M.Sc. Computer Software

Prospectus No. 20141210

SANT GADGE BABA AMRAVATI UNIVERSITY

विज्ञान विद्याशाखा
(FACULTY OF SCIENCE)

PROSPECTUS
OF
MASTER OF SCIENCE IN
COMPUTER SOFTWARE

Semester-I & Semester III Winter 2013,
Semester-II & Semester IV Summer 2014

2013
Visit us at www.sgbau.ac.in

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- The index lists the title and page numbers for each paper/practical.
- The papers are categorized by semester and part.
- The index is organized alphabetically by title.
SYLLABUS PRESCRIBED
FOR M.SC.(COMPUTER SOFTWARE)

SEMESTER-I

PAPER I:-DESIGN AND ANALYSIS OF ALGORITHM

Unit I : Divide and Conquer: General Method, Binary Search, Finding the maximum and minimum, Merger Sort, Quick Sort, Selection sort, strassen’s matrix multiplication.

Unit II : Greedy Methods, Optimal storage, Knapsack Problem, Job sequencing with deadline, Optimal merge patterns, minimum spanning trees, single source shortest path algorithm.


Unit IV : Basic search and traversal techniques: General Method, Code Optimization, AND/OR graph, Game trees, Bi-connected Components, Depth first search technique.

Unit V : Backtracking: General Method, the 8-Queens problem, Sum of subsets. Graph Coloring, Hamiltonian Cycles, Knapsack problem. Branch and Bound Techniques: General Method, 0/1 Knapsack Problem, Traveling salesman problem. Efficiency Considerations.

Books:
1. E. Horowitz & S. Sahani : Fundamentals of Computer Algorithm, (Golgotia)
2. Aho & Ullman : Analysis and Design of Algorithm (Addison- Wesley)
3. Hopcroft : Analysis of Algorithm (Addison- Wesley)
5. Corman : Design and Analysis of Algorithm (PHI)
6. Aho : data structure & Algorithm (Addison- Wesley)

PAPER II:-OPERATING SYSTEM

Unit I : General Overview of UNIX system kernel, Architecture of Unix / Linux OS, Kernel data structure, System administration, Buffer cache : Operation, advantages and disadvantages.


Unit III : Main memory management : Memory management policies in Unix, Swapping, paging and demand paging. Hybrid system, I/O subsystem: Drives, streams and I/O subsystem management in Unix.

Unit IV : Inter process communication & Synchronization, Process tracing system, IPC, Network Communication, remote procedure calls, Sockets: Concepts, Programming and implementation in Unix.

Unit V : Multiprocessor system: Problems and solutions with Master / Slave processors, Concept of client/server computing, and the role of an Operating System in such environments. Distributed Unix OS.

Books:
1. Bach M.J. Design of Unix Operating System (PHI)
2. Crowley Operating Systems : A Design-Oriented Approach (TMH)
3. Taneubum A.S. - Operating System : Design & Implementation (PHI)
4. Linux Linleashed (Techmedia)
6. Back Linux Kernel Internals (Addison ï Wesley)

PAPER III:-.NET TECHNOLOGIES - I


Unit II : Debugging and Error Handling, Using Debugger, Event sequence, File and event log access with ASP.Net, Writing files, creating files and directories, Sending and receiving files, Accessing windows Registry, Sending and receiving Messages, Types of messages.

Unit III : VB.Net: Application Vs Web sites, Creating configuration files, State maintenance options, Cache object, Caching.
ASP .net Pages, controlling access and monitoring, SSL, Tracking usage, advanced page count. Planning applications, Design methodology, plan the user interface, data storage and retrieval, creating database and data access components.

**Unit IV**: Advance VB.Net Web applications, Client / Server side script, DOM, Accessing the DOM from script, using ActiveX controls, Web services, Remote method call and XML, Interoprate across application / platform, Web Service Description Language, Consume a Web service, SOAP(Simple Object access Protocol), Finding Web services.

