SANT GADGE BABA
AMRAVATI UNIVERSITY

(FACULTY OF SCIENCE)

PROSPECTUS

PRESCRIBED

M.Sc. Semester I & III W-2010
and Semester II & IV S-2011
IN
COMPUTER SCIENCE

2010

Visit us at www.sgbau.ac.in

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SANT GADGE BABA AMRAVATI UNIVERSITY

SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

(1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects or papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.

(2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc. refer the University Ordinance Booklet the various conditions/provisions pertaining to examination as prescribed in the following Ordinances.

Ordinance No. 1 : Enrolment of Students
Ordinance No. 2 : Admission of Students
Ordinance No. 4 : National cadet corps
Ordinance No. 6 : Examinations in General (relevant extracts)
Ordinance No. 18/2001 : An Ordinance to provide grace marks for passing in a Head of passing and Improvement of Division (Higher Class) and getting Distinction in the subject and condonation of deficiency of marks in a subject in the subject/s in which the student/s have not passed in a Head of passing and Improvement of Division (Higher Class) and getting Distinction in the subject/s by the student/s

Ordinance No. 19/2001 : An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Ordinance No. 9 : Conduct of Examinations (relevant extracts)
Ordinance No. 10 : Providing for Exemptions and Compartments
Ordinance No. 19 : Admission of Candidates to Degrees.
Ordinance No. 109 : Recording of a change of name of a University student in the records of the University student in the records of the University.

Ordinance No. 109/1993 : Records of a charge of name of a student.
Ordinance No. 109/1996 : Records of a charge of name of a student.

Dineshkumar Joshi
Registrar
Sant Gadge Baba Amravati University.

PATTERN OF QUESTION PAPER ON THE UNIT SYSTEM.

The pattern of question paper as per unit system will be broadly based on the following pattern:

1. Each question paper will be divided into units equal to the number of questions to be answered in the paper. On each unit there will be a question either a long answer type or a short answer type.

2. For every question there will be an alternative choice from the same unit. However, there will be no internal choice in a question.

3. Division of marks between long answer and short answer type questions will be in the ratio of 40:60.

4. Each short answer type question shall contain 4 to 8 short sub-questions with no internal choice.

5. Each long answer type question shall contain 4 to 8 long sub-questions with no internal choice.
M.Sc.PART-I  SEMESTER I (EXAMINATION)

Syllabus prescribed for
M.Sc.Part-I & Part-II  Semester I & II (Computer Science)

1MCS1         DIGITAL SYSTEMS & MICROPROCESSORS

Unit-I :Introduction to logic families : TTL, ECL, MOS, CMOS etc. and their characteristics, tristate, flip-flops, RS, JK, JKMS, D, T, IC series for gates and ... Design : Standard forms of logical functions, SOP, POS, minterms, maxforms, K-map, IC series for combinational logic.

Unit-II : Multiplexers, demultiplexers, decoders, encoders, combinational logic design, adder & their use as subtractor, BCD arithmetic, ALU, Digital Comparators, parity generator/checkers, parity encoders/decoders, IC series for all these devices.

Unit-III : Sequential Logic Design : Resisters, application of shift registers, shift register structures, shift register applications, asynchronous counters, synchronous counters, Design of counters, speed, up-down counters, application of counters, introduction to various counters and shift register ICs, digital memory unit, types.

Unit-IV : Register Transfer Logic : Introduction, transfer, arithmatic, logic and shift micro operations, conditional control statements, overflow, arithmatic shifts, fixed binary data, decimal data, floating point data, nonnumeric data, instruction codes, design of computer.

Unit-V : Processor Organisation : (8086) : Register organisation, Architectures, signals, memory organisation, general bus operations, address, interrupt, Stack, stack memory unit, registers, introduction to various computer and memory organisation, memory organisation, general bus operations, address, interrupt, Stack, stack memory unit, registers, history, application of shift registers, application of shift register ICs, digital memory unit, types.

Unit-VI : Special Architectural Features and Programming : Stack, structure, interrupts, ISR, NMI & INTR, interrupt programming, interfacing memories, I/O ports, ADC, DAC.

