BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M.Sc. Software Technology– Course Structure under CBCS

(For the candidates admitted from the year 2005-2006 onwards)

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
I	Core Course – I (CC)	Data Structures and Algorithm	6	4	3	25	75	100
	Core Course – II (CC)	Computer Communication and Networks	6	4	3	25	75	100
	Core Course – III (CC)	Object oriented Analysis and Design	6	4	3	25	75	100
	Core Course – IV (CC)	Programming Lab – I : OOP Lab	6	4	3	25	75	100
	Elective Course – I (EC)	----------	6	4	3	25	75	100
II	Core Course – V (CC)	Software Engineering	6	4	3	25	75	100
	Core Course – VI (CC)	Java Programming	6	4	3	25	75	100
	Core Course – VII (CC)	Programming Lab – II: Java Seivelels Prog.	6	4	3	25	75	100
	Elective Course – II (EC)	----------	6	4	3	25	75	100
	Extra Disciplinary Course – I (EDC)	_____	3	2	3	25	75	100
	Extra Disciplinary Course – II (EDC)	_____	3	2	3	25	75	100
III	Core Course – VIII (CC)	Unified Modeling Language	6	4	3	25	75	100
	Core Course – IX (CC)	XCOM / DCOM	6	4	3	25	75	100
	Core Course – X (CC)	Web Design	6	4	3	25	75	100
	Core Course – XI (CC)	Programming J Lab: Web designing Lab.	6	4	3	25	75	100
	Elective Course – III (EC)	_____	6	4	3	25	75	100
IV	Project Viva Voce 25 marks Dissertation 75 marks	-----	30	12	-	-	-	100
			120	72				

The Department of Software Technology will offer the following Elective Courses (ECs)

Elective I. (Any One)

a) Client Server Computing
b) Principles of E-Commerce
c) Visual Programming

Elective II. (Any One)

a) Software Project Management
b) Distributed Operating Systems
c) Principles of Compiler Design

Elective III. (Any One)

a) Wap and XML
b) Internet Based Information System
c) Multimedia Systems and Design

The Department of Software Technology will offer the following Extra Disciplinary Courses (EDCs)

1. Office Automation Theory
2. Office Automation Practical

CORE COURSE I – DATA STRUCTURES AND ALGORITHMS

Unit I

Arrays and sequential representations – Ordered Lists – Stacks and queues – Evaluation of expressions – Multiple stacks and queues - Singly linked lists – Linked stacks and queues – Polynomial addition – Doubly linked lists and Dynamic Storage Management – Strings – a case study.

Unit II

Trees – Binary tree representation – Tree traversal – Threaded binary trees – Binary tree representation of trees – Set representation – Decision trees – Game trees and counting binary trees – Graphs and representation – Traversals, connected components and spanning trees – Shortest path and transitive closures – Activity network – Topological sort and critical paths.

Unit III

Algorithms – Conventions – Writing structured programs – Analysing algorithms – Sorting – Heapsort – Binary search – Finding the maximum and minimum – Mergesort – Quicksort – Selection sort.

Unit IV

Greedy Method : The General Method – Optimal Storage Tapes – Knapsack Problem – Job sequencing with Deadlins – Optimal Merge Patterns – Minimum Spanning Tress – Single Source Shortest Paths.

Unit V

Backtracking : The General Method – The 8-Queens' problem – Sum of subsets – Graph coloring – Hamiltonian cycles – Knapsack problem.

Branch and Bound : The General Method – O/I Knapsack Problem – Travelling Salesperson – Efficiency considerations.

Text Books :

1. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structure", Galgotia, 1999 (Chapters 2,3,4,5 and 6 only).
2. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Computer Algorithms, Galgotia.

CORE COURSE II

COMPUTER COMMUNICATIONS AND NETWORKS

Unit I

Protocol concepts : Basic flow control – Sliding Window Protocol – Protocol correctness – Datalink control protocols.

Unit II

Network topologies – Ethernet : IEEE standard 802.3 – Token ring : IEEE standard 802.5 – Token Bus : IEEE standard 802.4 – Interconnecting LANs.

Unit III

Wide Area Networking : Network routing – Public data networks : The X series protocol – Internet protocols – Transport protocols – Socket Programming.

Unit IV & V

Additional Network Protocols : Internet applications – WWW – Electronic Mail : X.400 and X.500 standards – ISDN – Asynchronous Transfer Mode – System Network Architecture.

Text Book :

William A Shay, "Understanding Data Communication and Networks" Second Edition – Brooks / Cole Publishing Company, Distributed by Vikas Publishing House, New Delhi, 2001.

CORE COURSE III – OBJECT ORIENTED ANALYSIS AND DESIGN

Unit I

Complexity : Inherent Complexity of Software – Structure of Complex Systems – Bringing orders to chaos – Designing complex systems. Object Model: Evolution – Elements Applying the Object Model.

