	Elective – I		4	3	25	75	100	4
	Practical III Advanced Concept of Internet & Java Programming Lab		5	3	40	60	100	4
	Practical IV Data Mining using R		5	3	40	60	100	4
III	Paper IX Digital Image Processing		4	3	25	75	100	4
	Paper X Advanced Tools in Computing		4	3	25	75	100	4
	Paper XI Network Security and Cryptography		4	3	25	75	100	4
	Paper XII Business Intelligence		4	3	25	75	100	4
	Elective – II		4	3	25	75	100	4
	Practical V Advanced Tools in Computing Lab		5	3	40	60	100	4
	Practical VI Digital Image processing using matlab		5	3	40	60	100	4
IV	Project work and Viva voce						250*	10
	Total						2250	90

* Project report - 200 marks; Viva-voce – 50 marks

ELECTIVE – I.	ELECTIVE – II
1.1. Multimedia and its Applications	2.1. Mobile Computing
1.2. Embedded Systems	2.2.Cloud computing
1.3. Open source systems	2.3.Web Services

Paper I : ANALYSIS & DESIGN OF ALGORITHMS

Subject Description
This course presents an introduction to the algorithms, their analysis and design and various methods like divide and conquer method, Dynamic programming, backtracking and parallel models.
Goals
To enable the students to learn the Elementary Data Structures and algorithms.
Objectives
On successful completion of the course the students should have

- Understood the various design and analysis of the algorithms.

Contents
UNIT I
     Introduction:- algorithm definition and specification – performance analysis – Elementary Data structures:- stacks and queues – trees – dictionaries – priority queues – sets and disjoint set union – graphs – basic traversal and search techniques.

UNIT II
     Divide – and – conquer: - General method – binary search – merge sort – quick sort – The Greedy method:- General method – knapsack problem – minimum cost spanning tree – single source shortest path.

UNIT III
     Dynamic Programming - general method – multistage graphs – all pair shortest path – optimal binary search trees – 0/1 Knapsack – traveling salesman problem – flow shop scheduling.

UNIT IV
     Backtracking:- general method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem − Branch and bound:- The method – 0/1 Knapsack problem – traveling salesperson.

UNIT V
     Parallel models:- Basic concepts, performance Measures. Parallel Algorithms: Parallel complexity, Analysis of Parallel Addition, Parallel Multiplication and division, Parallel Evaluation of General Arithmetic Expressions, First-Order Linear recurrence.

REFERENCE BOOKS
1. Ellis Horowitz, "Computer Algorithms", Galgotia Publications.
2. S. Lakshmivarahan, Sundarshan K.Dhall, "Analysis and Design of Parallel Algorithms".
3. Alfred V.Aho, John E.Hopcroft, Jeffrey D.Ullman, "Data Structures and Algorithms".
4. Goodrich, "Data Structures & Algorithms in Java", Wiley 3rd edition.

Paper II   :   OBJECT ORIENTED ANALYSIS AND DESIGN & C++

Subject Description
This course presents the object model, classes, objects and their relationship, nature of the classes and introduction to C++

Goals
To enable the students to learn C++ and object models.

Objectives
On Successful completion of the course the students should have
- Understood the concepts in object models and the basically the C++ language

Contents
UNIT I
        The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of an Object – Relationship among Objects.

UNIT II
        Classes and Object: Nature of Class – Relationship Among classes – The Interplay of classes and Objects. Classification: The importance of Proper Classification –identifying classes and objects –Key Abstractions and Mechanism.

UNIT III
        Introduction to C++ - Input and output statements in C++ - Declarations -control structures – Functions in C++.

UNIT IV
        Classes and Objects –Constructors and Destructors –operators overloading –Type Conversion- Inheritance – Pointers and Arrays.

UNIT V
        Memory Management Operators- Polymorphism – Virtual functions – Files –
Exception Handling – String Handling -Templates.

REFERENCE BOOKS
1. "Object Oriented Analysis and Design with Applications", Grady Booch, Second Edition, Pearson Education.
2. "Object -Oriented Programming with ANSI & Turbo C++", Ashok N.Kamthane, First Indian Print -2003, Pearson Education.
3. Balagurusamy "Object Oriented Programming with C++", TMH, Second Edition, 2003.

Paper III   : ADVANCED NETWORKS

Subject Description
This course presents the Introduction to Digital networks, Internet Address, Internet protocol, TCP and UDP.
Goals
To enable the students to learn the digital networks, Internet protocol and UDP diagrams.
Objectives
On Successful completion of the course the students should have
- Gained in-depth knowledge of Internet protocols and their functionalities.

Contents
UNIT I
        Introduction to digital networks - WAN - WAN standards - Introduction TCP/IP and Internet - network technologies - TCP/IP features, protocol standards Internetworking concepts and Architectural model - Network interface layer.

UNIT II
        IP layer: Internet Address - Mapping Internet Address to Physical Address - Determining an Internet address at startup - Transparent   gateways and subnet addressing - multicast addressing - client-server model of interaction - bootstrap protocol - domain name system - address discovery and binding.