**Unit V**: Web Services, COM components, Microsoft SOAP toolkit, Creating client application, building ActiveX DLL, User controls, custom server control, customizing toolkit, Transforming data between web form and component, Efficiency and scalability.

**Books**:
1. A Russell Jones : ASP.Net with VB.Net. (BPB Publication)
4. VB.Net How to Program : Harvey M. Deitel, P.J. Deitel.
5. An Introduction to Object Oriented Programming with VB.Net : Dan Clark

**PAPER IV**: DATA COMMUNICATION AND NETWORKING

**Unit I**: Introduction : Definition and use of data Communication, components of communication network, future trends in communication and networking, Network application, Voice communication network. Switches, PBX, cellular technology, FAX machines, special purpose devices. Data communication network architecture, Hosts, Clients Circuit, special purpose communication devices.


**Unit III**: LAN: Types, Components of Lan, Ethernet, Token Ring, MAP, Arcnet, Apple talk, Selecting and performance improvement of LAN. LAN/MAN: Types of communication services, Dialed, dedicated & switched circuit services. Packet switched network.

**Unit IV**: Back Bone networks: Components, Fast Ethernet, FDDI, switched network, Performance improvement, Network design and implementation steps: Feasibility study, Design plan, Information needs, Defining, new network requirements, Geographic scope, Circuit requirements, Network security & control Configuration, costs & implementation.


**Books**:
2. Tenanbarry A.S. Ò Computer Network (PHI)
3. Stalling W. Ò Data & Computer Communication (PHI)
4. Milless : Analog & Digital Data Communication (Jaico)
5. Sterens : TCP/IP illustrated (Addison Ò Wesley)
6. Beyda: Data Communication (Addison Ò Wesley)

**SYLLABUS PRESCRIBED FOR M.SC.(COMPUTER SOFTWARE) SEMESTER – II**

**PAPER V**: ELECTRONIC COMMERCE


**Unit II**: E-Cash & E-payment systems: Internet monetary payment and security requirements, confidentiality, integrity, authentication, inter operability payment and purchase order process. On-line electronic cash: overview, problem,
issues, implementation & e-cash inter operatability. Electronic payment schemes.

**Unit III**: Security: need for computer security, specific intruders approaches, security strategies, security tools, Encryption methods, Enterprise networking & internet access, Antivirus program, security teams.

**Unit IV**: Master Card/Visa card Processing: Introduction, Business requirements, Payment system participants, cryptography, certificate issuance, kinds of shopping, payment processing, cardholder/merchant registration, purchase request, payment authorization & capture.

**Unit V**: E-mail & Secure E-mail: A model for message handling, working of e-mails. MIME: Basic concept, parts, data encoding technique, address directory. S/MIME.MOSS. Comparisons of security methods. MIME & related facilities over the internet.

**Books:**
1. Mindi & Minoli Web Commerce Technology Handbook (TMH)
2. Kakakota & Whinston Frontiers of Electronic Commerce (Addison Ï Wesley)
4. Kamlesh K. Bajaj & DNag, E-Commerce, the cutting edge (TMH) of Nusiness.
5. Understanding Electronic Commerce Ï David Kansiur (Misor of press)

**PAPER VI: CORE JAVA**


**Unit II**: Inheritance basics, Using super, Multilevel hierarchy, Method overriding. Dynamic method dispatch. Abstract classes, Final keyword, object class. Packages, class path, access protection, importing packages, interfaces & their usage.

**PAPER VII: RDBMS**


**Unit II**: Normalization process, 1NF, 2NF, 3NF, 4NF, BCNF transforming a conceptual model to a Relational model. Relational Algebra; Relational calculus, Relational implementation with SQL: overview, schema & table definition, data manipulation, view definition, Information schema.

Unit IV: Physical data base system: Storage media, disk performance factors, data storage formats on disk, file organization & Access methods. Implementing logical relationships, balanced- tree indexing, Query optimization.

Unit V: DB Administration: overview, DBA functions, goals, Database integrity, database systems: General DDS model, Design issues, data integrity in DDS. Database Recovery in DDS.