Books :
2) Digital Integrated Electronics - Taub & Sehilling
3) Modern Digital Electronics - R.P.Jain
4) Digital Fundamentals 5/e (Indian Adaptation) - Floyd & Jain

Please note that the text is slightly distorted and some words are not legible. However, the overall structure and content are clear and readable.
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**BOOKS**

1. **C++ Programming using Java**
   - Introduction to Programming using Java
   - Creating, compiling, running Java programs
   - Java syntax, strings, operators, data types
   - Control structures: if-else, switch-case
   - Functions

2. **Data Structures and Algorithms in C++**
   - Algorithms for sorting and searching
   - Trees, graphs, and network analysis
   - Advanced data structures

3. **Object-Oriented Programming**
   - Introduction to object-oriented programming
   - Classes, objects, inheritance, and polymorphism
   - Exception handling and error reporting

4. **NP-Complete and Approximation Problems**
   - Complexity theory and polynomial time algorithms
   - NP-complete problems and approximation algorithms

**REFERENCES**

1. **Introduction to Algorithms**
2. **Algorithms**
3. **C++ and Java**
4. **Java 2 Essentials**
5. **Java 2 From Scratch**

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UNIT-I: Introduction to data communication, N/W application, telephone communication, hardware.

UNIT-II: Data communication hardware, N/W architecture, Hosts, clients circuits, data transmission.

UNIT-III: Data link layer: Access control, Error control, protocols; Trib N/W layer: Topology, Routing, standards, protocols, SNA.


UNIT-V: Backbone networks, Network design & implementation, N/W management, security.

UNIT-VI: Novell Netware: Introduction, Server, setting up server, netware commands.

Books Recommended:
1) Business Data Communications & Networking 5th edition - Jerry Fitzgerald, Alan Dennis (WE)
2) Data Communications, Communications and Open System - 2nd Edition, Fred Halsoll - Pearson
3) Computer Networking - Kurose & Ross - Pearson
4) Computer Network and Internet - 4th Edition - De Comer - Pearson
5) Communications, Systems and Networks - 2nd Ed. - Ray Horok (IDG)
6) Sklar - Digital Comm. - Pearson

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UNIT-1: System Analysis, Design and Software Engineering

Unit-I: SDLC: Goals, Computer Based Business System Life cycle. DFD, DFDS with case, structured methodology.

Unit-II: System Analysis: Goals and overviews, fact finding, interviewing, review, assignment, prototyping and 4GL, OOA.

System Design: Output design, formatting and designing reports, input design, file design, database design, network design, s/w design, implementation, maintainance and management issues.


Unit-V: System Design: Effective design, methods, interface design, documentation design.

Software Testing: Methods, Strategies, Art of designing, metrics, test reports.

Unit-VI: Software Engineering: Overview, reverse engineering, forward engineering, metrics for maintainance, Software Reuse, CASE Tools.

Books Required:
1) System Analysis and Design - Edwards
2) System Analysis & Design - Don Yates (M)
3) Fundamentals of System Analysis & Design - deitel, deitel & Associates
4) Engineering: Processes and Open Systems - Jim Rising (WE)

Books Recommended:
1) Netware Commands
2) Novell's Netware: Introduction, Server, setting up server
4) CCNP: CCNP: Certified Network Professional, 2nd Edition
5) CCIE: CCIE: Certified Internetwork Expert, 2nd Edition
8) CCIE: CCIE: Certified Internet Expert, 2nd Edition
9) CCNA: CCNA: Certified Network Associate, 2nd Edition
10) CCNP: CCNP: Certified Network Professional, 2nd Edition

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SEMESTER-II

2MCS1 SYSTEM SOFTWARE AND OPERATING SYSTEM

Unit-I :
Introduction, Basic Assembler functions, One-pass assembler, multi-pass assembler, loaders & linkers, relocation, linkage editor, dynamic linking.

Unit-II :
Compilers, phases of compilation, lexical analysis, parsing, compilation of expressions, control structures, code optimization.

Unit-III :
Functions of OS, types of OS, process management, states of processes, process scheduling algorithms, file management, space allocation techniques, directory types and structures.

Unit-IV :
Memory Management, partitioning, paging, segmentation, virtual memory management, demand paging, page replacement algorithms, thrashing.

Unit-V :
Space Allocation Techniques : Secondary storage, disk scheduling algorithms, concurrency control, deadlocks.