UNIT III
        Internet Protocol: Connectionless Datagram delivery - data Structures and input processing. Routing IP datagrams - error and control messages - protocol layering - user datagram protocol - reliable stream transport service - fragmentation and reassembly. Routing: Cores - peers and algorithms - autonomous systems – interior gateways protocols - routing table and routing algorithms

UNIT IV
        UDP: User datagrams. TCP: Data structures and Input processing - finite state machine implementation - output processing – timer management - flow control and adaptive retransmission - urgent data processing and the push function - socket level interfaces

UNIT V
        Application layer: Remote login - File transfer Access - electronic mails - Internet management. X.25 networks and support protocols.

REFERENCE BOOKS

1. Douglas E. Comer, "Internetworking with TCP/IP Volume I", Prentice Hall, 1991.
2. Douglas E. Comer, David L. Stevens, "Internetworking with TCP/IP Volume II", Prentice Hall, 1991
3. Uyless Black, "TCP/IP & Related Protocols" McGraw-Hill, 1995.

Paper IV   : ADVANCED SOFTWARE ENGINEERING

Subject Description
This course presents the Introduction to Software Engineering, Design, Testing and Maintenance
Goals
To enable the students to learn the concepts of Software Engineering
Objectives
On Successful completion of the course the students should have:

- Understood the concepts of Software Engineering.
- Understood the concepts of SPM

Contents

UNIT - I
Introduction: The Problem Domain – Software Engineering Challenges - Software Engineering Approach – Software Processes: Software Process – Characteristics of a Software Process – Software Development Process Models – Other software processes.

UNIT – II
Software Requirements Analysis and Specification : Requirement engineering – Type of Requirements – Feasibility Studies – Requirements Elicitation – Requirement Analysis – Requirement Documentation – Requirement Validation – Requirement Management – SRS - Formal System Specification – Axiomatic Specification – Algebraic Specification - Case study: Student Result management system.
Software Quality Management – Software Quality, Software Quality Management System, ISO 9000, SEI CMM.

UNIT – III
Software Project Management: Responsibilities of a software project manager – Project planning – Metrics for Project size estimation – Project Estimation Techniques – Empirical Estimation Techniques – COCOMO – Halstead's software science – Staffing level estimation – Scheduling – Organization and Team Structures – Staffing – Risk management – Software Configuration Management – Miscellaneous Plan.

Unit-IV
Software Design: Outcome of a Design process – Characteristics of a good software design – Cohesion and coupling - Strategy of Design – Function Oriented Design – Object Oriented Design - Detailed Design - IEEE Recommended Practice for Software Design Descriptions.

UNIT – V
Software Testing: A Strategic approach to software testing – Terminologies – Functional testing – Structural testing – Levels of testing – Validation testing - Regression testing – Art of Debugging – Testing tools - Metrics-Reliability Estimation.
Software Maintenance - Maintenance Process - Reverse Engineering – Software Re-engineering - Configuration Management Activities.

References

1. An Integrated Approach to Software Engineering – Pankaj Jalote, Narosa Publishing House, Delhi, 3rd Edition.
(Unit – I Chapters: 1.1, 1.2, 1.3, 2.1, 2.2, 2.3,2 .4)
(Unit – IV Chapters 8.1 to 8.3)
(Unit – V Chapter 10.6)
2. Fundamentals of Software Engineering – Rajib Mall, PHI Publication, 3rd Edition.
(Unit –II Chapters 4.1 to 4.9, 11.3, 11.4, 11.5, 11.6)
(Unit – III Chapters 3.1 to 3.14)
(Unit – IV Chapters 5.1, 5.2, 5.3)
3. Software Engineering – K.K. Aggarwal and Yogesh Singh, New Age International Publishers, 3rd edition.
(Unit – II Chapters 4.2, 4.3, 4.4, 4.5)
(Unit – IV Chapters 5.3, 5.4, 5.5, 5.6)
(Unit – V Chapters 8.1 to 8.8, 9.1, 9.2, 9.5, 9.6, 9.7, 9.8)
5. A Practitioners Approach- Software Engineering, - R. S. Pressman, McGraw Hill.
6. Fundamentals of Software Engineering - Carlo Ghezzi, M. Jarayeri, D. Manodrioli, PHI Publication.

PRACTICAL I

ALGORITHM AND OOPS LAB

1)Write a program to solve the tower of Hanoi using recursion.
2) Write a program to traverse through binary search tree using   traversals.
3)Write a program to perform various operations on stack using linked list.
4)Write a program to perform various operation in circular queue.
 5)Write a program to sort an array of an elements using quick sort.
6)Write a program to solve number of elements in ascending order using heap sort.
7)Write a program to solve the knapsack problem using greedy method
8)Write a program to search for an element in a tree using divide & conquer strategy.
9) Write a program to place the 8 queens on an 8X8 matrix so that no two queens
    Attack.
10.   Write a C++ program to perform Virtual Function
11.   Write a C++ program to perform Parameterized constructor
12.   Write a C++ program to perform Friend Function
13.   Write a C++ program to perform Function Overloading
14.   Write a c++ program to perform Single Inheritance
15.   Write a C++ program to perform Employee Details using files

Practical II: SOFTWARE TESTING LAB

Subject Description
This course provides hand on experience of Software Testing tools.

Goal :
To enable the students to learn about the usage of tools of Software testing.

Objectives :
On successful completion of the course the students must have
- understood the concepts of Software testing
- got the skill of software testing tools
- expertise in using software testing tools.