Unit II

Classes and Objects : The Nature of an object – Relationships among objects – Nature of a class – Relationship among classes – Interplay of classes and objects; Classification : The importance of proper classification – Identifying Classes and Objects – Key abstractions and Mechanisms.

Unit III

Object Oriented Programming : C++ console I/O – C++ comments – Classes : Introducing function overloading – Constructor and destructor functions – Introducing inheritance – Object Pointes – Inline functions – Assigning objects – Passing object to functions – Returning objects from functions – An Introduction to friend functions – Arrays of objects – using Pointers to objects – The this pointer – Using new & delete.

Unit IV

Overloading constructor functions – Creating and using a copy constructor – Using default arguments – the basics of operator overloading binary operators – overloading the relational and logical operators – overloading a unary operator.

Unit V

Base Class Access Control – Using Protected Members – Constructors destructors and inheritance – Multiple inheritance – virtual base classes – some C++ I/O basics – formatted I/O – using width ( ), Precision ( ) and fill ( ) – Using I/O manipulators.

Text Books:

1. Grady Booch, "Object Oriented Analysis and Design", 2nd Edition, Pearson Edicatopm Asia – (Chapters 1, 2, 3 and 4), 1994.
2. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Computer Algorithms", Galgotia, 2000.
3. Herbert Schildt, "Teach Yourself C++", TMH, 2000.

Reference Book:

1. Seymour Lipschutz, "Data Structures", Schaum's Series, 1986.
2. Robert Lafore, "Object Oriented Programming in Turbo C++, Galgotia, 2000.

CORE COURSE IV – PROGRAMMING LAB – I

OOP LAB

I. USING FUNCTIONS :

a. Write a function in C++ to generate a Fibonacci series n numbers.
b. Develop a program in C++ to find the largest of any 3 numbers using Macro definition.
c. Write a function called zeroSmaller() that passes two int arguments, by reference and then sets the smaller of the two numbers to 0. Write a main () program to exercise this function.

II. USING CLASSES

a. Create a class that imitates part of the functionality of the basic data type int. Call the class Int (note different spelling). The only data in this class is an int variable. Include member functions to initialize an int to 0, to initialize it to an int value, to display it (it looks just like an int), and to add two int values.

   Write a program that exercises this class by creating two initialized and one uninitialized int values, adding these two initialized values and placing the response in the uninitialized values, and then displaying this result.

b. Create a class called time that has separate int member data for hours, minutes, and seconds. One constructor should initialize data to 0, and another should initialize it to fixed values. A member function should display it, in 11.59.59 format. The final member function should add two objects of type time passed as arguments.

   A main () program should create two initialized time objects, and one that isn't initialized. Then it should add the two initialized values together, leaving the result in the third time variable. Finally it should display the value of this third variable.

c. Develop an object oriented program in C++ to read the following information from the Keyboard.

   a. Employee name
   b. Employee code
   c. Designation
   d. Years of experience
   e. Age and

   Construction an object oriented data base to carry out the following methods :

   a. build a master table
   b. list a table
   c. insert a new entry
   d. delete old entry
   e. edit an entry
   f. search for a record that to be printed
   g. sort entries

III. USING POLYMORPHISM

Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get-data () to initialize base class data members and another member function display_area () to compute and display the area of figures. Make display_area() as a virtual function and redefine this function in the derived classes to suit their requirements.

Using these three classes design a program that will accept dimensions of a triangle or rectangle interactive and display the area.

IV. USING INHERITANCE

a) Develop an object oriented program in C++ to create a data base of the following items of the derived class.

a. name of the patient
b. sex
c. age
d. ward number
e. bed number
f. nature of the illness
g. data of admission

Design a base class consisting of the data members namely, name of the patient, sex and age. Another base class consist of ward numbers, bed number and nature of the illness. The derived class consists of the data member date of admission. Design a virtual class for the data member, namely, name of the patient, sex and age.

b) Create a generic base class called building that stores the number of floors a building has, the number of rooms, and its total square footage. Create a derived class called house that inherits building and also stores the number of bedrooms and the number of bathrooms. Next, crate a derived class called office that inherits building and also stores the number of fire extinguishers and the number of telephones.

V. USING OVERLOADING

a. Write a program in C++ using function overloading to read two matrices of different data types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the total sum of these array individually.
b. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.

VI. USING CONSTRUCTORS & DESTRUCTORS

Write an object oriented program in C++ to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructor, default constructor and inline member functions.

VII. USING POINTERS

a. Write a C++ program to find out the number of vowels in each word of a given text using a pointer.
b. Write a C++ program to check whether the given string is a palindrome or not using the pointer method.

VIII. USING FILES

a. Write a C++ program to read a file and display the contents of the file on the screen with line numbers.
b. Write a C++ program to merge two files into a one file heading.
c. Case studies :

   i. Paybill Preparation
   ii. Marklist Preparation

VIII. USING EXCEPTION HANDLING

Create a generic function that returns the mode of an array values.

CORE COURSE V – SOFTWARE ENGINEERING

Unit I

Introduction – Definitions – Size factors – Quality and Productivity factors – Managerial issues.