Unit-VI :

Books :
1) "S.S. & O.S." - D.M. Dhamdhere (TMH)
2) Operating System 3/e : Nutt Pearson
3) "Operating System Concepts" - Abraham Silberschatz, Peter B. Galvin, Greg Gagne - TMH
4) "Modern Operating Systems" - Tenenbaum Pearson Education
5) Deitel - Operating System - Pearson

2MCS2 WINDOWS PROGRAMMING

Unit-I :
Introduction to MFC : MFC class hierarchy, CWin ALP, CWnd, C Main Frame classes, handling windows, messages in MFC.

Unit-II :
Graphic Device Interface (GDI) : C Client DC, C Window DC, C Paint DC classes, stock GDI project, color and fonts, drawing shapes and curves, C Bitmap, C Brush, C Pen, C Font, C Pallette, C Pen, C Rgn Classes.

Unit-III :
Windows Control and Dialogue : C Progress Ctrl, C Slider Ctrl, C Spin Button Ctrl, C List Ctrl, C Tree Ctrl classes, C fileDialog, C Color Dialog, C Font Dialog, C Print Dialog, classes.

Unit-IV :
Menus and Accelerators : Command Processing C Menu, Cemd UI classes. Floating popup menus : Keyboard, accelerator, file menus, enabling, disabling menu items. Multithreading :... Synchronization, critical section : Critical section, C mutex, C semaphore.

Unit-V :

Unit-VI :

Case Study : Calendar and Web browser controls ODBC, OLE, DAO.

Books :
1617

MCS 3 MICROPROCESSOR PROGRAMMING AND INTERFACING

UNIT-I: Introduction to Pentium Microprocessor:
- Microprocessor introduction, evolution of MP, block diagram, MP operation, hardware/software requirements, PC, developing software for previous Intel Mps.

UNIT-II: Instructions:
- Introduction, ALP, Pentium instructions, addressing modes, instruction examples: processor flags, data transfer, strings, arithmetic, logic, bit manipulation, program transfer, processor control.

UNIT-III: Memory & I/O Interface:
- Memory devices, address decoding, 8086 memory I/f, Pentium memory I/f, I/O interfacing, address decoding, PPI, Kbd I/f, display I/f, 8254, PCI, ADC, DAC.

UNIT-IV: Interrupts:
- Introduction, basic interrupt processing, hardware interrupts, PIC, RTC, Introduction to DMA.

UNIT-V: Arithmatic Coprocessor:
- 80x87 architecture, preliminary instructions, Bus I/f: ISA, GISA, VESA, PCI.

UNIT-VI: Advance Programming with I/f:
- Programming with DOS and BIOS functions, calls, keyboard, video, speaker, printer control & programming, command line interface, advance programming applications: Mouse, TSR, Interfacing C with ALP.

BOOKS:
1) The Pentium Microprocessor: Antonakos Pearson
2) The Intel Microprocessors - Brey - Pearson
3) Assembly Language Programming for PC - Socha & Norton (PHI)
4) IBM PC Assembler Language Programming - Peter Abel - Pearson 5/e
5) Essentials of Assembly Language Programming for the IBM PC - Rajaraman, T., Radhakrishnan (PHI)
6) Fundamentals of Assembly Language Programming - Xefiner (GP)

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2MCS 4 COMPUTER GRAPHICS AND IMAGE PROCESSING

UNIT-I: Geometry and Line Generation:
- Overview, pixel, and frame buffers, vector and character generation, displaying framebuffer.

UNIT-II: Graphics Primitives:
- Overview & Introduction, display file, display control, text line style primitives.

UNIT-III: Transformations:
- Scaling, Sin & Cos, Rotations, translation, other transformations and display procedures.

UNIT-IV: Segments:
- Operations on segments, Image transforms, display file structure.

UNIT-V: Viewing:
- Transformation, implementation.

UNIT-VI: Clipping:
- Various clipping operations.

UNIT-VA: 3D Geometry:
- Overview, transformations, projections algorithms for hidden surfaces and lines shading and curves.

UNIT-VB: Image Processing:
- Overview of image processing techniques, two dimensional systems and mathematical preliminaries.

UNIT-VI: Image Enhancement:
- Applications, image filtering, edge detection, noise removal, image enhancement, scaling, and quantization.

BOOKS:
3) Fundamentals of Digital Image Processing: A.K. Jain...
4) Digital Image Processing using MATLAB: Gonzalez (PE)
5) Image Processing using C: Gonzalez (PE)
6) Computer Graphics 80 x 87: Xefiner (GP)

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1MCS 5 ADVANCE COMPUTER NETWORK

UNIT-I: Introduction, overview, Network Core, media, delays, models, Internet backbones, NAP & ISP, History.