Running and testing in any one of the following Testing tools :

- WinRunner
- Silk Test
- SQA Robot
- LoadRunner
- JMeter
- TestDirector
- GNU Tools (Source Code Testing Utilities in Unix / Linux)
- Quick Test Professional

REFERENCE :

Dr.K.V.K.K.Prasad, Software Testing Tools, Dreamtech Press, 2007

Paper V   : DATA MINING AND WAREHOUSING

Subject Description
This course presents the Introduction to Mining tasks, classification, clustering and Data Warehousing.
Goals
To enable the students to learn the Data mining tasks& Data warehousing techniques.
Objectives
On Successful completion of the course the students should have:
- Understood the Association rules, Clustering techniques and Data warehousing.

Contents
UNIT I

Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective.

Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.

UNIT II

Classification: Introduction – Statistical – based algorithms - distance – based algorithms – decision tree - based algorithms - neural network – based algorithms –rule - based algorithms – combining techniques.

UNIT III

Clustering: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms - Partitional Algorithms.

Association rules: Introduction - large item sets - basic algorithms – parallel & distributed algorithms – comparing approaches- incremental rules – advanced association rules techniques – measuring the quality of rules.

UNIT IV

Data warehousing: an introduction - characteristics of a data warehouse – data marts – other aspects of data mart. Online analytical processing: introduction - OLTP & OLAP systems – data modelling –star schema for multidimensional view –data modelling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.

UNIT V

Developing a data WAREHOUSE: why and how to build a data warehouse –data warehouse architectural strategies and organization issues - design consideration – data content – metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse.

Applications of data warehousing and data mining in government: Introduction - national data warehouses – other areas for data warehousing and data mining.

REFERENCE BOOKS

1. Margaret H. Dunham, "Data mining introductory and advanced topics", Pearson education, 2003.
2. C.S.R. Prabhu, "Data warehousing concepts, techniques, products and a applications", PHI, Second Edition.
3. Arun K.Pujari, " Techniques", Universities Press (India) Pvt. Ltd., 2003.
4. Alex Berson, Stephen J. Smith, "data warehousing, data mining, & OLAP, TMCH, 2001.
5. Jiawei Han & Micheline Kamber, " Data mining Concepts & Techniques", 2001, Academic press

Paper VI   : ADVANCED OPERATING SYSTEMS

Subject Description
This course presents the Introduction & Evolution of Operating Systems, Interprocess Communication, distributed systems and UNIX OS.

Goals
To enable the students to learn the basics of operating systems, distributed operating systems and Unix OS.

Objectives
On Successful completion of the course the students should have:
- Understood the IPC problems and File caching schemes.
- Gained knowledge in Distributed OS and Unix OS

Contents
UNIT I
        Introduction – Evolution of Operating systems – Serial, Simple Batch, Mutiprogrammed Batch , Timesharing, Distributed and Real time operating systems – Computer Hardware review – Interrupts - Operating System Concepts – Processes – Model – Creation - Termination – Process Hierarchy – Process States – Implementation of Processes – Threads – Thread Usage – Implementation of Threads in User Space and Kernel space – Multi threading.

UNIT II
        Inter Process Communication – Race condition – Critical Region – Mutual Exclusion – Sleep and wakeup – Semaphores – Mutexes – Message Passing.
        Classical IPC Problems : The Dining Philosophers Problem – The Readers and Writers Problem – The Sleeping Barber Problem – Producer Consumer problem.

UNIT III
        Distributed Operating System Concepts & Design - Fundamentals -Remote Procedure Calls - The RPC Model - Transparency of RPC - Implementing RPC mechanism - Stub Generation - RPC Messages - Server Management - Parameter-Passing Semantics - Call Semantics - Communication Protocol for RPCs. Distributed File System: Introduction - Desirable Features - File Models - File - Accessing Models - File Sharing Semantics - File Caching Schemes - File Replication .

UNIT IV
        UNIX : Architecture of Unix Operating System – Introduction to system concepts – Kernel data structures – Internal representation of Files – Inodes – Algorithms for allocation and Releasing inode - Structure of a Regular file – Directories – Super block – Algorithm for assigning new Inode and freeing Inode - Allocation of Disk blocks - Process states and transition – Layout of system memory - The context of a Process

UNIT V

Process Control in Unix – Algorithm for Fork system call – Algorithm for Exit – Algorithm for Wait – Algorithm for Exec – Uses of Exec – Algorithm for Booting the Unix system – Algorithm for Init process - Process scheduling algorithm – Example of Process scheduling in Unix. Example C programs by using fork, exec, wait, exit system calls.

REFERENCE BOOKS

1. Andrew S.Tanenbaum,"Modern Operating Systems", PHI/Pearson Education Asia, Second Edition, 2001
2. Pradeep K. Sinha, "Distributed operating systems concepts and design" ,Prentice - Hall of India, 2002
2. Maurice J. Bach, "The Design of the Unix Operating System", Prentice-Hall of India, 1998.
4. William Stallings, "Operating Systems", Prentice Hall of India, Second   Edition, 2000

PAPER VII   : INTERNET AND JAVA PROGRAMMING

Subject Description
This course presents the Introduction to Internet, Java, Advanced Java,
Goals
To enable the students to gain knowledge in Internet and Java.
Objectives
On Successful completion of the course the students should have:
• Understood the features of Java.
Contents

UNIT I The Internet : Introduction – Understanding the Internet – A tour of the Internet – Hardware and Software requirements of Internet – Internet Services Providers (ISP) – Internet addressing – Mail – Understanding the Web – The Web: Advanced topics – Introduction to usenet – Gopher, Veronica and Jughead.