Books:
1. Raghu Ramkrishna – Database Management System (McGrawHill)
2. Hansen & Hansen – Database Management & Design (PHI)
4. C.J. Date - Database Management system (Addison ï Weley)

PAPER VIII: FREE OPEN SOURCE SOFTWARE

Unit I: Overview of Free/Open Source Software  
- Definition of FOSS & GNU, History of GNU/Linux and the Free Software Movement  
- Advantages of Free Software and GNU/Linux, FOSS usage, trends and potential  
- Global and Indian GNU/Linux OS installation  
- Detect hardware, configure disk partitions & file systems and install a GNU/Linux distribution  
- Basic shell commands - logging in, listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management  
- User and group management, file ownerships and permissions, PAM authentication  
- Introduction to common system configuration files & log files  
- Configuring networking, basics of TCP/IP networking and routing, connecting to the Internet (through dialup, DSL, Ethernet, leased line).

Unit II: Configuring additional hardware - sound cards, displays & display cards, network cards, modems, USB drives, CD writers  
- Understanding the OS boot up process  
- Performing every day tasks using gnu/Linux  
- Accessing the Internet, playing music, editing documents and spreadsheets, sending and receiving email, copy files from disks and over the network, playing games, writing CDs  
- X Window system configuration and utilities  
- Configure X windows, detect display devices  
- Installing software from source code as well as using binary packages. Setting up email servers using postfix (SMTP services), courier (IMAP & POP3 services), squirrel mail (web mail services)  
- Setting up web servers using apache (HTTP services), php (server-side scripting), perl (CGI support)  
- Setting up file services using samba (file and authentication services for windows networks), using NFS (file services for gnu/Linux/Unix networks)  
- Setting up proxy services using squid (http/ftp/https proxy services)  
- Setting up printer services - using CUPS (print spooler), foomatic (printer database)

Unit III: Setting up a firewall - Using netfilter and ip tables; Using the GNU Compiler Collection GNU compiler tools; the C preprocessor (cpp), the C compiler (gcc) and the C++ compiler (g++), assembler (gas); Understanding build systems  
- Constructing make files and using make, using autoconf and autogen to automatically generate make files tailored for different development environments  
- Using source code versioning and management tools using CVS to manage source code revisions, patch & diff.

References
Text Book:
1. Introduction to Linux: Installation and Programming N. B. Venkateshwarlu (Ed); B S Publishers; 2005. (An NRCFOSS Publication)

Reference Books:
On-line materials
5. *An Introduction to GCC*, Brian Gough. URL: http://www.network-theory.co.uk/docs/gccintro/

**SYLLABUS PRESCRIBED**
**FOR M.SC.(COMPUTER SOFTWARE)**

**SEMESTER- III**

**PAPER IX: SOFTWARE ENGINEERING**


**Unit V**: Software testing fundamentals. test care design, whitebox testing. Basis pathcontrol structure, Black box - Testing & for specialized environments. Strategic approach to S/W testing. Unit testing, integration testing, Validation testing, system testing, Debugging. Technical metrics for software.

**Text Book:**
1. Pressman Roger S. *S/W Engineering, A Practitioner’s approach (S/E)* TMH.
6. Desikan, Ramesh : *Software testing Principles and Practices* (PE)

**PAPER X: ADVANCED JAVA**

**Unit I**: Applet and AWT tools, Windows fundamentals, working with various controls, Layout managers, Image controls. Working with events, Interfaces & event listeners.

**Unit II**: Packages: API Packages, Reflection, Remote method invocation, Stand alone applications, Client /Server application using RMI, Socket programming.

**Unit III**: *Java Beans*: Bean development kit, JAR Files, creating Bean, Properties of bean, BeanInfo Interface, Java Bean API. Multithreading, priority of a thread, changing the priority.

Unit V: Servelets: Life cycle of a servelet, JSDK, Servelet API, Servelet Package, Classes and interfaces in servelets, Servelet parameters, reading and initializing servelets, HTTP, Request/Response.