Planning a software Project – Introduction – Defining the problem – Developing a solution strategy – Planning the development process – Planning an Organization Structure – Other Planning activities.

Unit II

Software cost estimation – Cost factors – Cost estimation techniques – Staffing – level estimation – Estimating Software Maintenance costs.

Software requirements definition – Software requirement specification – formal specification techniques – Languages and Processors for requirements.

Unit III

Software design – Fundamental design concepts – Modules and modularization criteria – Design notations – Design techniques – Detailed design considerations – Real time and distributed system design – Test plans – Milestones, Walkthroughs and Inspections – Design guidelines.

Unit IV

Implementation issues – Structured coding techniques – Coding style – Standards and guidelines – Documentation guidelines – Data abstraction – Exception handling – Concurrency mechanisms.

Unit V

Verification and validation techniques – Quality assurance – Walkthroughs and Inspections – Static Analysis – symbolic Execution – Unit testing and debugging – System testing – Formal verification.

Software maintenance – Enhancing maintainability during development – Managerial aspects – Configuration management – Source code metrics – Other Maintenance tools and techniques.

Text Book :

Richard Fairely, "Software Engineering Comcepts", TMH, 2001.

CORE COURSE VI – JAVA PROGRAMMING

Unit I

Data Types and Variables : The Simple Types – Literals – Variables – Type conversion and casting – Automatic Types Promotion in Expressions – Arrays – Strings – **Classes and Methods** : Class Fundamentals - Declaring Class Objects – Constructors – Garbasge College – The finalize ( ) Method – Overloading Methods – Argument Passing – Recursion – Understanding Static – Access Control – The main ( ) method.

Unit II

Operators : Arithmetic Operators – Bitwise Operators – Relational Operators – Boolean Logical Operators – The Assignment Operator – The? Operator - The Dot Operator – Operator Precedence – Inheritance Packages, and Interfaces : Inheritance – Using Super – when Constructors are called – Method Overriding – Abstract Classes – The final Keyword – Packages – Importing Packages – Importing Packages – Access Control – Interfaces – Keyword Summary.

Unit III

The Language Classes and Interfaces – The Utility Classes and Interfaces – The Input / Output Classes and Interfaces.

Unit IV

The Networking Classes and Interfaces – The Java Applet Class and Interfaces.

Unit V

The Abstract Window Toolkit Classes and Interfaces – The Event Classes and Interfaces.

Text Book :

Herbert Schildt with Joe O'Neil, "Java – Programmer's Reference" Publication, Reprint 2000.

Reference Books :

1. Kris James Ph.D., and Ken Cope, "Internet Programming", Galgotia Publication, Reprint 2000.
2. Michael Morrison, "Java Unleashed", Second Edition.
3. Patrick Naughton and Herbert Schildt, "Complete Reference", 3rd Edition, Tata McGraw Hill Publishing Company Ltd, 2000.

CORE COURSE VII

PROGRAMMING LAB – II – JAVA AND SERVLETS PROGRAMMING

1. Write a Java program to print a triangular multiplication table as shown below.

```
0
0       2
0       3       6
0       4       8       12
0       5       10      15      20
0       6       12      18      24      30
0       7       14      21      28      35      42
```

2. Write a java program that will print the details about the current date, time, month, year, day of the month and day of the week.

3. Write a Java program that will contain two arrays. In the first array store the following products,

   (i) apples
   (ii) mangoes
   (iii) pens
   (iv) towels
   (v) hangers

   and store the following prices in the 2nd array.

   (i) 10
   (ii) 12
   (iii) 125
   (iv) 75
   (v) 19

   Write a method that will display the products with their corresponding prices.

4. Create a class called **numeral** that access an array of 10 numbers. Create a sub-class called num-play which has a menu as follows :

   (a) display numbers
   (b) sum of the numbers
   (c) maximum of the numbers
   (d) minimum of the numbers

5. Create an integer array which contain 10 numbers using Random Access file. Write an array into a file called **rand.dat.** The program should read the contents of the **rand.dat** file Backwards. Make use of try / catch and finally clauses.

6. Create an applet to display a string "I am in the college" in courier font, with 30 and style bold and italic. The text should be centered both horizontally and vertically.

7. Create an applet to obtain the list of fonts available with the current Java working environment.

8. Write an animation applet that makes an mage, appears from left to right, in stages.

9. Create an applet that let the user to adjust its background colour. Provide 3 scroll bars in your applet, one each for the 3 base colours, red, green and blue.

10. Write a frame application that has an edit menu. This menu contains cut, copy, & paste as menu items and does similar activities. Include a text area into which text can be entered and the cut, copy & paste activities can be demonstrated.

11. A servelet that will return an HTML page to the client containing course details. In order to invoke the course servelet, create an HTML page that will post an HTML request using the servelet URL.

12. Create a home page and count the number of times the home page is accessed using servelet.

CORE COURSE VIII – UNIFIED MODELLING LANGUAGE

Unit I

Principles of modeling – Object Oriented Modeling – Introduction to UML.