UNIT II Introduction: History of JAVA, JAVA class libraries – Basics of a typical JAVA environment – Arithmetic, Equality and Relational Operators – Thinking about Objects, Applet: Adding Integers (Example) – Control Structures: if, if/else, while, for, switch, do/while, break and continue – Operators: Assignment, Increment and Decrement and Logical – Primitive Data types. Methods: program modules in JAVA – Methods – Method definitions – JAVA API packages – Duration of identifiers – Scope rules – Method overloading - Arrays – References and Reference parameters – Passing arrays to methods – Multiple subscripted arrays – Class scope – Controlling access to members.

UNIT III Packages: Creating packages – Constructors – Overloaded constructors – Set and Get methods – Final instance variables – Packages access – Using this reference – Finalizers – static

Class members – Data abstraction and Information Hiding – Superclasses and Subclasses – protected members – Constructers and Finalizers in subclass – inner class definitions – Type wrapper class for primitive types.

UNIT IV String constructors – String methods: length, CharAt, getChars, value of, intern and miscellaneous string methods – Substrings and concatenating strings – stringBuffer class – stringTokenizer Class – Graphics contexts and Graphics Objects – color and Font controls – Drawing lines, Rectangles, Ovals, Arcs, Polygons and Polylines - The JAVA2D API – Swing overview – Jlabel – Event handling model – JtexField, JpasswordField, Jbutton, JcheckBox, Jradio Button, JcomboBox, Jlist, JtextArea, Jslider – Mouse event handling, Adapter classes – Layout managers – Panels – Using menus with frames – Boxlayout manager – Exception handling.

UNIT V Class Thread: an overview – Thread states – Thread priorities and scheduling – Thread synchronization – Runnable interface – Files and Streams – Creating, Reading and Updating a sequential access file – Creating, Writing and Reading a random access file – Class file – Reading, Inserting and Updating a database (Use JDBC to a MS Access)
        RMI: defining, implementing the RMI – Define the Client – Compile Execute the server and the client – Networking: Reading a file on a web server – Establishing a simple server and a simple client (using stream sockets).

Reference Books:
1.Harley Hahn, "The Internet – Complete Reference", Second edition, Tata McGraw Hill, 1996
2. Deitel and Deitel, " Java How to Program", Third Edition, PHI/Pearson Education Asia.
3. Keyur shab,"Java 2 programming", Tata McGraw-Hill Pub. Company Ltd.
4. C.Xavier,"Programming with Java 2",SciTech Publications (India) P. Ltd.
5. Cays S. Horstmann, Gary Cornell, "Core Java2 Volume I – FundamentalsPearson Edition, AOS & Advanced Concept of Internet & Java Programming

PAPER VIII : ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

Subject Description
This course presents the Introduction to AI Problems, Heuristic techniques, and Represents Simple facts and learning.
Goals
To enable the students to learn the concepts of AI and Expert Systems
Objectives
On Successful completion of the course the students should have:
- Understood the AI & Expert Systems.
- +Learnt the Heuristic techniques and reasoning
/
Contents

UNIT I

Introduction: AI Problems - Al techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems - Problem Characteristics - Issues in design of Search.

UNIT II

Heuristic Search techniques: Generate and Test - Hill Climbing- Best-First, Problem Reduction, Constraint Satisfaction, Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations -Issues in Knowledge representations - Frame Problem.

UNIT III

Using Predicate logic: Representing simple facts in logic - Representing Instance and Isa relationships - Computable functions and predicates - Resolution - Natural deduction. Representing knowledge using rules: Procedural Vs Declarative knowledge - Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.

UNIT IV

Statistical reasoning – Knowledge representation – Planning– Understanding.

UNIT V

Learning – Common sense – Perception and Action – Expert System.

REFERENCE BOOK

1. Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.
2. George F Luger, "Artificial Intelligence",4th Edition, Pearson Education Publ,2002.

PRACTICAL III

ADVANCED CONCEPT OF INTERNET & JAVA PROGRAMMING:

Lab Programmes:
1. Create an employee package to maintain the information about the employee. Use constructors to initialize the employee number and use overloading method to set the basic pay of the employee. By using this package create a java program.
2. Program to implement inheritance.
3. Java program to handle different mouse events.
4. Create an applet for a calculator application.
5. Create a login form using Swing Components.
6. Java program to maintain the student information in text file.
7. Animate images at different intervals by using multi-threading concepts.
8. Program to send a text message to another system and receive the text message from the system (use socket programming).
9. Java program by using JDBC concepts to access a database.
10. Java program to implement RMI.