Books:
1. P. Navghatan & H. Schildt: Java2 Complete Reference (TMH)
2. Java 2 Unlished (Techmedia)
3. Dietel & Dietel: Java 2

PAPER XI: .NET TECHNOLOGIES II

Unit I: Introduction, .Net Framework, common language runtime, class library, general purpose languages, Domain specific languages, Working in groups, Common language runtime, common type system, common language specification, MSIL, metadata.

Unit II: C#: Introduction, Types, variables, Expressions, Operators, Boxing and unboxing, Type declaration, Input from console, Printing and formatting the output, interactive I/O, CLR, Command line arguments, controls and statements: Decision making, Iteration, branching statements.

Unit III: Classes, Objects, Objects as data types, static methods, class members, Controlling access, implementing class, Methods, Overloading methods, implementing methods, Abstract and base classes, virtual methods.

Unit IV: Structs and enum, arrays, strings, attributes, Exception and error handling, Common Exception classes, Exception handling routine. Data handling, ADO, Accessing and using Data in ADO, data set and commands.

Unit V: Printing in C#, Print preview, ListView, automatic memory management, Garbage collection, algorithms for garbage collection, Finalization, Resurrection, Clean up, forcing an object clean up

Books:
2. Eric Gunnerson: A Programmers introduction to C# (APress)
3. Y.P. Kanetkar: C#.Net Fundas

PAPER XII: NETWORK SECURITY

Unit I: Introduction to network security, passive and active attacks, authentication, integrity, access control, The model of internet work security, internet standards: the internet society and RFC publications (Request for comments.)

Unit II: Cryptography: Encryption principles and various algorithms, standardization process, key distribution, public key cryptography and message authentication, digital signature. Network security applications: Kerberos, X.509 directory authentication services, e-mail security PGP (Pretty Good Privacy) operational description. MIME (Multipurpose Internet Mail Extensions), S MIME (Security/Multipurpose internet mail extensions) functionality.


Unit IV: Management Security: Basic concepts of SNMP, Network management architecture and protocol architectures, proxies, services, SNMPv1 authentication service, access policy and proxy service, SNMPv2 architecture, message processing and user security model, view based access control, System.

Unit V: Security: Intruders, Intrusion technologies, password protection, password selection strategies, Intrusion detection, viruses and related threats: Nature of viruses, types, micro viruses and various antivirus approaches. Firewall: Characteristics, types of fire walls, Firewall configuration, Trusted systems, data access control, the concept of the trusted systems.

Books:
2. Network Security: Kaufman, Perlman, speciner (PE)
3. Network Security: Ahkit Fadia (M)
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FOR M.SC.(COMPUTER SOFTWARE)
SEMESTER - IV
PAPER XIII: ARTIFICIAL INTELLIGENCE

Unit I : Introduction to Artificial Intelligence: Overview of Artificial Intelligence. Knowledge: General concept, Introduction to LISP: Syntax and numerical functions. Basic list manipulation function in LISP. Functions, predicates and conditional Input, output and local variables, iteration and recursion. Property list and arrays.


Unit III : Knowledge representation - II: Truth maintenance system. Default reasoning and closed world assumption. Predicate completion and circumscription, model and temporal logics. Overview of object oriented systems, object classes messages and methods, simulation examples using OOS program.


Books:
1. Artificial Intelligence by Elaine Rich, McGrawhill Inc.
2. Artificial Intelligence and Expert Systems-Jankiraman, Sarukesi (M)
4. Turbo prolog Nath(GP)
5. List Programming Rajeo Sangal (TMH)
6. Rule Based Expert System M. Sasikumar (Narosa)
7. Artificial Intelligence Russel Pearson 1st Text Book
8. Prolog: Prog. For A.I. by Bratko Pearson
9. Int. to Expert syst Jackson Pearson
10. Principles of AI Nils Nilson
11. A.I. by R.J. Winston Pearson
12. Prolog Programming and application Burnhan & Hall
13. ES: Theory and Practice Ermine PHI

PAPER XIV: WEB SERVER ADMINISTRATION


Unit III : ISAPI Architecture, Applications, Filters & DLL. Index Server Overview: Architecture, Using Index Server, CRS. IIS Administration: Logging IIS activity & Reading. Reports.


