BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

M. Sc Information Technology - Course Structure under CBCS

(Applicable to the candidates admitted from the academic year 2011 - 2012 onwards)

Eligibility: B.C.A. or B. Sc. Computer Science or B. Sc. Information Technology and B. Sc Software Development or any other degree (with Mathematics as an allied subject / major subject) or (with Mathematics or Computer Science or Business Mathematics or Statistics at + 2 level) of this University or from a recognized University or a Examination accepted by the syndicate as equivalent thereto

Semester	Course	Course Title	Ins. Hrs/ Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
I	Core Course – I (CC)	Data Structures and Algorithms	5	4	3	25	75	100
	Core Course – II (CC)	Programming in Java	5	4	3	25	75	100
	Core Course – III (CC)	Fundamentals of Multimedia Technology	5	4	3	25	75	100
	Core Course – IV (CC)	Data Base Systems	5	4	3	25	75	100
	Core Course – V (CC)	Computer Networks	5	4	3	25	75	100
	Core Course – VI (CC)	Programming in Java Lab I	5	4	3	40	60	100
		Total	**30**	**24**	**-**	**-**	**-**	**600**
II	Core Course – VII (CC)	Operating Systems	5	4	3	25	75	100
	Core Course – VIII (CC)	Computer Programming Lab II – UNIX & Shell Programming	5	4	3	40	60	100
	Core Course – IX (CC)	Data Mining and Data Warehousing	5	4	3	25	75	100
	Core Course – X (CC)	Enterprise Resource Planning	5	4	3	25	75	100
	Elective Course – I (EC)	Any one from the Given List	5	4	3	25	75	100
	Elective Course – II(EC)	Any one from the Given List	5	4	3	25	75	100
		Total	**30**	**24**	**-**	**-**	**-**	**600**
III	Core Course –XI(CC)	Programming the Web	5	4	3	25	75	100
	Core Course –XII(CC)	OOAD and UML	5	4	3	25	75	100
	Core Course – XIII(CC)	Computer Programming Lab III – Web Technologies Programming	5	4	3	40	60	100
	Core Course – XIV(CC)	Open Source Based Web Application Development	5	4	3	25	75	100
	Elective Course III(EC)	Any one from the Given List	5	4	3	25	75	100
	Elective Course IV(EC)	Any one from the Given List	5	4	3	25	75	100
		Total	**30**	**24**	**-**	**-**	**-**	**600**
IV	Elective Course V(EC)	Any one from the Given List	5	4	3	25	75	100
	Major Project	Dissertation=100 Marks [2 reviews –20+20=40 marks Report Valuation = 40 marks] Viva = 20 Marks	25	14	-	-	-	100
		Total	**30**	**18**	**-**	**-**	**-**	**200**
		Grand Total	**120**	**90**	**-**	**-**	**-**	**2000**

Recommended Credits Distribution: (Total should not be less than 90 Credits)

Course Type	Course	Credits	Total Credits
Core (Theory)	11	4	44
Core (Practical)	3	4	12
Core (Major Project)	1	14	14
Elective	5	4	20
Total	**20**		**90**

The Internal and External Marks to be awarded for any **Practical Course** is **40 & 60** respectively and for **Theory course**, it is **25 & 75** respectively for MCA, M.Sc (CS), M.Sc (IT) & PGDCA.

List of Elective Courses (For 2011 – 2012) :

Elective I		**Elective II**	
1	Real Time and Embedded Systems	1	Wireless Communication and Networks
2	Personal Computer Architecture and Hardware Troubleshooting	2	Web Technologies
3	Microprocessors and Interfacing	3	Computer Networks and Internet
Elective III		**Elective IV**	
1	Geographical Information System Technology	1	Natural Language Processing
2	Microsoft Windows Programming Technology	2	Software Engineering
3	Advanced J2EE Technology	3	Network Security
Elective V			
1	Computer Graphics		
2	Mobile Communications		
3	Software Testing		

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CORE COURSE I - DATA STRUCTURES AND ALGORITHMS

Unit I

Introduction to data structures, Records, Arrays, Stacks, Queues, Recursion, Linked list, Binary tree and traversing.

Unit II

Sorting and Searching Techniques: Introduction, Internal and External Sorting, Insertion, Selection, Merging, Radix, Quick sort, Heap sort and Bubble sort. Searching: Introduction, Sequential search, Binary search, Binary Tree search.

Unit III

Gra phs and Their applications: Introduction, Graph Theory, Terminology, Represent ation of graphs, Tree & Binary tree, operations on graphs, shortest path Algorithms, Topological sorting.

Unit IV

Algorithms, Devel opment of Algorit hms, basic concepts, Structured Program Concepts, Top down development of algorithms, Principle of analyzing Algorithms, Algorithms design methods, Sub goals, Hill climbing.

Unit V

Algorithms Design Techniques: Divide and Conquer algorithms, Dynamic Programming, Greedy algorithms, Backtracking and Branch & bound.

Text Books

1. Seymour Lipschitz "Data Structures, Tata McGraw-Hill
2. Ellis Horowitz & S. Sahni, Fundamenta ls of Data Structures, Galgotia Pub.

References

1. Data Structures Using C - Langsam, Augenstien, Tenenbaum, PHI
2. Data struct ures and Algorithms, V.Aho, Hopcropft, Ullman , LPE
3. Introduction to de sign and Analysis of Algorithms - S.E. Goodman, ST. Hedetniem- TMH

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CORE COURSE II - PROGRAMMING IN JAVA

UNIT-I

Introduction – Literals – Data types – The structure of Java program – Operators – Control statements

UNIT-II

Arrays – Classes - Inheritance

UNIT-III

Packages and Interfaces – Wrapper classes – mathematical methods – Exceptions

UNIT-IV

Input and Output classes

UNIT-V

Threads – Applets - Graphics.