PRACTICAL IV

Data Mining Using R

1. Implement Apriori algorithm to extract association rule of data mining.

2. Implement k-means clustering technique.

3. Implement any one Hierarchal Clustering.

4. Implement Classification algorithm.

5. Implement Decision Tree.

6. Linear Regression.

7. Data Visualization.

Paper IX   : DIGITAL IMAGE PROCESSING

Subject Description
This course presents the Introduction to Digital image Processing, fundamentals, image enhancement and image restoration techniques
Goals
To enable the students to learn the fundamentals of Digital Image Processing, image compression and segmentation
Objectives
On Successful completion of the course the students should have:

- Understood the fundamentals of Digital Image Processing, image compression and segmentation

Contents
UNIT I
　　　　Introduction: What is Digital image processing – the origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system.
　　　　Digital Image Fundamentals: Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and Quantization – Some Basic relationship between Pixels – Linear & Nonlinear operations.
UNIT II
　　　　Image Enhancement in the spatial domain:- Background – some basic Gray level Transformations – Histogram Processing – Enhancement using Arithmetic / Logic operations – Basics of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – Combining spatial enhancement methods.
UNIT III
　　　　Image Restoration: A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering – Linear, Portion – Invariant Degradations – Estimating the degradation function – Inverse filtering – Minimum mean square Error Filtering – Constrained least squares filtering – Geometric mean filter – Geometric Transformations.
UNIT IV
　　　　Image Compression: Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards.
UNIT V
　　　　Image Segmentation: Detection and Discontinuities – Edge Linking and Boundary deduction – Threshold – Region-Based segmentation – Segmentation by Morphological watersheds – The use of motion in segmentation.

REFERENCE BOOKS
1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Second Edition, PHI/Pearson Education.
2. B. Chanda, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI, 2003.
3. Nick Efford, "Digital Image Processing a practical introducing using Java", Pearson Education, 2004.

Paper X   : ADVANCED TOOLS IN COMPUTING

Subject Description

This course presents the Introduction of XML, Document type definition, Schemas, Document Object models, and ASP.net.

Goals:

To enable the students to learn the XML Technologies, applications and ASP.net programming

Objectives:

On Successful completion of the course the students should have:

* Gained knowledge in XML, DOM technologies
* Understood the basics of ASP.NET, and Programming in ASP.NET and Web forms.

Contents

UNIT I

XML : Introduction to XML Markup – Parsers and Well formed XML Documents – Parsing a Document with msxml – Characters – Markup – CDATA Sections – XML Namespaces – Case study: A Day Planner Application

Document Type Definition (DTD) : Introduction – Parsers, Well formed and valid XML Documents – Document Type Declaration – Element Type Definitions – Attribute Types – Conditional Selection – White space characters – Case Study: Writing a DTD for the Day Planner Application.

UNIT II

Schemas : Introduction – Schemas vs DTD – Microsoft XML Schema: Describing Elements- Describing Attributes – Data Types – W3C XML Schema - Case Study: Writing a Microsoft XML Schema for the Day Planner Application.

Document Object Model(DOM) : Introduction – DOM Implementation – DOM and Java Script – Setup – DOM Components – Creating Nodes – Traversing the DOM – Modifying the Day Planner Application to use DOM.

UNIT III

XML Technologies and Applications : Introduction – XML Query Language – Directory Services Markup Language – Resource Definition Framework – XML Topic Maps – Virtual Glossary – Channel Definition Format – Information and Content Exchange Protocol \ Rich Site Summary – P3P – Blocks Extensible Exchange Protocol – XML Digital Signatures – Extensible Tights Markup Language – XML Metadata Interchange – W3C's XML Protocol – XAML.

UNIT IV

ASP.NET : Introduction - .NET Framework – ASP – Operating Systems – Servers – ASP Objects – ADO and ADO.NET Objects – ASP Components – Relational DBMS and Other Data Sources – Developing Distributed Online Application – Client/Server or Tiered Applications.

Programming ASP.NET with Visual Basic .NET : VB .NET Programming Language Structures – Built in ASP .NET Objects and Interactivity – u\Using the Response Object – The ASP Server Object

UNIT V

Web Forms and ASP .NET : Programming Web Forms – Web Forms Capabilities – Web Forms Processing – Web Forms and Events – Creating Web Forms Events Handlers – Building Interactive Applications with VS .NET – Solutions and Project in VS .NET – Solution Explorer – Creating a Web Form .

ASP .NET Configuration, Scope and State – ASP Application - ASP .NET Applications – ASP .NET and State – The Application Object – ASP Sessions – The Session Object.

ASP .NET Objects and Components : The Scripting Object Model – Active Server Components and Controls – More Active Server Components.

REFERENCE BOOKS
1. Dave Mercer, "*ASP*.NET: A Beginner's Guide", Tata McGraw-Hill Publishing Company Limited Edition 2002.
2. H.M. Deitel P.J.Deitel T.R. Nieto T.M. Lin P.Sadu , "XML How to Program".
3. AI Williams , Kim Barber ,"ASP Solutions" , DreamTech Press 2000.

Paper XI　:　NETWORK SECURITY AND CRYPTOGRAPHY

Subject Description
This course presents the Introduction to Cryptography, Web Security and Case studies in Cryptography

Goals
To enable the students to learn the concepts of Network Security and Cryptography
Objectives
On Successful completion of the course the students should have:
  • Understood the process of implementing the cryptographic algorithms.

Contents

UNIT I

　　　Introduction to Cryptography – Security Attacks – Security Services –Security Algorithm - Stream cipher and Block cipher - Symmetric and Asymmetric-key Cryptosystem Symmetric Key Algorithms: Introduction – DES – Triple DES – AES – IDEA – Blowfish – RC5.