Basic Structural Modeling :

Classes – Relationships – Common mechanisms – Diagrams – Class diagrams.

Unit II

Advanced Structural Modeling :

Advanced Classes – Advanced Relationships – Interfaces, Types and Roles - Packages – Instances – Object diagrams.

Unit III

Basic Behavioral Modeling : Interactions – Use cases – Use case Diagrams – Interaction Diagrams – Activity Diagrams.

Unit IV

Advanced Behavioral Modeling : Events and Signals – State Machines – Processes and Threads – Time and Space – Statechart Diagrams.

Unit V

Architectural Modeling : Components – Deployment – Collaborations – Patterns and Frameworks – Component Diagrams – Deployment Diagrams – Systems and Models.

Text Book:

Grady Booch, James Rumbaugh and Ivar Jacobson, "The unified Modeling Language User Guide", Addison Wesley – Fourth Indian Reprint 2001.

Reference Book:

1. Pieree – Alain Muller, "Instant UML", Wrox Press Ltd., Shroff Publishers and Distributors Pvt., Ltd., 2000.
2. Deitel & Deitel, "Introducing Object Oriented Design with the UML", Addison Wesley Longman.

CORE COURSE IX – COM / DCOM

Unit I

Object Revolution :

Objects and Classes – Encapsulation – Inheritance – Polymorphism – Abstract base classes – Objects from C++ perspective – Object from a COM perspective – Inheritance in COM.

Building COM Objects and Interfaces :

Clients and Servers – Identifying classes with GUIDs – The HERESULT return type – Anatomy of an interface – Exploring IUnknown.

Unit II

Implementing a COM Client Server : Building the Ifortune Teller Interface – Unicode and Internationalized Strings – CFortune Teller Rebuilt as ComFortune Teller – ComFortune Teller Factory Class – Completing the In-Process Server – Building the Client – Registering the Server.

COM Programming with MFC.

Unit III

Building COM Objects using the Active X: Template Library : ATL Architecture – New ATL Version of PizzaOrderTaker – Registry Scripting and the Registrar – A Distributed Objects Overview : The Evolution of Distributed Systems – Distributed COM.

Unit IV

Security : The Security Support Provider Interface - Overview of NT Security – COM Security – COM Object Identity – Processwide Security – Security Blankets and Impersonation – DCOM and CAPI.

Using Different COM Threading Models : Thread Functions – Thread Types – Thread Synchronization – The COM Threading Model.

Unit V

Automation : Automation Features – Automation and Event Support – Automation Support in MFC and ATL – Special – Meaning DispIDs Using Distributed Objects : Remote Object Instantiation – Designing the Distributed Object Application – The Distributed Pizza – Ordering System – The PizzaMaker Server – The PizzaMaker Server Spy.

Text Book :

Corry, Mayfield, "COM / DCOM Primer Plus" Cadman – Techmedia First Indian Edition, 1999.

CORE COURSE X – WEB DESIGN

Unit I

Introduction to the Internet : Computers in Business – Networking – Internet – Email – Resource Sharing – Gopher – WWW – Usenet – Telnet – Bulletin Board Service – Wide Area Informatin Service.

Introduction to Web Design: The anatomy of a website – Web Browsers – An overview of common Web Technologies and Languages – Design and Production tools.

Unit II

Analysis and Planning : Organising the team – Documenting the project – Development Life Cycles – Analysis the project – Planning the structure, content and navigation.

Site Type and Architectures : General Website Types – Static and Dynamic sites – Specific types of web sites.

Navigation theory and Practice : Navigation – Placing navigation – consistency of navigation.

Unit III

Introduction to HTML : Designing a home page – HTML document – Anchor tag – Hyperlinks – Head and Body sections – Header section – Title – Prologue – links – colorful pages – comments – body section – heading – horizontal ruler – paragraph – tabs – Images and pictures – lists and their types – nested lists – table handling.

Unit IV

Frames – frameset definition – frame definition – nested framesets. Forms and form elements.

DHTML and Style Sheets – Defining a styles – elements of styles – linking a Style Sheet to a HTML document – Inline styles – External Style sheets – Internal Style sheets – Multiple Styles – Web Page Designing.

Unit V

Web Designing Tools : Microsoft Front Page – working with text in web pages – creating paragraphs and lists – Images and colors – Tables – links.

Site Delivery and Management : The importance of delivery – Web protocols – Domain name service – web servers – outsourcing the web hosting – managing the web servers.

Text Book :

1. "World Wide Web Design with HTML", C.Xavier, TMH, 2000.

Reference:

1. "Web Design – A beginners Guide", Wendy Willard, Tata McGraw Hill
2. "The Complete Reference Web Design", Thomas A.Powell, Tata McGraw Hill
3. "Mastering Web Design", John Mocy – BPB Publications.
4. "Web Design in a Nutshell", Jennifer Niederst – O'Reilly, First Edition – Shroff Publishers and Distributors Pvt.Ltd.