UNIT-II: Application Layer:
- Principles of Application Layer protocol, HTTP, FTP, e-mail in Internet, DNS.

UNIT-III: Transport Layer:
- Services and Principles, multiplexing and demultiplexing applications, connection-less transport: UDP.

UNIT-IV: Network Layer:
- Introduction, basic Internet addressing.

UNIT-V: Link Layer:
- Introduction, basic Ethernet protocols.

UNIT-VI: Physical Layer:
- Introduction, basic physical layer protocols.

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MICROPROCESSOR PROGRAMMING AND INTERFACING
2021

MPEG, hypertext, MHEG, hypermedia, document architecture, SGML, OOA. Augmented and Virtual reality & Multimedia: Concept, VR devices, VR chair, CCD, VCR, 3D sound system, head-mounted display.


Books:

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2MCS5 (4) COMPUTATIONAL SCIENCE


Unit-II: Graph Theory: Introduction, notations, definitions, path and connectivity types, subgraphs, isomorphic graphs, representation, Eulerian and non-Eulerian graphs, trees.


Unit-IV: Finite Automata: DFA, NFA, completion, regular expressions.

Unit-V: Context Free Languages: CFG, PDA, PDA & CFG, properties, parsing.

Unit-VI: Turing Machines: Definition, computation, computing, examples, extensions, NFA, Turing machines, regular expressions, NFA, completion, DETERMINISTIC FINITE AUTOMATA.

Books:
2) Elements of Theory & Computations: Levitin & Papadimitrou - PHI.
3) Introduction to Automata Theory & its Applications: V.Krishnamurthy - (EWP).
4) Automata & Theoretical Computer Science: Regev - Pearson.
5) Introduction to Automata Theory & its Applications: Hopcroft, Motwani, Ullman.

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2MCS6 COMMERCE


Unit-II: Scanning and Parsing Techniques: The Scanner, parser, translation, symbol table organization, structures.

Unit-III: Memory Allocation: Static and dynamic memory allocation, array allocation and access, allocation for strings, structure allocation, introduction to compilation of expressions.

Unit-IV: Compilation of Control Structures: Control transfers, procedural calls, conditional execution, instruction execution, conditional execution, instruction execution, control structures.

Unit-V: Error Detection, Indication & Recovery: Error detection, indication, recovery, compilation of I/O Statements: Compilation of I/O list, compilation of FORMAT list.

Unit-VI: Code Optimization: Major issues, optimising transformations, local optimization, global optimization, common subexpression elimination, temporary allocation and access, allocation for strings, structure representation.

Books:
1) Compiler Construction: D.M. Dhandhere (M).
2) Compiler Writing: Tremble-Sorenson (TMH).

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2MCS7 COMMERCE


Unit-II: Scanning and Parsing Techniques: The Scanner, parser, translation, symbol table organization, structures.

Unit-III: Memory Allocation: Static and dynamic memory allocation, array allocation and access, allocation for strings, structure allocation, introduction to compilation of expressions.

Unit-IV: Compilation of Control Structures: Control transfers, procedural calls, conditional execution, instruction execution, conditional execution, instruction execution, control structures.

Unit-V: Error Detection, Indication & Recovery: Error detection, indication, recovery, compilation of I/O Statements: Compilation of I/O list, compilation of FORMAT list.

Unit-VI: Code Optimization: Major issues, optimising transformations, local optimization, global optimization, common subexpression elimination, temporary allocation and access, allocation for strings, structure representation.

Books:
1) Compiler Construction: D.M. Dhandhere (M).
2) Compiler Writing: Tremble-Sorenson (TMH).

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Distribution of Marks for Computer Lab.-I & Lab.-II

A) Each student shall perform two practicals.
B) Questions slip for each examinee shall be based on an answer book.