Unit V : Apache Server: Introduction, Installing Apache, Configuring Apache, starting, restarting and stopping, Advance administration, hosting multiple sites, Proxy server and caching, logs and monitoring, security, dynamic content, performance tuning, URL reviewing, Module construction.

Books:
1. Nelson Howell Using IIS4 Que (EEE)
2. (TMH) IIS Complete Reference Menller & Sheldon.
PAPER XV: DATA MINING AND WAREHOUSING

Unit I : Introduction, Data mining, Data mining functions, classification and major issues. Data Preprocessing: Data cleaning, data integration and transformation, data reduction, discretisation concept hierarchy generation.

Unit II : Data mining primitives: Data mining primitives, data mining query language. Concept description: concept description, data generalization, Analytical characterization, mining class comparison.

Unit III : Application and trends in data mining: data mining applications, data mining systems and research Prototypes, additional themes on data mining, Data Mining tools: Architecture, Memory Based Reasoning, Automatic cluster detection, Neural Networks, Genetic Algorithms, Decision Trees.

Unit IV : Data ware house design: OLAP, MOLAP, ROLAP Technologies Data Staging: overview, plan effectively, dimension table staging, fact table loads and ware house operations, data quality and cleansing, miscellaneous Issues, Distributed data ware house, its architecture, types of database distribution.

Unit V : Building end user applications: role of end user application, application specification, end user application development, maintaining and growing data ware house: manage the existing data ware house environment, prepare for growth and evaluation, data ware house analysis, CUBE, ROLL UP and STAR queries.

Books:
2. R. Kimball: The Data Ware House Life Cycle Tool Kit, Wiley Press, John Wiley and Sons (ASIA) Pvt. Ltd.
3. Berson: Data Ware Housing, Data Mining and OLAP, Tata McGraw Hill.

PAPER XVI: COMPUTING TECHNIQUES IN BIOINFORMATICS

Unit I : Introduction to Bioinformatics, its branches, applications, area of research. Introductory biology for bio informatics. Bio informatics data bases, its categories, type, retrieval system, sequence and Molecular file formats, prediction of Protein structure.

Unit II : Data bases in bioinformatics: sequence data bases, Structure data bases, and other data bases. PDB, MMDB, CATH, FSSP, DALI, SCOP, MEROPS, BRENDA, CAZY, enzyme DATA BASES, NTSYS-pc, SOPMA, FASTA, BLAST.

Unit III : Tools in Bioinformatics: Tools, its need, trends, Data submission sequence submission, protein submission, tools. Data analysis tools, Prediction tools, Modeling tools.

Unit IV : Algorithms in Bioinformatics: Biological, Bio informatics algorithms, analysis, Sequence comparison, substitution matrices, prediction, structure algorithms, unweighted pair group method for arithmetic averages (UPGMA).


BOOKS:
4. Introduction to Bioinformatics; Attwood David J. etc Long man Pub.
5. Introduction to Bioinformatics algorithm: Jone, Pavel A. P etc., Anne pub.
7. Developing Bio informatics Computer Skill: Gibas, Cythia, shroff pub

Distribution of Practical
(Common for Each Semester & Practical)

Breakup of Marks :-
a) Lab. Practical :-
i) Two Programme 30 Marks (15 Each)
ii) Practical Record 05 Marks
iii) Viva-Voce 05 Marks
iv) Internal Assessment 10 Marks

Total 50 Marks

b) Project Work :
i) Project Work and Presentation 30 Marks
ii) Project Report 05 Marks
iii) Project Viva-voce 05 Marks
iv) Internal Assessment 10 Marks

Total 50 Marks

Each M.Sc.-II student is required to submit two copies of report at the time of examination. The project work will be evaluated by external and internal examiner.

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