TEXT BOOK:

1. Dr. K. Somasundaram, "Programming in Java 2", Jaico Publishing House – 2008.

REFERENCE BOOK

1. Ken Arnold, Games Gosling, David Holmes, "The Java Programming Language", 3rd Edition, TMH
2. Patric Naughton and Herbert Schildt, "Jave 2 Complete Reference", TMH, 1999
3. Nortron Peter and William Stanek, "Guide to Java Programing", Samsnet 1996

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CORE COURSE – III
FUNDAMENTALS OF MULTIMEDIA TECHNOLOGY

Objective: *To teach students about various tools & technologies that provide audio, video data handling capabilities to a computer.*

UNIT-I

Introduction to Multimedia – Multimedia Authoring and Tools – Graphics and Image Data Representations - Color in Image and Video.

UNIT-II

Fundamental Concepts in Video – Basics of Digital Audio - Lossless Compression Algorithms.

UNIT-III

Lossy Compression Algorithms - Image Compression Standards - Basic video compression techniques.

UNIT-IV

MPEG Video Coding (MPEG-1 and 2) - Basic Audio Compression techniques - MPEG Audio Compression.

UNIT-V

Computer and Multimedia Networks- Multimedia network communications and applications – Content based Retrieval in Digital Libraries.

TEXT BOOK:

1. **Ze-Nian Li and Mark S. Drew** , Fundamentals of Multimedia , Pearson education/Prentice Hall of India, First Edition,2006, (ISBN 81-7758-823-0) **[Unit-1 :(**Chapters 1,2,3,4); **Unit-2** : (Chapters 5,6,7); **Unit-3 (**Chapters 8,9,10); **Unit-4 (**Chapters 11, 13);**Unit-5 (**Chapters 15,16,18)**]**

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CORE COURSE IV – DATA BASE SYSTEMS

Unit I

Introduction – purpose of database systems – Data Abstraction – Data models – Instances and schemes – Data independence – DDL – DML – Database users – ER model – Entity sets – Keys – ER diagram – relational model – Structure – Relations Algebra – Relational Calculus – Views.

Unit II

SQL – QBE – QUEL – Basic structure – various Operations – Relational database design problems in the relational data base design – Normalizations – normalization using functional, Multi value and join dependencies**.**

Unit III

File and system structure – overall system structure – file Organization – data dictionary – Indexing and hashing – basic concept B and B+ tree indices – Static and Dynamic hash functions.

Unit IV

Recovery and atomicity – failures classification and types – Transaction model and Log based recovery, schedules – serial and non-serial types – Serialization of schedules and views – testing for seriability – lock based protocols – time based protocols – validation techniques – multiple Granularity – multiversion schemes – insert and delete Operations.

Unit V

Distributed data bases – structure of distributed databases – Trade offs in Distributing the database – Transparency and autonomy – distributed query processing – recovery in distributed systems – commit protocols – security and integrity violations – authorization and views – security specification – encryption – Statistical databases.

Text Book(s):

Henry F. Korth, and Abraham Silberschatz,, Sudarshan "Database system Concepts", McGraw Hill, 4th Edition, 2002

References:

1. Pipin C. Desai, "An Introduction to data base systems", Galgotia Publications Private Limited, 1991.
2. C.J. Date, "An Introduction to Database Systems", 3rd Edition, Addison Wesley 1983

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CORE COURSE V – COMPUTER NETWORKS

Unit I

Computer Networks - Applications - Line configuration - Topology - Transmission Modes - Categories of Network: LAN, MAN, WAN - OSI Layer. Physical Layer: Signals - spectrum - bandwidth of analog/digital signals – signal encoding - DTE-DCE interface - Transmission Media - Multiplexing : FDM, TDM.

Unit II

Data Link Layer: Error Detection - Error correction - Line discipline Flow Control: stop - wait protocol and sliding window protocol Error control: ARQ, Go-back-n ARQ, selective - repeat ARQ. Data Link Protocols: Asynchronous protocols – synchronous protocol: character oriented - bit oriented protocols - HDLC. LLC, MAC, PDU. MAN: DQDB - SMDS.

Unit III

Network Layer: Circuit switching - packet switching - message switching - Connection oriented and connectionless services. Routing Algorithms – congestion control Algorithms - internetworking - Routers and Switches - Introduction to firewalls- Wide Area Network - X.25 - Frame Relay - Frame relay - Protocol Architecture - Frame relay call control - User Data Transfer Network Function – Congestion Control.

Unit IV

LAN Protocols: Ethernet - Token Ring - Token Bus - FDDI - Addressing and Frame format – Bridges - LAN Security: Types of threats - Levels of security Case Study: Novell Netware - Wireless LAN: need - components - Receiving Devices - advantages & disadvantages.

Unit V

TCP/IP Networking : TCE/IP Architecture - Structural overview – Inter networking model - Protocol evolution - Division of functions - Network characteristics - implementation characteristics - Network addressing and Routing: Datagram Header - IP address space - Basic routing consideration -Hardware addressing – Common interior Gateway Protocols - Internet control Message Protocol. Transport Layer: Data flow, ports, sockets - user Data gram protocol - Transmission control protocol - TCP Header - connection establishment and termination - TCP Reliable Delivery & Flow control - Applications and services: Domain name system - Remote Logon – Mail Exchange - File Transfer - Remote Procedure Call - Remote File Access - Security - Window system.

Text Book(s)

Data Communication and Networking, Behruz A. Ferouzon, Tata McGraw, 2004.