C) Marks should be given on the basis of the following breakdown:

- I) Practical-I: 12 Marks
- II) Practical-II: 12 Marks
- III) Viva-Voce (each practical 10 marks): 20 Marks
- IV) Record Book: 06 Marks

Total: 50 Marks

Syllabus prescribed for M.Sc. Part-II Semester-III (Computer Science)

3MCS1WEB TECHNOLOGIES AND PROGRAMMING

Unit-I: Internet
- History, growth, architecture, applications, impact on society, services on the internet, protocols, IP addresses, and computer networks.
- DNS, setting up internet, WWW: Web and its components.
- Browsing tricks.
- Emails: Mail servers and networks, protocols, clients.
- FTP: Servers, clients, Telnet, IRC.

Unit-II: E-Commerce
- Perspectives of e-commerce, framework, information management, EC on private networks, EDI, EC on the web, EC models, issues, applications, future.
- EC practices, benefits, limitations, EC payment, transactions, EC model, online banking.

Unit-III: Web Servers
- PWS, PWS setup, starting DNS, creating a site on your own computer, publishing information, preparing applications, dynamic application, using databases, IIS, Apache, Jigsaw, proxy servers.

Unit-IV: HTML4
- Introduction, common tags, text styling, linking, images, lists, format, tables, forms, games, meta tags, CSS.

Unit-V: Javascript
- Using JS, arithmetic, decision making, objects, sub-objects, methods, control structures, functions, arrays.
- JDBC / ODBC introduction.

Unit-VI: ASP
- Introduction, working with ASP, client-side scripting, server-side scripting, simple ASP example, server-side activeX components, file system objects, session tracking, cookies, accessing database for ASP.
- Introduction to JSP, Web authoring tools.

Books:
1. IT Tools and Applications (M)
2. Bridge to Online Storefront (M)
3. Internet and Web Design (M)
4. Internet & Web Design (M)
5. Web 101: Internet Programming (M)
6. Active Server Pages 3.0: Lehnert & Pearson
7. Active Server Pages 3.0: N. Chare (Que)
8. Frontiers of E-Commerce: Kolkata & Whitson (Pearson)
9. Modern Database Management System Concepts (M)
10. Database Management System (M)
11. Fundamentals of Data Base Systems (M)
12. Fundamentals of Data Base Systems (M)
13. Fundamentals of Data Base Systems (M)
14. Fundamentals of Data Base Systems (M)
15. Fundamentals of Data Base Systems (M)
16. Fundamentals of Data Base Systems (M)
17. Fundamentals of Data Base Systems (M)
18. Fundamentals of Data Base Systems (M)
19. Fundamentals of Data Base Systems (M)
20. Fundamentals of Data Base Systems (M)
21. Fundamentals of Data Base Systems (M)
22. Fundamentals of Data Base Systems (M)

WEB TECHNOLOGIES AND PROGRAMMING

MSE-PART-I Semester-III (Computer Science)

Syllabus prescribed for

Grades: A, B, C, D, E

Distribution of Marks:

(1) A: 50
(2) B: 40
(3) C: 30
(4) D: 20
(5) E: 10

Note: Students should ensure they complete all the units on time.
UNIT-1: Overview of Microcomputer system, instruction prefetch, interrupts, I/O techniques, controllers & error detection, peripheral devices. PC-overview, Hardware-BIOS-DOS interaction, mother board logic, memory & I/O addressing, wait state, interrupts & controller.

UNIT-II: Mother Board of IBM PC: Support chips : 8284, Bus controller, 8259, 8253, 8255A, 8237. Mother board functions, Reset logic, CPU logic, other logics, and I/F.


UNIT-IV: HDC: Overview, interfacing, controller ports, commands, design & types, display: CRT display, controller, adapter.

UNIT-V: PC Installation and Maintenance: Planning, installations, checks, configuration, upgradation, softwares, movement, maintaining, computer faults, diagnostic procedure & tools.

UNIT-VI: PC Troubleshooting: Bus faults, Symptoms, diagnosis, Rectification, POST, diagnostic softwares, checks, motherboard problems, peripheral problems, IC faults, measures.

BOOKS:
1) Pentium Microprocessors: Antonakos Pearson
2) IBM PC Maintenance; Troubleshooting- Govindrajalu - TMH.
3) Intel Microprocessors - Bany Brey - Pearson
4) Using A2-P - Allan Wyatt.
5) The 8088 & 8086 microprocessors - Pearson Tribel

UNIT-I: JDBC: Overview, JDBC-ODBC bridge, Java SQL package and JDBC related classes, Architecture of JDBC application, creating C-S Application using JDBC oracle / Access databases.