UNIT II

　　　Public-key Cryptosystem: Introduction to Number Theory - RSA Algorithm – Key Management - Diffie-Hell man Key exchange – Elliptic Curve Cryptography Message Authentication and Hash functions – Hash and Mac Algorithm – Digital Signatures and Authentication Protocol.

UNIT III
　　　Network Security Practice: Authentication Applications – Kerberos – X.509 Authentication services and Encryption Techniques. E-mail Security – PGP – S / MIME – IP Security.
UNIT IV
　　　Web Security - Secure Socket Layer – Secure Electronic Transaction. System Security - Intruders and Viruses – Firewalls– Password Security

UNIT V
　　　Case Study: Implementation of Cryptographic Algorithms – RSA – DSA – ECC　(C / JAVA Programming).
　　　Network Forensic – Security Audit - Other Security Mechanism: Introduction to: Stenography – Quantum Cryptography – Water Marking - DNA Cryptography

REFERENCE BOOKS
  1. William Stallings, "Cryptography and Network Security", PHI/Pearson Education.
  2. Bruce Schneir, "Applied Cryptography", CRC Press.
  3. A.Menezes, P Van Oorschot and S.Vanstone, "Hand Book of Applied Cryptography", CRC Press, 1997 [Free Downloadable].
  4. Ankit Fadia,"Network Security", MacMillan.

M.Sc. Comp. Sci. (Colleges) 2015-16 onwards
Page 18 of 28

Annexure No. 27A
SCAA Dt. 24.04.2015

PAPER XII BUSINESS INTELLIGENCE

Subject Description
This course presents the Introduction to Business intelligence, Big data, Hadoop and Applications of Big Data

Goals
To enable the students to learn the concepts of Big Data

Objectives
On Successful completion of the course the students should have:
- Understood the process of implementing the Big data

Contents

Unit I
Introduction to Business Intelligence **- C**hanging Business Environments and Computerized Decision Support - A Framework for Business Intelligence - Intelligence Creation and Use and BI Governance - Transaction Processing Versus Analytic Processing -Successful BI Implementation - Major Tools and Techniques of Business Intelligence

Unit II
Big Data: Volume, Velocity, Variety in practice: cloud or in house
Apache Hadoop: Core of Hadoop, Hadoop lower levels ,HDFS and Map Reduce improving , Programbility: Pig and Hive

Unit-III
Big Data: From the Technology Perspective-All about Hadoop: The history of Hadoop-Components of Hadoop- Application Development in Hadoop-Getting your data into Hadoop-Other Hadoop Components.

Unit- IV
Hadoop- Integrated Hadoop System- Analytical Databases with Hadoop Connectivity- Hadoop-Centered Companies. Big Data in the Cloud: Iaas And Private Clouds-Platform Solutions-Big Data Cloud platforms compared.

Unit- V
Future of Big Data: More Powerful and Expressive tools for Analysis – Streaming Data Processing – Rise of Data Marketplace – Development of Data Science Workflows and Tools Increased Understanding and demand for Visualization
Case Study: Big Data Analytics in Banking Sector, Manufacturing,

REFERENCE BOOKS

1.Business Intelligence: A Managerial Approach, Efraim Turban, Ramesh Sharda, Dursun Delen, David Kind, Pearson II Edition, 2012(Unit I)

2. Planning for Big Data, O'Reilly Radar Team, 2012.(ebook) (Unit II -V)

3.Understanding Big Data, Analytics for Enterprise Class Hadoop and Streaming Data, Chris Eaton, Dirk Deroos,Tom Deutsch, George Lapis, Paul Zikopoulos, Tata Mc Graw Hill, 2012 Edition. (ebook) (Unit II)

4. Michael Minelli , Michele Chambers , Ambiga Dhiraj " Big Data Big Analytics " , Wiley Publications, Indian Reprint 2014

PRACTICAL V
Advanced Tools in Computing Lab

Programming in XML

1) Program to create an XML file to display the college details using stylesheet.

2) Program to create an XML file with xsl to display the library book menu

3) Program to create an XML file to display breakfast menu.

4) Program to create an XML document to display the student detail.

5) Program to create an XML program to load an XML file and to manipulate.

Programming in ASP.NET

6. Program to demonstrate the textbox control in ASP.NET

 7. Program to demonstrate the button as image control in ASP.NET

8) program to demonstrate the checkbox control in ASP.NET

9) program to demonstrate the radio button control in ASP.NET

10) Program to design a registration form by using ASP.NET objects.

11)Program to develop a quiz event program .

12)Program to create an E-card using web control

 13)Program to demonstrate the use of application and session objects in ASP.NET

Programming in VB.NET

14) Program to develop Date & time using VB.Net

15) .Program to develop a Calculator using VB.NET
Practical VI

DIGITAL IMAGE PROCESSING Using MATLAB

1. Implement Image enhancement Technique.
2. Histogram Equalization
3. Image Restoration.
4. Implement Image Filtering.
5. Edge detection using Operators (Roberts, Prewitts and Sobels operators)
6. Implement image compression.
7. Image Subtraction
8. Boundary Extraction using morphology.
9. Image Segmentation

ELECTIVE I

ELECTIVE I.1 : MULTIMEDIA AND ITS APPLICATIONS

Subject Description
This course presents the Introduction to Multimedia, Images & Animation.
Goals
To enable the students to learn the concepts of Multimedia.