References

1. Computer Networks - III edition - Andrew S. Tanenbaum - Pearson Edun.1998.
2. Data and Computer Communication – William Stallings, Pearson Education, 5thEdition, September 2000

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CORE COURSE VI – PROGRAMMING IN JAVA LAB I

Objective: *To teach students how to program in JAVA language (from an advanced perspective) and use certain object oriented concepts in programming.*

Suggested exercises:

1. Write a JAVA program to sort the given numbers using arrays.
2. Write a JAVA program to implement the FIND and REPALCE operations in the given multiple text.
3. Write a JAVA program to implement a calculator to perform basic arithmetic operations.
4. Write a JAVA program to handle the division by zero operation.
5. Write a JAVA program to use inheritance.
6. Write a JAVA program to find the area of a rectangle using constructor
7. Develop an applet to get interactive input for adding two numbers and display the sum of the same applet.
8. Write a JAVA program to create buttons in a frame that displays the information on clicking it.
9. Write a JAVA program to display the mouse co-ordinates.
10. Write a JAVA program to display the item selected from a drop-down list.
11. Write a JAVA program to find the student's percentage and grade using command line arguments.
12. Write a JAVA program to create threads and assign priorities to them
13. Write a JAVA program to develop an applet to play multiple audio clips using multithreading.
14. Write a JAVA program to create a window with three check boxes called red, green and blue. The applet should change the colors according to the selection.
15. Write a JAVA program to display the file name chosen from the file dialog box.
16. Write a program to handle File open, read, write operations.
17. Write a program to draw circle or triangle or square using polymorphism and inheritance.
18. Use JDBC to connect to a database and retrieve /insert/update rows of data. Design an applet based GUI to carryout these operations.

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CORE COURSE VII - OPERATING SYSTEMS

Unit I :

Operating Systems Objectives and functions – Operating System and User / Computer Interface, Operating System as a Resource Manager: Evaluation of Operating Systems – Serial Processing, Sample Batch Systems, Time Sharing Systems.

Unit II :

Process Description, Process Control –Processes and Threads. Concurrency – Principles of Concurrency, Mutual Exclusion – Software support, Dekker's Algorithm – Mutual Exclusion – Hardware support, Mutual Messages – Deadlock – Deadlock prevention, Deadlock Detection, Deadlock Avoidance – An Integrated deadlock Strategy.

Unit III :

Memory Management – Memory Management Requirements – Fixed Partationing, Placement Algorithm, Relocation in a Paging System – Sample Segmentation. Virtual Memory – Paging – Address Translation in a Paging System. Segmentation – Organization, Address Translation in a Segmentation System – Combined Paging and Segmentation – Virtual Memory – Operating System Software – Fetch Policy, Placement Policy and replacement Policy, Page buffering resident set Management.

Unit IV :

Scheduling – Types of Scheduling, scheduling Algorithms, scheduling criteria, FIFO, Round Robin, Shortest Process next, Shortest Remaining Time, Highest response ratio and Feedback scheduling Performance comparison – Fair – Share Scheduling. I/O Management and disk scheduling – Organization of the I/O function – the Evaluation of the I/O function, Logical structure of the I/O function, I/O Buffering, Disk Cache.

Unit V :

File Management – Files, File Management Systems, File System Architecture, Functions of File Management File Directories – File Sharing – Secondary Storage Management – File allocation.

Text Books

1. William Stallings, "Operating Systems", Second edition, Maxwell McMillan, International Editions, 1997.
2. Charles Crowley, "Operating Systems-A Design Oriented Approach", IRWIN Publications Chicago, 1997.

References

1. Dental H.M. "An Introduction to Operating Systems", Addison Wesley Publishing Co. 1998.
2. Silberchatz A. Peterson J.L., Galvan P. "Operating System Concepts", Third Edition, Addison Wesley Publishing Co., 1992.

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C0RE COURSE -VIII
COMPUTER PROGRAMMING LAB II - UNIX & SHELL PROGRAMMING

Objective: *In this course students shall be exposed to using popular version of UNIX (namely LINUX), shall learn programming of it based on scripts and carry out basic UNIX system administration tasks.*

Suggested exercises:

1. Trying out basic UNIX commands – passwd, who, tty, set, mkdir, ls, pwd, echo, wc – Using man, info, whatis and apropos.
2. Using vi editor – Basic operations like opening, inserting/deleting text, navigation, changing/moving text, string search.
3. Using emacs editor – Basic operations like opening, replacing, deleting, moving, copying, undo/redo editing, string search/replace, help facility.
4. File/File system manipulation – Try out basic commands like : pwd, cd, rmdir, cat, file, lp, cancel, df, du, compress, gzip, zip commands – Change file permissions using chmod, umask, chown, chgrp, touch, ln, find.
5. Trying out UNIX commands and writing simple shell scripts – pipes, redirection, special files /dev/null, /dev/tty, cmp, diff, sort, spell, ps, nice, nohup, cron, crontab, at, batch.
6. Using UNIX commands – talk, mesg, finger, rlogin,ftp,rcp,rsh, xhost, xterm,xrdb.
7. Electronic mail system – making use of :- mail,elm,pine, messengers – MIME usage- setting up vacation, .signature, .forward.
8. Internet applications : getting familiarized with Listserv, Newsgroup, tin, irc, web pages.
9. Writing simple shell scripts using awk (such as list the file names in a directory, and filter for a specific file name).
10. Shell configuration – creating/making use of .profile, .cshrc, .login, .logout, .bash_ profile, .bash, .logout, .bashrc.
11. Writing Simple shell programs: use commands like: - if, test, expr, while, for, arrays, strings.
12. Basic system administration: Using commands like - fdisk, mkfs, mount, umount, fsck, passwd, date, wall, groupadd, useradd, usermod, userdel, initdd, tar, lpstat, lpmove, ipconfig, ping, netstat.

Note : Students may use the following books related to LINUX to carryout the above exercises apart from the text book they study in their theory course.

REFERENCE BOOK:

1. **Graham Steven, Shah Steve,** Linux Administration – A beginner's guide, Third edition, Dreamtech press, 2003. (ISBN 81-7722-309-7)
2. **Sobell , Mark G.** A practical guide to Linux, Pearson education, 2002 (ISBN 81-7808-690-5).

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CORE COURSE IX - DATA MINING AND DATA WAREHOUSING

Objective: *In this course students shall learn the mathematical & algorithmic details of various data association techniques to discover patterns in underlying data (namely mining data).He also learn how to consolidate huge volume of data in one place efficiently.*

UNIT-I

Introduction to data mining – Association Rule Mining.