CORE COURSE XI

PROGRAMMING LAG

WEB DESIGNING LAB

1. Using atleast 20 HTML Tags, Create a screen with a string "WEB DESIGN".
2. Create a small paragraph about 10 lines. Try to use FONT, TITLE and Head Tags. Apply different sizes and colors using Tags.
3. a) Create Tables with rows and columns and split them using Rowspan and Colspan.
   b) Divide a page in 3 or more frames.

4. Create a web page in the format of front page of a news paper using Text links. Align the text with colors.
5. Create a web page that acts like a Book. The Book should have 10 chapters. Chapter links should be from both the navigator Bar and from individual pages.
6. Develop a picture gallery having atleast 3 pages. Each of them is having several pictures.
7. Develop a single page advertisement for a shop to be opened shortly.
8. Develop a web page for job recruitment Agency in an IT industry.
9. Design a web page advertisement for a new product.
10. Design and Publish a web page for a college.

ELECTIVE COURSE I (a)

CLIENT SERVER COMPUTING

Unit I

Introduction to Client / Server computing – Main Frame – Centric Client / Server computing – Downsizing and Client / Server computing – Client / Server development tools – advantages of Client / Server computing – Connectivity – User Productivity – Reduction in network traffic – Faster delivery of Systems.

Unit II

Components of Client / Server applications – The role of the client – Client services – Request for service – Dynamic data exchange (DDE) – Object linking and embedding (OLE) – Common Object Request Broker Architecture (CORBA).

Unit III

Components of Client / Server applications – Role of the server – Server functions – Network operating systems – Novell Netware – LAN manager – IBM LAN server – Banyan VINES – PC Network file service – Server operating systems : Netware, OS/2, Windows NT, Unix – System application Architecture (SAA).

Unit IV

Components of Client / Server architecture – Connectivity – Open systems interconnect (OSI) – Inter – Process communication – interface technology – Wide area Network technology – Client / Server systems development software – Platform Migration and Reengineering of Existing Systems – Client Server System development methodology – Client Server Systems development hardware – PC level processing units – Unit Workstation – server hardware – Mirrored disk – RAID – Disk array – CD – ROM – WORM – Network interface cards (NIC).

Unit V

Client / Server systems development – Service and support – system administration – Availability – Reliability – Serviceability – Performance – Network management – Remote Systems management – Security – LAN and network management – Client server systems development – training – training advantages of GUI applications – system administrator training – LAN administration – WAN issue – Operating systems issues – Application issues – database administrator training – End user training.

Text Book :

1. Patrick Smith and Steve Guengrtich, "Client / Server Computing", Prentice Hall of India, Second Edition, 1997.

Reference Books:

1. Dewire and Dawana Travis "Client Server Computing", McGraw Hill, 1993.
2. Joe Salemi Ziff "Guide to Client / Server Databases", Davis Press, California.

ELECTIVE COURSE I (b)

PRINCIPLES OF E-COMMERCE

Unit I

Introduction :

Electronic Commerce Frame Work – The anatomy of E-Commerce applications – Electronic Commerce Consumer applications – Electronic Commerce Organization Applications.

The Network Infrastructure for Electronic Commerce:

Components of the Highway – Network Access Equipment – Global Information distribution Networks.

Unit II

The Internet as a Network Infrastructure :

The Internet Terminology – Chronological history of the Internet – NSFNET – Architecture and components – National Research and Education Network – Globalization of the Academic Internet.

The Business of Internet Commercialization :

Telco / Cable / Online Companies – National Independent ISPs – Regional level ISPs – Local level ISPs – Service Provided Connectivity – Internet Connectivity options.

Unit III

Network Security and Firewalls :

Client Server Network Security – Firewalls and Network Security – Data and Message Security - Challenge Responses System – Encrypted documents and Electronic mail.

Electronic Commerce and WWW :

Architectural Framework for Electronic Commerce – Technology behind the web – Security and the web.

Consumer Oriented Electronic Commerce :

Consumer Oriented Applications – Mercantile Models from the Consumer's Perspective.

Unit IV

Electronic Payment System :

Types of Electronic Payment Systems – Digital token based Electronic Payment System – Smart Card and Electronic Payment Systems – Credit card based Electronic Payment Systems – Risk and Electronic Payment Systems –Designing Electronic Payment Systems.

Inter Organizational Commerce and EDI :

Electronic Data Interchange – EDI applications in Business.

EDI implementation, MIME and Value added Networks :

EDI software implementation – EDI envelops for Message transport – Value added Networks (VANs) – Internet based EDI.

Unit V

Advertising and Marketing on the Internet :

The new age of information based marketing – Advertising on the Internet – Charting the Online Marketing Process.

Consumer Search and Resource Discovery :

Information search and retrieval – Electronic commerce catalogues or directories – Information filtering – Consumer Data Interface Emerging Tools – On demand education and digital copyrights – Computer based education and training – Technological components of education on demand.