UNIT-II: Servelets: Methods of Interface servelets, Important methods of class http servelet, Hipp servelet request, Http servlet response, Http get & post, cookies, methods of class cookies, session tracking, C-S application using servelets.

UNIT-III: RMI: Temperature Server interface, class temperature servelet, weather server class, temperature client class, wether display class, Discovery class, Discovery of temperature servelet application, temperature client application, temperature server application, run & execute.

UNIT-IV: Networking: Loading from URL, reading through URL, server portion of C-S stream socket, demonstrating client and server side, C-S application.

UNIT-V: Java beans: Windows of Bean, Property, move cursor, resize cursor, selecting event, target selector line, interaction between Explicit Button and Juggler.

UNIT-VI: Java beans Contd.: File dialog, other dialog, applet, applet running, standalone application, contents of logo animator jar, loading bean, animation, setting up event, class sliderfield panel, selecting property.

BOOKS:
1) Java How to Program: Deitel & Deitel Pearson
2) Inside Servelets: D.R.Collaway Pearson
3) Java 2 Complete Reference: Schidlt & Maughta (TMH)
4) Using Java 2 Platform - D.L.Weber - PHI

UNIT-I: EC Troubleshooting: EC Troubleshooting, EC Troubleshooting, EC Troubleshooting.

UNIT-II: EC Installation and Maintenance: EC Troubleshooting, EC Troubleshooting, EC Troubleshooting.


UNIT-IV: Advanced Microprocessor Devices: Overview of Microcomputer system, Instruction register, peripherals.
UNIT-VI: Memory Management and System

Initialization: Objects in C, Scope, lifetime, automatic allocation, static allocation, difference dynamic allocation, recursions using shared memory concept and its access. Introduction to system initialization.

Books:
1) Fundamentals of Embedded Software: Lewis Pearson
2) An Embedded Software Primer: Simon Pearson
3) 8051 Microcontroller and Embedded System: Mazidi and Mazidi

UNIT-I: Need for Object-Oriented Programming:

Procedural Languages, object-oriented approach, advantages, characteristics, characterization of OO languages, object, classes, inheritance, reusability, new data types, polymorphism, and overloading.

UNIT-II: Object-Oriented Design:

Object structure concept, object types, attribute types, association types, object behavioral types.

UNIT-III: Methodology for Object-Oriented Design:

Booch methodology, Chen and Chen methodology, design modelling, system design, life cycle, model types, iteration hierarchy, packaging strategy, checkpoint strategy.

UNIT-IV: Overview of Object-Oriented Programming:

(C++ / Java) Loops, decision, structures, functions, objects and classes, arrays, pointers, inheritance, virtual functions.

UNIT-V: Object-Oriented Databases:

Relational vs object-oriented databases, the architecture of OO databases, query language of OO databases, Gemstone/O2/Oerien distributed object-oriented system, Object Management Group, CORBA.

UNIT-VI: Object-Oriented Software Engineering:

Object-oriented system, concept and management issues, OOA, object-oriented design and testing, OO metrics, OMT technology.

Books:
1) Object-Oriented Software Development: McGregor and Kykes (Van Nostrand)
2) C++ Programming Language 3/e: Stroustrup
3) Object-Oriented Programming in C++: Laffore (GP)
4) Object-Oriented Programming in C++: (M)
5) Object-Oriented Programming using C++: 2/e by Pohl - Pearson

NETWORK SECURITY

Unit-I: Introduction:


Unit-II: Cryptography:

Introduction, Symmetric Cryptography, Hashes and Message Authentication.

Unit-III: Authentication:

Overview of authentication system, protocols, keys, intermediaries, authentication of people, security services for remote, single sign-on, and Kerberos.

Unit-IV: Standards:

Kerberos vs. X.509, PKI, Smart Cards, PKCS, S/MIME, SSL, TLS, IPSec, AH & ESP, Overview of PKI, PKCS, IPSEC, AH, ESP.

Unit-V: Email Security:

Distribution lists, store and forward, security services for email, establishing keys, privacy, authentication of source, message integrity, non-repudiation, and delivery.

Unit-VI: Firewalls:

Packet filters, application level gateways, encrypted tunnels, comparisons.