UNIT-II

Classification – Cluster analysis.

UNIT-III

Web Data Mining – Search engines.

UNIT-IV

Data warehousing – Algorithms & operations to create data warehouse – Designing data warehouse- Applications of data warehouse.

UNIT-V

Online analytical processing – Information Privacy.

TEXT BOOK:

1. **G.K. Gupta,** Introduction to Data mining with case studies ,Prentice Hall India , 2006 (ISBN 81-203-3053-6) **[Unit-1 :(**Chapters 1,2); **Unit-2** : (Chapters 3,4); **Unit-3 (**Chapters 5,6); **Unit-4 (**Chapters 7), **Unit-5 (**Chapters 8,9)**].**

REFERENCE BOOK:

1. **K.P.Soman & Shyam Diwakar and V. Ajay,** Insight to Data Mining Theory and Practice, Prentice Hall of India, 2006. (ISBN -81-203- 2897-3)
2. **Jiawei Han and Micheline Kamber**, Data Mining Concepts and Techniques, Elsevier, Second Edition, 2007 (ISBN: 81-312-0535-5)

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CORE COURSE X - ENTERPRISE RESOURCE PLANNING

Objective: *In this course students shall learn various components of an application software that help computerize functioning of an enterprise such as sales, materials, production, financial , customer relationship AND supply chain modules.*

UNIT-I

A Foundation for Understanding Enterprise Resource Planning systems – Re-engineering and Enterprise Resource Planning Systems – Planning ,Design ,and Implementation of Enterprise Resource Planning Systems – ERP Systems: Sales and Marketing – ERP Systems: Accounting and finance ERP Systems :Production and Materials Management ERP Systems: Human Resources

UNIT-II

Managing an ERP Project – Supply chain Management and the marketplace – Rules of the game – Winning as a team.

UNIT-III

Solutions - Supply chains as Systems - Modeling the Supply Chain – Supply Chain Software - **Operations** – Meeting Demand – Maintaining Supply – Measuring Performance

UNIT-IV

Planning – Forecasting Demand – Scheduling Supply – Improving performance – Mastering Demand – Designing the Chain – Maximizing Performance

UNIT-V

Essentials of Customer relationship management – Designing CRM application – Various modules of CRM application - Advantages of CRM

TEXT BOOK:

1. **Sumner Mary**, Enterprise Resource Planning, First edition, Pearson education, 2006 (ISBN 81-317-0240-5) (**Unit 1**: Chapters 1 to 7; **Unit 2:** Chapters 8, 9 (continued on text book number TWO)
2. **Taylor David A**., Supply Chains (A managers guide), Pearson education, 2004 (ISBN 81-297-0334-3) (**Unit 2:** Chapters 1, 2, 3; **Unit 3:** Chapters 4, 5, 6, 7, 8, 9; **Unit 4:** Chapters 10, 11, 12, 13)
3. **Tiwana**, Essential guide to knowledge management : The e-business and CRM applications, Pearson education (ISBN 81-780-8326-4) **(Unit 5)**

REFERENCE BOOK:

1. **ALTEKAR Rahul V**., Enterprise wide resource planning (Theory and practice), Prentice Hall of India, 2005 (ISBN 81-203-2633-4)
2. **Garg Vinod K & Venkitakrishnan N.K**, Enterprise resource planning, Second edition, Prentice Hall of India, 2006 (ISBN 81-203-2254-1).
3. **Handfield R. B & Nichols. Ernest L**., Introduction to supply chain management, Prentice Hall of India, 2006 (ISBN 81-203-2753-5)

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ELECTIVE COURSE I:1 – REAL TIME AND EMBEDDED SYSTEMS

Unit I

INTRODUCTION: Introduction to Embedded systems – Processor and memory organization-Devices and buses for Device Networks – Device drivers and Interrupt servicing mechanism.

Unit II

RTOS : RTOS – Programming tools – Case studies- Hardware- software Co0design in an Embedded system.

Unit III

REAL TIME SYSTEMS : Basic Real time concepts – Computer hardware – Language issues – Software life Cycle

Unit IV

REAL TIME SPECIFICATIONS: Design techniques – Real-time kernels – Intertask communication and synchronization – Real –time memory management

Unit V

MULTIPROCESSING SYSTEMS: Multiprocessing Systems - Hardware/Software integration- Real time Applications

Text Book(s)

1. Raj Kamal, 'Embedded Systems Architecture, Programming and Design', Tata Mc-Graw-Hill, 2003
2. Phillip A. Laplante, "Real –Time Systems Design and Analysis, An Engineer's Handbook", Prentice-Hall of India, 2002

References

1. R.J.A.Buhr, D.L.Bailey, "An Introduction to Real Time Systems: Design to networking with C/C++", Prentice- Hall, International, 1999.
2. Grehan Moore and Cyliax, "Real Time Programming: A guide to 32 Bit Embedded Development Reading: Addison- Wisley-Longman", 1998.
3. Haeth, Steve, "Embedded systems Design", Newnes, 1997.

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ELECTIVE COURSE I:2
PERSONAL COMPUTER ARCHITECTURE AND HARDWARE TROUBLESHOOTING

Objective: *To teach students about the internal architecture of IBM Personal Computer and various parts of it and give some knowledge in PC troubleshooting & maintenance.*

UNIT-I

Fundamentals of PC technology – Signaling – CPU family & operation – CPU trouble shooting – details of RAM.

UNIT-II

Motherboards – Power supply, Cooling and Protection.

UNIT-III

Data storage interfaces: Mass storage, Magnetic storage, Optical Storage.

UNIT-IV

I/O ports and Devices – Keyboards and pointing devices- Video sub-system – Audio subsystem.

UNIT-V

Modem and Communication – Networking – Printers – Troubleshooting tools and techniques – Basic data recovery & disaster recovery.