Software Agents :

Characteristics and Properties of agents – The technology behind software agents – Applets, Browsers and Software Agents.

Text Book:

Ravikalakota & Andrew Whinston, "Frontiers of Electronic Commerce", Addison Wesley, 2000.

Reference Book :

Pete Loshin, & Paul A. Murphy, "Electronic Commerce", 2nd Edition, Jaico Publishing House, 2000.

M.Sc. Software Technology

ELECTIVE COURSE I (c)

VISUAL PROGRAMMING

Unit I

Visual Basic Programming :

Introduction to Visual Basic : Variables, Constants, Strings, Numbers, Remarks and End Statements – Built – in Functions : String, Date, Financial and Numeric Functions – Program

Flow Control – User Defined Functions and Modules – Forms – Single Document Interface – Creating Controls, Even Procedures, Text Boxes, Message Boxes and Labels Properties.

Unit II

Custom Controls – Picture Box, Rich Text Box, List Pad, Progress Bar, Tree view, Tool Bar, Slider, Objects in VB – Classes – Objects Creation and Manipulation – Graphics – Line, Shape, Boxes, Circles, Elipses and Pie Charts – Menus.

Unit III

DDE Properties – DDE Events – DDE Methods – OLE Properties – ActiveX Control Creation and Usage and ActiveX DLL Creation and Usage – Data Base Access – Data Control – Filed Control – Data Grid Record set using SQL to manipulate Data – Open Database Connectivity (ODBC).

Unit IV

Visual C++ Programming :

Introduction to Visual C++- Interface Elements – MFC studio Windows Elements – Class view – Resource view – File view – Info view – Toolbars, Understanding Application Types – Console – Dialog Based – Single Documents – Multiple Documents – Writing Console Application – Writing a Dialog – Based Application – Writing Single – Documents Application.

Unit V

Visual C++ and Database Management :

Data Access Objects (DAO) – Open Database Connectivity (ODBC) – Database Building Blocks – Creating a Database – Adding Tables – Using Queries to Order Data – Creating a Test form – Creating a simple form view application – Manipulating the content of a Database – Creating a Simple Grid View Application – Adding Reports to an Application.

Text Books:

1. Cary Cornell, “Visual Basic 5 from the Ground Up”, TMH, 1997.
2. John Paul Mueller, “Visual C++ 5 from the Ground Up”, TMH 1997.

Reference Books:

1. Azam Mohamed, “Programming with Visual Basic 6.0”, Vikas Publishing House, 2000.
2. Bronson, Gary J, “A first book of Visual C++”, Thomson Vikas Publishing House, First Reprint 2001.

ELECTIVE COURSE II (a)

SOFTWARE PROJECT MANAGEMENT

Unit I

Conventional Software Management – Evolution of Software Economics – Improving Software Economics – Principles of Modern Software Management.

Unit II

Life Cycle Phases – Artifacts of the Process – Model – based Software Architecture – Workflows of the Process – Checkpoints of the Process.

Unit III

Iterative Process Planning – Project Organization and Responsibilities – Process Automation – Project Control and Process Instrumentation.

Unit IV

Modern Project Profiles – Next Generation Software Economics – Modern Process Transitions.

Unit V

COCOMO cost estimation Model – Change Metrics – CMM Overview – Case study.

Text Book :

Walker Royce, "Software Project Management – A unified framework", Addison Wesley, First Indian Reprint 2000.

ELECTIVE COURSE II (b)

DISTRIBUTED OPERATING SYSTEMS

Unit I

Distributed Computing Systems : Evolution – Models – Distributed Operating System – Issues in designing DOS – Distributed Computing Environment. Communication in distributed system : Protocols – Features of a Good Message Passing System – Issues in IPC by Message Passing – Synchronization – Buffering – Process addressing – Failure handling – Group Communication.

Unit II

Synchronization : Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Selection Algorithms. Process Management : Process Migration – Threads.

Unit III

Security : Potential Attacks to Computer Systems – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles.

Unit IV

File System structure : History – System structure – User Perspective. Internal Representation of files : Inodes Assignment to a new file – Allocationof Disk blocks. System Calls for the file system : Open – Read – Write – Close – File creation – Creation of special files – change directory, root, owner and mode – stat and fstat – pipes – dup – mounting and unmounting file systems – link and unlink.

Unit V

Interprocess Communication : Process tracing – system V IPC – sockets. Multiprocessor systems : Problem of multiprocessor systems – solution with master and slave processors – solution with semaphores.

Text Books:

1. For Units I, II & III : Pradeep K.Sinha, "Distributed Operating Systems Concepts and Design", Prentice Hall of India Private Limited, 1998.
2. For Units IV & V : Maurice J.bach, "The design of the UNIX operating system", Prentice Hall of India Private Limited, 1995.

Reference Books:

1. Andrew S.Tanaenbaum, "Modern Operating System", Prentice Hall of India Private Limited, 1997.
2. W.Richard Stevens, "UNIX Network Programming", Prentice Hall of India Private Limited, 1993.