Objectives
On Successful completion of the course the students should have:
- Understood the Multimedia animation and Desktop Computing.

Contents
UNIT I
        What is Multimedia – Introduction to making Multimedia – Macintosh and Windows Production platforms – Basic Software tools.

UNIT II
        Making Instant Multimedia – Multimedia authoring tools – Multimedia building blocks – Text – Sound.

UNIT III
        Images – Animation – Video.

UNIT IV
        Multimedia and the Internet – The Internet and how it works – Tools for World Wide Web – Designing for the World Wide Web.

UNIT V
        High Definition Television and Desktop Computing – Knowledge based Multimedia systems.

REFERENCE BOOK

1. Tay Vaughan, "Multimedia making it work", Fifth Edition, Tata McGraw Hill.
2. John F. Koegel Bufford, "Multimedia Systems", Pearson Education.
3. Judith Jeffloate, "Multimedia in Practice (Technology and Applications)", PHI, 2003

ELECTIVE I.2 : EMBEDDED SYSTEMS

Subject Description
This course presents the Introduction to 8051 Microcontroller Instruction Set, concepts on RTOS & Software tools.
Goals
To enable the students to learn about Microcontroller and software tools in the embedded systems.
Objectives
On Successful completion of the course the students should have:
- Understood the Instruction Set and Programming.
- Understood the Embedded software Development

Contents
UNIT I
        8051 Microcontroller: Introduction - 8051 Architecture-Input/Output Pins, Ports and Circuits - External Memory - Counters / Timers - Serial Data Input / Output - Interrupts.

UNIT II
        Instruction Set and Programming Moving Data-Addressing Modes-Logical operations-Arithmetic Operation-Jump and Call Instructions-Simple Program. Applications: Keyboard Interface-Display Interface-Pulse Measurements-DIA and AID Conversions-Multiple Interrupts.

UNIT III
        CONCEPTS ON RTOS: Introduction to RTOS-Selecting an RTOS-Task and Task states - Tasks and data- Semaphores and shared data. MORE operating systems services: Interrupt Process communication - Message Queues, Mailboxes and pipes- Timer Functions-Events - Memory Management-Interrupt Routines in an RTOS Environment.

UNIT IV
        Basic Design using a RTOS: Principles - Encapsulating semaphores and Queues-Hard real time scheduling considerations-Saving memory space and power- introductions to RTL & QNX.

UNIT V
        SOFTWARE TOOLS: Embedded software Development Tools:Hosts and Target Machines- Linker/Locators for Embedded software-getting Embedded software into the Target systems. Debugging Techniques: Testing on your Host machine -Instruction set simulators- The assert macro-using laboratory tools.

REFERENCE BOOKS
1. David.E.Simon, "An Embedded Software Primer", Pearson Education-2001.
2. The 8051 Microcontroller and Architecture programming and application II Edition - Kenneth J Ayala- Penram International.

ELECTIVE 1.3 : OPEN SOURCE SOFTWARE

Subject Description
This course presents the Introduction to Open Source Software and it various types. In addition two languages such as PERL and PHP is taught.

Goals
To enable the students to learn the fundamentals of Open Source software and get experience in PERL and PHP.

Objectives
On Successful completion of the course the students should have:
- To Learn PERL and PHP

Unit I
Overview of Free/ Open Source Software: The Open Source Definition - Examples of OSD Compliant Licenses - Examples of Open Source Software Product – The Open Source Software Development Process – A History of Open Source software: The Berkeley Software Distribution – The Free Software Foundation – Linux – Apache – Mozilla – Open Source Software.

Unit II
Qualification: Defining Open Source Software – Categorizing Defining Open Source Software – Specific Characteristics of Open Source Software Transformation: The OSS Development Process – Taboos and Norms in OSS Development – The OSS Development Life Cycle – Deriving a Framework for Analyzing OSS – Zachman‟s Framework for IS Architecture – CATWOE and Soft System Method – Deriving the Analytical Framework for OSS.

Unit III
Environment: The "where" of OSS – the "when" of OSS – World View: A Framework for classifying OSS Motivations – Technological Micro-level (individual) motivation – Economic Micro-level and Macro-level (individual) Motivation – Socio-political Micro-level and Macro-level (individual) Motivation.

Open Source Server Applications: Infrastructure Services – Web Services – Database Servers – Mail Servers – Systems Management – Open Source Desktop Applications: Introduction – Graphical Desktops – Web Browsers – The Office Suite – Mail and Calendar Clients – Personal Software – Cost of OSS: Total Cost of Ownership – Types of Costs Licensing: Types of Licenses – Licenses in Use – Mixing Open and Close Code – Dual Licensing.

Unit IV
Perl Programming
Perl - Introduction, Perl Basics: - Syntax, Variables, Strings, Numbers, Operators, Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays, Chop, Length, and Sub string. Hashes, Arguments, Logic, Looping, Files, Pattern Matching, Environment Variables, Using cgilib for Forms. File Management PERL: - File Handling, Reading From Files, Appending Files, Writing to Files, File Checking, Reading Directories. Databases PERL: - DBI Module, DBI Connect, DBI Query, MySQL Module, MySQL Connect, MySQL SelectDB, MySQL Query.