TEXT BOOK:

1. **Craig Zacker, John Rourke ,** PC hardware – The Complete Reference, Tata McGrawHill, 2001 (ISBN 0-07-043606-1)**[Unit-1 :(**Chapters 1,2,3); **Unit-2** : (Chapters 4,5); **Unit-3 (**Chapters 6,7,8); **Unit-4 (**Chapters 9,10,11, 12) ; **Unit-5 (**Chapters 13,14,15,17,18)]

REFERENCE BOOK:

1. **Govindarajulu. B,** IBM PC and clones : Hardware, Trouble shooting and Maintenance. Second edition, Tata-McGraw Hill, (ISBN 0-07-048286-1).
2. **Rosch. Winn L.**, Hardware bible, Sixth edition, Que/Techmedia publishers, 2003 (ISBN 81-7635-696-4).

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ELECTIVE COURSE I:3 –MICROPROCESSORS AND INTERFACING

Objective: *To teach students about 8085 microprocessor architecture and its interfacing; This shall give them necessary technical basis for understanding modern processors.*

UNIT-I

Basic concepts of microprocessors- 8085 Assembly language – 8085 architecture and memory interfacing.

UNIT-II

Interfacing I/O - 8085 Instruction set.

UNIT-III

Programming techniques - Counters-Time delays – Stack –Subroutines.

UNIT-IV

Software systems & assemblers - Interrupts – Programmable interface devices.

UNIT-V

Serial I/O – Microprocessor applications.

TEXT BOOK:

1. GAONKAR Ramesh**,** Microprocessor architecture, programming, and applications with 8085, Fifth edition, Penram international publishers, 2000. **[Unit-1 :(**Chapters 1,2,3,4); **Unit-2** : (Chapters 5,6); **Unit-3 (**Chapters 7,8,9); **Unit-4 (**Chapters 11, 12,14), **Unit-5 (**Chapters 16,17)]

REFERENCE BOOK

1. Mathur Adithya P**.,** Introduction to microprocessors, Tata Mc Graw Hill, 2003 (ISBN 0-07-460222-5)

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ELECTIVE COURSE II:1
WIRELESS COMMUNICATION AND NETWORK

Objective: *In this course students shall learn the basis & structure of wireless protocols and how they stack up to constitute a network module that can run on a computer to enable it to network.*

UNIT-I

Introduction to Wireless technology – Transmission fundamentals – Communication networks – TCP/IP suite.

UNIT-II

Antennas and propagation – Signal encoding techniques – Basics of spread spectrum coding

UNIT-III

Wireless networking – Satellite networking – Cellular wireless networks –

UNIT-IV

Cordless systems & Wireless local loop - Mobile IP and wireless Access Protocols

UNIT-V

Wireless LAN technology – IEEE 801.11 Wireless LAN technology.

TEXT BOOK:

1. **William Stallings**, Wireless communications and networks, Second edition, Pearson education/ Prentice-Hall of India, 2007.

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ELECTIVE COURSE II:2 – WEB TECHNOLOGIES

Unit I

Introduction – What are web services? SOAP WSDL UDDI-Why Web Services are important ? – The evolution of web applications Not just another distributed computing platform – Web services and enterprises.

Unit II

XML Fundamentals XML: The Lingua Franca of web services- XML Documents-XML namespaces Explicit and Default namespaces, Inheriting namespaces, And not inheriting namespaces, Attributes and namespaces –XML Schema XML schema and namespaces, A first schema, Implementing XML schema types, The any Element, Inheritance, Substitution groups, Global and local type declarations, Managing Schemas, Schemas and instance documents, XML schema best practices- Processing XML SAX: Simple API for XML, DOM: Document object Model, XSLT, XPATH

Unit III

SOAP and WSDL5 The SOAP Model- SOAP- SOAP Messages SOAP Envelope, SOAP Header, SOAP Body, SOAP Faults- SOAP encoding – SOAP RPC- Using alternative SOAP Encodings, Document, RPC, Literal, Encoded SOAP RPC and SOAP Document-Literal, SOAP web services and the REST Architecture- Looking back to SOAP 1.1 Syntactic differences between SOAP 1.2 and SOAP 1.1- Changes to SOAP-RPC- SOAP Encoding- WSDL structure, The stock quote WSDL interface, definitions, The type element, bindings, services, managing WSDL descriptions, Extending WSDL – Using SOAP and WSDL

Unit IV

UDDI: UDDI at a glance- The UDDI Business registry- UDDI under the covers – Accessing UDDI- How UDDI is playing out Conversations Overview – Web Services – Web services Conversation Language – WSCL Interface components – The Bar scenario conversations – Relationship between WSCL and WSDL Workflow Business Process Management – Workflow and Workflow management systems – Business process execution language for web services

Unit V

Transactions ACID Transactions – Distributed Transactions and two phase commit – Dealing with Heuristic outcomes – Scaling transactions to web services – OASIS business transaction protocol – Other web services transaction Protocol Security Everyday security basis – Security is an end to end product – Web service security issues – Types of Security attacks and threats - Web services security road map – WS security

Text Book(s)

Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services - An Architect's Guide" Pearson Education– Second Indian Reprint 2005.

References

Eric Newcomer, Greg Lomow, Understanding SOA with Web Services, Pearson Education, First Indian Reprint 2005.

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ELECTIVE COURSE II -3
COMPUTER NETWORKS AND INTERNET

Objective: *In this course students shall learn the basis of various protocol layers that stack up to enable computers to interlink and work in the internet environment.*

UNIT-I

Basics of Internet applications – Network programming – Transmission media – RS232 communication – Long distance communication – Packets, Frames and Error detection.

UNIT-II

Lan technology and network topology – Addressing and Framing – LAN wiring – WAN technology – Connection oriented networking.

UNIT-III

Protocols and layering – Internetworking – IP, ARP protocol.