ELECTIVE COURSE II (c)

PRINCIPLES OF COMPILER DESIGN

Unit I

Introduction to Compilers – Compilers and Translators – Assembly Language – Macros - Structure of Compiler – Compiler writing tools - Bootstrapping.

Lexical Analysis – Role of Lexical Analyser – Regular Expression – Finite Automata – Implementation of lexical analyzer – Context Free Grammars – Derivation and Parse trees.

Unit II

Parsers – Shift reduce parsing – Operator Precedence parsing – Top down parsing – Predictive parsers – Simple Precedence Parser – LR parsers – Constructing SLR parser tables – Constructing Canonical LR parsing table – constructing LALR parsing tables – using ambiguous grammars.

Unit III

Syntax directed translation schemes – Implementation of syntax directed translation schemes – Intermediate code – Postfix notation – Parse Trees and syntax trees – Three address code, quardruples and tuples – Translation of assignment statements – Boolean expression – Postfix translation.

Unit IV

Symbol table – The contents of a symbol table – Data structures for symbol tables – Representing scope information – Implementation of a simple stack allocation scheme – Implementation of block structured language – Storage Allocation in FORTRAN – Storage allocation in Block Structured Languages.

Errors – Lexical Phase errors – Syntactic phase errors – Semantics errors.

Unit V

Code Optimization – Principle sources of optimization – Loop Optimization – Machine dependent Optimization – DAG representation in Basic Blocks.

Code Generation – Problems in code generation – A simple code Generator – Register allocations and Assignment Code Generation from DAG's – PEE hole optimization.

Text Books:

Av Aho and J D Ullman, "The Principles of Compiler Design" Narosa Publishing House, 1987.

(Chapters: 1, 3, 4, 5 6, 7, 9, 10, 11, 12, 15)

ELECTIVE COURSE III (a) - WAP & XML

Unit I

Overview of WAP : WAP and the wireless World – WAP Application Architecture – WAP Internal Structure – WAP versus the Web – Setting up WAP : Available Software products – WAP resources – The Development Took Kits.

Unit II

WAP gateways : Definition – Functionality of a WAP gateway – The web model versus the WAP model – Positioning of a WAP gateway in the Network – Selecting a WAP Gateway – Basic WML ; Extensible markup Language – WML structure – A Basic WML Card – Text formatting Language – Navigation – Advanced Display Features.

Unit III

Interacting with the user : Making a selection – Events Variables – Input parameter passing – WML script – Need for WML script – Lexical structure – Variables & Literals – Operators – Automatic data type conversion – Control Constructs – Functions – Using the standard Libraires – Programs – Dealing with errors.

Unit IV

XML : Introduction XML : An Eagle's Eye view of XML – XML Definition – Life of an XML Document – Related Technologies – An Introduction to XML Applications – XML Applications – XML for XML – First XML Documents Structuring Data : Examining the Data XMLizing the Data – The advantages of the XML format – Preparing a style sheet for Document Display.

Unit V

Attributes, Empty Tags and XSL : Attributes – Attributes Versus Elements – Empty Tags – XSL – well formed XML Documents – Foreign Languages and Non – Roman Text : Non Roman Scripts on the web – Scripts, Character sets, Fonts and Glyphs – Legacy Character sets – The Unicode Character set – Procedure to Write XML in Unicode.

Text Books:

1. For Units – I, II & III : Charles Arehart and Others, " Professional WAP, with WML, WML Script, ASP, JSP, XML, SXLT, WTA, Push and Voice XML", Shroff Publishers and Distributors, Pvt. Ltd., 2000.
2. For Units – IV & V : Elliotte Rusty Harold, "XML TM Bible", IDG Boobs India (P) Ltd, 2000

Reference Book :

Michael J.Young, " Microsoft Step by Step XML", PHL.

ELECTIVE COURSE III (b)
INTERNET BASED INFORMATION SYSTEMS (CLIENT SERVER COMPUTING)

Unit I

Introduction to Information Systems (IS) – why study IS – why business need Information Technology (IT) – Fundamentals of ID concepts – overview of IS – solving business problems with IS – developing IS solutions.

Unit II

Information Systems for Business operations – Business IS – Marketing, manufacturing, human resource, accounting and financial Information Systems – transactions processing system – management information and decision support systems.

Unit III

Managing Information Technology – Managing information resource and technologies – Global It management – planning and implementing business change with IT.

Unit IV

Enterprise Resource Planning (ERP) – an overview – benefits of ERP – ERP and related technologies – Business process reengineering – dataware housing – datamining – online analytical processing – supply chain management.

Unit V

ERP Implementation – to be or not to be – ERP Implementation life cycle – Implementation methodology – hidden cost – organizing the Implementation – vendors, consultants and users contracts with vendors, consultants and employees project management and monitoring – ERP present and future – turbo change the ERP systems – Enterprise Integration Applications – ERP and E-commerce – ERP and internet.

Text Book:

For Units I, II & III : James A O'Brien, "Management Information Systems for Managing IT in the Internetworked Enterprise", 4th edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 1999.