Unit V
PHP Programming Basics :PHP - Introduction, PHP Basics: - Syntax- Variables- Controls and functions - Strings. Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays
OOP with PHP –Advanced Array functions-Sessions-cookies and HTTP.

Reference Books
1. Joseph Feller, Brain Fitzgerald, Eric S. Raymond, "Understanding Open Source Software Development", Addison-Wesley Professional, 1st Edition, 2001.
2. Perl CookBook –Tom Christinasen & Nathan Torkington , O‟Relliy ,SPD Pvt ltd,2006 Edition.
3. PHP 5 and MySQL Bible Wiley Dream Teck India Pvt.ltd 2006 .

ELECTIVE II
ELECTIVE 2.1 : Mobile Computing

Subject Description:
This course presents the overview of Mobile computing, Applications and Architectures. Also describes the futuristic computing challenges.

Goal:
To enable the students to learn the concept of mobile computing

Objectives:
On successful completion of the course the students should have:
- Understood the mobile computing applications, techniques
- Understood the mobile computing environment

UNIT - I
Introduction: Advantages of Digital Information - Introduction to Telephone Systems –Mobile communication: Need for Mobile Communication – Requirements of Mobile Communication – History of Mobile Communication.

UNIT - II
Introduction to Cellular Mobile Communication – Mobile Communication Standards –Mobility Management – Frequency Management – Cordless Mobile Communication Systems.

UNIT - III
Mobile Computing: History of data networks – Classification of Mobile data networks - CDPD System – Satellites in Mobile Communication: Satellite classification – Global Satellite Communication – Changeover from one satellite to other – Global Mobile Communication – Interferences in Cellular Mobile Communication.

UNIT - IV
Important Parameters of Mobile Communication System – Mobile Internet: Working of Mobile IP – Wireless Network Security – Wireless Local Loop Architecture: Components in WLL – Problems in WLL – Modern Wireless Local Loop – Local Multipoint Distribution Service – Wireless Application Protocol.

UNIT -V
WCDMA Technology and Fibre Optic Microcellular Mobile Communication – Ad hoc Network and Bluetooth technology – Intelligent Mobile Communication system – Fourth Generation Mobile Communication systems.

REFERENCE BOOK:

1. T.G. Palanivelu, R. Nakkeeran, Wireless and Mobile Communication, PHI Limited.2009

2. Jochen Schiller, Mobile Communications, Second Edition, Pearson Education.2007

    Asoke K Talukder,Hasan Ahmed,Roopa Yavagal, Mobile Computing , TMH, 20

ELECTIVE 2.2. CLOUD COMPUTING

Subject Description:
> This course presents the introduction to Cloud computing, cloud services, architectures and applications.

Goal:
> To enable the students to learn the basics of cloud computing and its applications, architecture

Objectives:
On successful completion of the course the students should have:

- Understood the Cloud computing architectures, applications and challenges

UNIT – I INTRODUCTION
Cloud Computing Introduction, From, Collaboration to cloud, Working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.

UNIT – II CLOUD COMPUTING FOR EVERYONE
Centralizing email communications, cloud computing for community, collaborating on schedules, collaborating on group projects and events, cloud computing for corporation, mapping schedulesm managing projects, presenting on road

UNIT – III USING CLOUD SERVICES
Collaborating on calendars, Schedules and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets, and databases.

UNIT – IV OUTSIDE THE CLOUD
Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis

UNIT – V STORING AND SHARING
Understanding cloud storage, evaluating on line file storage, exploring on line book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web based desktops.

REFERENCES:
1. Michael Miller, "Cloud Computing", Pearson Education, New Delhi, 2009

2. Anthony T. Velte,Cloud Computing A Practical Approach 1st Edition, Tata Mcgraw Hill Education Private Limited (2009)

ELECTIVE 2.3 WEB SERVICES

Subject Description:

This course presents an Overview of Distributed Computing, XML, web services

Goals:

To enable the student to be familiar with distributed services, XML and web services

Objectives:

On successful completion of the course the student should have:

* Understood the concepts of web services

Contents:

Unit - I

Introduction to web services – Overview of Distributed Computing- Evolution and importance of web services-Industry standards, Technologies and concepts underlying web services-Web services and enterprises-web services standards organization-web services platforms.

Unit - II

XML Fundamentals – XML documents - XML Namespaces- XML Schema –Processing XML

Unit - III

SOAP: The SOAP model- SOAP messages-SOAP encoding- WSDL: WSDL structure-interface-definitions-bindings-services-Using SOAP and WSDL-UDDI: About UDDI- UDDI registry-Specification- Core data structures-Accessing UDDI

Unit - IV

Advanced web services technologies and standards: Conversations overview-web services conversation language-WSCL interface components.
Workflow: business process management-workflows and workflow management systems
Security: Basics-data handling and forwarding-data storage-errors-Web services security issues.

Unit - V

Quality of Service: Importance of QoS for web services-QoS metrics-holes-design patterns-QoS enabled web services-QoS enabled applications.
Web services management-web services standards and future trends.

Reference Books:

1. Sandeep Chatterjee, James Webber, 'Developing Enterprise Web Services: An Architects Guide', Prentice Hall, Nov 2003.