UNIT-IV

ICMP, UDP, TCP protocols –Internet routing

UNIT-V

Client-Server interaction – Socket interface –Example of Client and server – IP telephony (VOIP)

TEXT BOOK:

1. **Douglas E. Comer**, Computer networks and Internets, Pearson education, 2004, ISBN 81-7758-749-8 **[Unit-1 :(**Chapters 1,2,3,4,5,6,7); **Unit-2** : (Chapters 8,9,10,13, 14); **Unit-3 (**Chapters 16,17,18,19); **Unit-4 (**Chapters 23,24,25, 27); **Unit-5 (**Chapters 28,29,30,33)**]**

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CORE COURSE XI - PROGRAMMING THE WEB

Objective: *In this course students shall learn programming tools and technologies with which he can create applications that run in a web browser environment.*

UNIT-I

Fundamentals of web technology - Introduction to HTML and XHTML – Cascading Style Sheets.

UNIT-II

Basics of JAVASCRIPT – JAVASCRIPT and HTML Documents.

UNIT-III

Dynamic Documents with JAVASCRIPT – JAVA APPLETS.

UNIT-IV

Introduction to XML – Basics of PERL – Using PERL for CGI Programming.

UNIT-V

Introduction to Web Server and Servlets – Introduction to PHP – Database Access through the Web.

TEXT BOOK:

1. Robert W. Sebesta, Programming the World Wide Web, Pearson education, Second Edition,2005 (ISBN 81-297-0439-0) **[Unit-1 :(**Chapters 1,2,3); **Unit-2** : (Chapters 4,5); **Unit-3 (**Chapters 6,7); **Unit-4 (**Chapters 8,9,10);**Unit-5 (**Chapters 11,12,13)**]**

REFERENCE BOOK:

1. H.M. Deitel, P.J. Deitel and A.B. Goldberg, Internet and World Wide Web - How to Programe, Prentice Hall of India, Third Edition, 2006 (ISBN 81-7758-239-9).
2. BAYROSS IVAN**,** Web enabled commercial application development using HTML, DHTML, Java script, Perl CGI, 2nd revised edition, BPB publishing, 2002 (ISBN 81-7656-274-2).

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CORE COURSE XII - OOAD and UML

UNIT-I

Structured approach to system construction: SSADM/SADT - An overview of object oriented systems development & Life cycle

UNIT-II

Various object oriented methodologies – Introduction to UML

UNIT-III

Object oriented analysis – Use cases- Object classification, relationships, attributes, methods

UNIT-IV

Object oriented design – Design axioms – Designing classes – Layering the software design :- data access layer, User interface layer, Control/business logic layer

UNIT-V

UML - Examples on: Behavioral models – Structural models – Architectural models from real world problems.

TEXT BOOK:

1. Bahrami Ali, Object oriented systems development, Irwin McGrawHill, 2005 (First 4 units covered here).
2. Booch Grady, Rumbaugh James, Jacobson Ivar, The Unified modeling language – User Guide, Pearson education, 2006 (ISBN 81-7758-372-7) (UNIT -5 covered here).

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CORE COURSE XIII
COMPUTER PROGRAMMING LAB III
WEB TECHNOLOGIES PROGRAMMING

Objective: *In this course students shall learn to use those modern programming technologies with which he can create applications that run in a web browser environment.*

Suggested exercises:

1. Create a Web Page for ABC INFOTECH LTD., With necessary images and marquee.
2. Create Web Pages which displays the menu card of a hotel. The first page should contain the list of items available. After selection of one item, the corresponding details should be displayed on the next page.
3. Create a Web Page which displays the balance sheets for the given list of companies (same as above problem).
4. Create a Web Page for XYZ INFOTECH LTD., to display the company profile employee details Balance sheet, receive resume, Customer service using links.
5. Using frames create web pages for a travel agency.
6. Create a Web Page using forms for our college students admission process. (Use list box, Push button, Radio button, Command Button, Rich text box, text box, etc where ever applicable).
7. Create a Web Page which receives suggestions from customers for a software development & consultancy agency using necessary VB Script.
8. Using VB Script language, Write a program to display the multiplication table in web page.
9. Using Java Script, display the product details of a vehicle dealer for a given date and time. Also display the details of the vehicles available. Use necessary controls where ever applicable.
10. Create a Web Page which displays the wage of style attributes and event function with demo.
11. Create a Web Page which displays the mouse co-ordinates and image co-ordinates.
12. Create a Web Page which displays the dynamic changing style. The web page should consist of list of cites organized in an order and the corresponding information using mouse over.

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CORE COURSE XIV
OPEN SOURCE BASED WEB APPLICATION DEVELOPMENT

UNIT-I

Installing LAMP stack (Linux, Apache, MySQL, PHP suite)- Configuring installation – Creating PHP pages – ingenerating MySQL with PHP.

UNIT-II

Web forms and user data manipulation – Basic data manipulation using PHP/MySQL forms

UNIT-III

Validating user inputs – Handling errors in form.

UNIT-IV

Case study: Building content management system using LAMP stack

UNIT-V

Configuring log files to improve LAMP stack based web site – Troubleshooting web site.

TEXT BOOK:

1. **Naramore Elizabeth, Gerner Jason,** et aln.., Beginning PHP5, Apache, MySQL web development, Wrox press/Wiley Dreamtech press, 2005 edition. (ISBN 81-265-0581-8) **[Unit-1 :(**Chapters 1,2); **Unit-2** : (Chapters 3,4,5,6); **Unit-3 (**Chapters 8,9); **Unit-4 (**Chapters 13), **Unit-5 (**Chapters 17,18)**]**
2. **Bayross Ivan,** Web enabled commercial application development using HTML, DHTML, JavaScript, Perl CGI., BPB publications, 2nd revised edition, 2002.

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ELECTIVE COURSE III:1
GEOGRAPHICAL INFORMATION SYSTEM TECHNOLOGY

UNIT-I

GIS and the Information Age –Introduction to GIS – Maps and GIS – Digital representation of Geographic data.

UNIT-II

Data quality and Data standards – Raster based GIS data processing – Vector based GIS data processing.

UNIT-III

Visualization of geographic information – Remote sensing and GIS integration – Digital terrain modeling.