Unit I : Chapters 1, 2 & 3
Unit II : Chapters 10,11 (Sec 1 only)
Unit III : Chapters 13 & 14
Unit IV & V : Alexis Leon, "ERP Demystified", Tata McGraw Hill Publishing Company Limited, New Delhi, 2000
Unit IV : Chapter 1 to 9
Unit V : Chapters 10 to 12, 14 to 18, 36 to 40.

Reference Books:

W.S.Jaswadekar, "Management Information Systems", Tata Mcgraw Hill, Publishing Company Limited, New Delhi, 1998.

ELECTIVE COURSE III (c)

MULTIMEDIA SYSTEMS AND DESIGN

Unit I

Introduction – Definition – Multimedia Hardware – Multimedia Software – Multimedia Networking – Multimedia Applications – Multimedia Environments – Multimedia Computer Components – Multimedia Standards – Multimedia PC.

Unit II

Multimedia Information Systems : Limitations in workstation operating systems. Middleware System Services Architecture : Goals of Multimedia Systems Services – Multimedia System Services Architecture – Text : Elements of Text – Using Text in Multimedia Applications –

Graphics: Element of Graphics – Images and color – Graphics file and Application formats – Obtaining images for Multimedia use – Using Graphics on multimedia applications.

Unit III

Digital Audio Representation and Processing : Uses of Audio in Computer applications – Digital Representations of sound – Transmission of Digital Sound – Digital Audio Signal Processing, Video Technology: Raster Scanning Principles – Sensors for TV Cameras – Color fundamentals – Color video – Digital Video and Image Compression: Evaluating Compression System – Video Compression techniques – JPEG Image compression standard – MPEG motion Video compression standard.

Unit IV

Multimedia Communications Systems : Applications Network Services – Network Protocols.
Multimedia Conferencing : Teleconferencing systems – Requirements for Multimedia Communications – Multimedia Conferencing Architecture.

Unit V

Multimedia and Internet : Internet – Client / Server technology – Communications protocol – Internet addressing – Internet functions – HTML and Web Authoring. Multimedia Development Team: Team approach – Assembling multimedia production Team – Multimedia Development process : Multimedia Project – Structured Multimedia development – Casting multimedia project.

Text Books:

1. For Unit I : Tay Vaughnan, "Multimedia making it work", 14th Edition Tata Mcgraw - Hill Edition, 2000.
2. For Units II, III, IV : John F.Koegel Buferd, "Multimedia Systems", Published by Addison Wesley Longman. 3rd Edition year 2000.
3. For Unit V : David Hillman, "Multimedia Technology and Applications", Galgotia Publications Pvt.Ltd., Year 1998.

Reference Books:

Fred T.Hofstetter, "Multimedia Literacy", McGraw Hill, 1995.

EXTRA DISCIPLINAR COURSE I – OFFICE AUTOMATION

(The Extra Disciplinary Courses are offered as Integrated Packages. The students enrolling for EDC I must enroll for EDC II)

Objectives

To understand the basic concepts of computers, MS-Windows, MS-Word, MS-Excel and MS-Powerpoint.

Unit I

INTRODUCTION TO COMPUTERS

Computer – Input and Output devices – CPU – Primary and Secondary Storage Devices – Hardware – Evolution of Computer – Generations of Computer – Types of Computers – Classification of Computers – Software – Generations of languages – Classification of Software.

Unit II

MS-WINDOWS

Using Windows – Using Windows Explorer, My Computer, Desktop & Network Neighbourhood – Find files and folders – Properties of Taskbar – Using Internet Explorer, and Control Panel, Display Properties.

Unit III

MS-WORD

Word basics – Formatting text and documents – Working with headers, footers and foot notes – Tabs, Tables and Sorting – Working with Graphics – Templates and Wizards – Creating Macros and Menus – Mail merge.

Unit IV

MS-EXCEL

Excel Basics – Arranging Worksheets – Functions – Chart and its features – Graphics – Macros – Data Filler, Sort – Share workbook – Formatting Cells.

Unit V

MS-POWERPOINT

Creating a new slide – Formatting text and slide, working with slide show – Insert files, picture, textbox sounds, Chart and Object – Different slide views – Using Auto correct, Auto format and Macros.

The Department of M.Sc. Software Technology will offer the following EDCs to the students of other science programmes

EXTRA DISCIPLINARY COURSE II – OFFICE AUTOMATION PRACTICAL

LIST OF PRACTICALS

MS-Word

1. Creation of tables and converting to text and vice-versa.
2. Using Word Art, changing the attribution of fonts
3. Creating and using templates for Bio-data
4. Using Mail-merge

MS-Excel

5. Using function for Mathematical and statistical applications
6. Creating various types of charts using numeric data
7. Exercises on sorting and formatting cells

(MS-Power point)

8. Formatting texts and creating slide shows with timing.
9. Inserting pictures, audio and video files
10. Usage of auto formatting and Macros.

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