UNIT-IV

Spatial analysis and modeling – GIS implementation – GIS Project management – GIS issues and prospects.

UNIT-V

The Future of the GIS and GIS in the Future – Study of GIS authoring tools like ESRI/AutoCAD MAP.

TEXT BOOK:

1. **Lo C. P. Yeung Albert K. W.,** Concepts and Techniques of Geographic Information Systems**,** Prentice Hall of India, 2005 (ISBN 81-203-2230-4) **[Unit-1 :** (Chapters 1, 2, 3); **Unit-2** : (Chapters 4, 5, 6); **Unit-3 (**Chapters 7, 8, 9); **Unit-4 (**Chapters 10,11,12**)]**
2. NIIT course notes, GIS and AutoCAD Map, Prentice-Hall of India, 2004. (**Unit-5)** (ISBN 81-203-2519-2).

REFERENCE BOOK:

1. **Bruce E. Davis, GIS**: A Visual Approach, Onward Press, Second Edition, 2005, (ISBN 0-7668-2764-X)
2. **Longley Paul, Goodchild Michael, Maguire David, and David Rahind,** Geographic Information Systems and Science, John Wiley & Sons Ltd, 2005 (ISBN 0-470-87001-x paperback).
3. **Heywood Ian, Cornelius Sarah et aln..,** An introduction to Geographic Information Systems, Pearson education, 2006 (ISBN 81-7758-784-6).
4. **Michael Worboys & Matt Duckham**, GIS a Computing Perspective, CRC press, Second Edition, 2004 (ISBN 0-415-28375-2)

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ELECTIVE COURSE III:2
MICROSOFT WINDOWS PROGRAMMING TECHNOLOGY

UNIT-I

C# and .NET historical background – C# language fundamentals – Object oriented capabilities of C#.

UNIT-II

Structs – Interfaces – Arrays, indexers – Strings – Exceptions – Events and Delegates.

UNIT-III

Building windows applications in C# - Accessing data with ADO .NET

UNIT-IV

Programming web application with web forms – Sample application creation using Web Forms.

UNIT-V

What is web service – Web service standards & their specification - Web services programming.

TEXT BOOK:

1. **LIBERTY Jesse,** Programming C#, Shroff publishers & distributors/O'Rielly, First edition, Feb 2002 (ISBN 81-7366-431-5) **[Unit-1 : (**Chapters 1, 2, 3, 4, 5, 6); **Unit-2** : (Chapters 7, 8, 9, 10, 11, 12); **Unit-3 (**Chapters 13, 14); **Unit-4 (**Chapters 15), **Unit-5 (**Chapters 16)**]**

REFERENCE BOOK:

1. **Hoffman Kevin et aln**.., Professional .NET framework, Wrox press/Shroff publishers, 2003 (ISBN 81-7366-401-3).
2. **Angshuman Chakraborti, Roopendra Jeet Sandhu et aln,** .NET framework, Prentice Hall India ltd, 2002, ISBN 81-203-2049-2.
3. Visual Studio.NET IDE for Dummies, IDG book house, 2005.
4. **Jesse Liberty (Author), Donald Xie (Author)**, Programming C# 3.0 (Programming) Publisher: O'Reilly Media, Inc.; 5 edition (January 11, 2008) ISBN-10: 0596527438, ISBN-13: 978-0596527433

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ELECTIVE COURSE III:3 - ADVANCED J2EE TECHNOLOGY

UNIT-I

J2EE and distributed computing – Design and development of J2EE application – Task list for building J2EE application.

UNIT-II

Resource access : JNDI & LDAP – Data access: JDBC - Control flow: Servlets.

UNIT-III

Java server pages : Introduction – Development – User interface design for Java applications.

UNIT-IV

Enterprise java beans – Building Session & Entity beans.

UNIT-V

Case studies in implementing Chat server - Case studies in implementing a web enabled online banking application.

TEXT BOOK:

1. Bambara Joseph, Allen Paul R., et al**...**, J2EE unleashed, SAMS / Techmedia Publishers, 2001 (ISBN 81-7635-616-6) **[Unit-1 :(**Chapters 1, 2, 3, 4); **Unit-2** : (Chapters 5, 6, 7); **Unit-3 (**Chapters 8, 9, 10); **Unit-4 (**Chapters 11, 12, 13)**]**
2. Jain Pallavi, Siddiqui, Shadab, J2EE – Professional projects, Prentice Hall of India, 2002 (ISBN 81-203-2051-4). **[Unit-5 :** Part 3 & Part-4 of the book).

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ELECTIVE COURSE IV:1 - NATURAL LANGUAGE PROCESSING

UNIT I INTRODUCTION

Introduction: Knowledge in speech and language processing – Ambiguity – Models and Algorithms – Language, Thought and Understanding. Regular Expressions and automata: Regular expressions – Finite-State automata. Morphology and Finite-State Transducers: Survey of English morphology – Finite-State Morphological parsing – Combining FST lexicon and rules – Lexicon-Free FSTs: The porter stammer – Human morphological processing

UNIT II SYNTAX

Word classes and part-of-speech tagging: English word classes – Tagsets for English – Part-of-speech tagging – Rule-based part-of-speech tagging – Stochastic part-of speech tagging – Transformation-based tagging – Other issues. Context-Free Grammars for English: Constituency – Context-Free rules and trees – Sentence-level constructions – The noun phrase – Coordination – Agreement – The verb phase and sub categorization – Auxiliaries – Spoken language syntax – Grammars equivalence and normal form – Finite-State and Context-Free grammars – Grammars and human processing. Parsing with Context-Free Grammars: Parsing as search – A Basic Top- Down parser – Problems with the basic Top - Down parser – The early algorithm – Finite- State parsing methods.

UNIT III ADVANCED FEATURES AND SYNTAX

Features and Unification: Feature structures – Unification of feature structures – Features structures in the grammar – Implementing unification – Parsing with unification constraints – Types and Inheritance. Lexicalized and Probabilistic Parsing: Probabilistic context-free grammar – problems with PCFGs – Probabilistic lexicalized CFGs – Dependency Grammars – Human parsing.

UNIT IV SEMANTIC

Representing Meaning: Computational desiderata for representations – Meaning structure of language – First order predicate calculus – Some linguistically relevant concepts – Related representational approaches – Alternative approaches to meaning. Semantic Analysis: Syntax-Driven semantic analysis – Attachments for a fragment of English – Integrating semantic analysis into the early parser – Idioms and compositionality – Robust semantic analysis. Lexical semantics: relational among lexemes and their senses – Word Net: A database of lexical relations – The Internal structure of words – Creativity and the lexicon.

UNIT V APPLICATIONS

Word Sense Disambiguation and Information Retrieval: Selectional restriction-based disambiguation – Robust word sense disambiguation – Information retrieval – other information retrieval tasks. Natural Language Generation: Introduction to language generation – Architecture for generation – Surface realization – Discourse planning – Other issues. Machine Translation: Language similarities and differences – The transfer metaphor – The interlingua idea: Using meaning – Direct translation – Using statistical techniques – Usability and system development.

TEXT BOOKS

1. Daniel Jurafsky & James H. Martin, " Speech and Language Processing", Pearson Education (Singapore) Pvt. Ltd., 2002.
2. James Allen, "Natural Language Understanding", Pearson Education, 2003.

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ELECTIVE COURSE IV:2 - SOFTWARE ENGINEERING

UNIT 1: SOFTWARE PROCESS

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) – system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

UNIT 2: SOFTWARE REQUIREMENTS

Functional and non-functional – user – system –requirement engineering process – feasibility studies – requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping –S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

UNIT 3: DESIGN CONCEPTS AND PRINCIPLES

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems – Real time software design – system design – real time executives – data acquisition system – monitoring and control system. SCM – Need for SCM–Version control – Introduction to SCM process – Software configuration items.

UNIT 4: TESTING

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues – unit testing – integration testing – validation testing – system testing and debugging.

UNIT 5: SOFTWARE PROJECT MANAGEMENT

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking – Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

Text Books:

1. "Software engineering- A practitioner's Approach", Roger S. Pressman, McGraw-Hill International Edition, 5 th edition, 2001.
2. "Software engineering", Ian Sommerville, Pearson education Asia, 6th edition, 2000.
3. "Software Engineering Concepts ", Richard E. Fairley, McGraw-Hill edition, 2002.

Reference Books:

1. "Software Engineering – An Engineering Approach", James F Peters and Witold Pedryez, John Wiley and Sons, New Delhi, 2000.

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ELECTIVE COURSE IV:3 - NETWORK SECURITY

Unit I

Overview-Symmetric Ciphers: Classical Encryption Techniques

Unit II

Symmetric Ciphers: Block ciphers and the Data Encryption Standards Public-key Encryption and Hash Functions: Public-Key Cryptography and RSA

Unit III

Network Security Practices: Authentication applications-Electronic Mail Security

Unit IV

Network Security Practices: IP Security-Web Security

Unit V

System Security: Intruders-Malicious Software-Firewalls

Text Book(s)

1. William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Third edition, 2003

References

1. Johannes A. Buchaman, Introduction to cryptography, Springer-Verlag.
2. Atul kahate, Cryptography and Network Security, TMH.

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ELECTIVE COURSE V:1 - COMPUTER GRAPHICS

UNIT-I

A survey of computer graphics – Overview of Graphic systems- output primitive (Mathematical functions for creating graphic output) – setting attribute of Output primitives

UNIT-II

Two dimensional geometric transformations – Two dimensional viewing

UNIT-III

Graphic structures – Hierarchical modeling – Graphical user interfaces and interactive input methods

UNIT-IV

3D Concepts – 3D- object Representation – 3D Geometric and Modeling Transformations.

UNIT-V

Visible surface detection methods – Illumination models – Computer Animation

TEXT BOOK:

1. Hearn Donald, Baker Paulin M., Computer graphics – C version**,** Second edition, Pearson education, 2006. (ISBN 81-7758-765-X)

REFERENCE BOOK:

1. Newman William M., & Sproull Robert F., Principles of interactive computer graphics, Second edition, Tata –McGraw Hill, 1 (ISBN 0-07-463293-0)

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ELECTIVE COURSE V:2 - MOBILE COMMUNICATIONS

Unit I

Introduction: Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons

Unit II

Telecommunications System: Telecommunication System – GSM – Architecture – Sessions – Protocols – Hand over and Security – UMTS and IMT 2000 – Satellite System

Unit III

Wireless LAN : IEEE S02.11 – Hiper LAN – Bluetooth – MAC Layer – Security and Link Management.

Unit IV

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

Unit V

WIRELESS APPLICATION PROTOCOL: Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications

Text Book(s)

1. Jochen Schiller, “Mobile Communication”, Pearson Education, Delhi, 2000.

References

1. “The Wireless Application Protocol: Writing Applications for the Mobile Internet”, Sandeep Singhal, et al.

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ELECTIVE COURSE V:3 – SOFTWARE TESTING

Unit I

Principles of Testing – Software Development Life Cycle Models

Unit II

White Box Testing - Integration Testing - System and acceptance testing.

Unit III

Testing Fundamentals -2 & Specialized Testing: Performance Testing-Regression testing-Testing of Object Oriented Systems-Usability and Accessibility Testing.

Unit IV

Test Planning, Management, Execution and Reporting.

Unit V

Software Test Automation-Test Metrics and Measurements

Text Book(s)

1. Software Testing - Srinivasan Desikan, Gopalaswamy Ramesh, Pearson Education 2006.

References

1. Introducing Software testing-Louis Tamres, Addison Wesley Publications, First Edition.
2. Software testing, Ron Patten, SAMS Techmedia, Indian Edition 2001.
3. Software Quality-Producing Practical, Consistent Software-Mordechai Ben-Menachem, Gary S Marliss, Thomson Learning, 2003.

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