Books:
1) Network Security: Kaufman, Perlman, Speciner (Prentice Hall)
2) Network Security: Ankit Fadia (M)
3) Network Security Essentials by Stallings (Pearson Education)
Unit-I: Testing
Introduction and Outline
- Introduction to testing and test outline
- Sample application
- Incremental testing approach
- Outline approach steps
- Evaluation and schedule estimation

Unit-II: Testing
- Introduction to test outline to test cases
- Creating test cases
- Documentation shortcuts
- Introduction to using tables and spreadsheets
- Sample applications
- Documenting test cases

Unit-III: Other types of tablets
- Introduction to tablets, slate machine, test case table with multiple inputs
- Decision tables
- Application with completed data
- Managing tests
- Testing object-oriented software
- Comparison system testing example
- Unit testing of Classes

Unit-IV: Testing Web Applications
- Introduction, sample application
- Functional and stability issues
- Configuration and compatibility testing
- Reliability and availability
- Security testing
- Database testing
- Post examination testing

Unit-V: Reducing the No. of test cases
- Introduction
- Prioritization guidelines
- Priority category
- Scheme
- Risk analysis
- Interviewing to identify problem areas
- Combination schemes
- Trading selected test cases

Unit-VI: Creating Quality Software
- Introduction
- Development environment
- Software testing environment
- Software testing tools
- Applying software standards to test documentation

Books:
1) Introducing Software Testing: Louise Tamres (PE)
2) Software Testing in the Real World: Kit - Pearson
3) Computer Oriented Numerical & Statistical Methods
   and Optimization Techniques
   UNIT-I: Iterative methods
   - Introduction, Roots of equations
   - Transcendental equations and their solution
   - Bisection method
   - False position method
   - NR method
   - Direct solution of simultaneous equations
   - Gauss elimination
   - Gauss-Seidel
   - Gauss-Jordan methods
   - Interpolation techniques

   UNIT-II: Numerical Differentiation
   - Numerical Integration
   - Solution of Differential equations

   UNIT-III: Sampling, Frequency distribution
   - Measures of Central tendency & Dispersion
   - Moments
   - Discrete distribution
   - Binomial Distribution
   - Poisson distribution
   - Hypergeometric distribution

   Curve fitting: Linear least square fit, Nonlinear fit, Fitting of polynomial

   UNIT-IV: Coefficient of correlation, Properties, Multiple, Partial & rank correlation
   - Test of significance: Y^2 test, t test, F-Test
   - Introduction to Dynamic programming

   UNIT-V: Linear programming, Formulation of models, Graphical solution
   - Constraints
   - Minimization
   - Simplex method
   - Transportation problem
   - Integer programming, Branch & Bound algorithm & applications
   - Inventory models
   - Introduction to sequencing problem

   UNIT-VI: Random variable concept, Polynomial & Simple regression
   - Decision theory
   - Game theory

Books:
1. Computer oriented Numerical Methods - V. Rajaraman (PHI)
2. Computer Oriented Statistical & Numerical Methods - E. Balaguruswamy (M)
3. Introduction to Operation research - Gillett (TMH)
5. Statistics - Murray R. Spiegel (MCG)
6. Probability & Statistical for Engineers - Irwin Miller John E. Freund
7) Operations Research by Natarajan - Pearson
8) Operations Research - Taha - Pearson
9) Mathematical Statistics by Hogg - Pearson
I) Practical-I : 12 Marks
II) Practical-II : 12 Marks
III) Viva-Voce (Each practical 10 marks) : 20 Marks
IV) Record Book: 06 Marks
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Total 50 Marks
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SEMESTER-IV
4MCS1 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM

UNIT-I :
Prolog Programming:
Introduction to turbo prolog, introduction to language, structure of language, cut, fail, recursion, lists and complex structures, programming practice, interactive programming, expert system in prolog.

UNIT-II :
Introduction:
Definition of AI, AI techniques, tic-tac-toe, pattern recognition, level of the model, criteria for success, problems ... characteristics, decomposition of problems, solution steps, predictability, absolute and relative solutions.

UNIT-III :
Basic problem solving methods, reasoning, problem trees and graphs, knowledge representation, matching indexing with variables, heuristic functions, weak methods, problem reduction, constraints satisfaction, means-ends analysis, analysis of search algorithms.

UNIT-IV :
Games playing:
Minimax search procedure, adding alpha-beta cutoffs, additional refinements, waiting for quiescence, secondary search, using book moves limitations.

UNIT-V :
Knowledge representation using predicate logic:
Representing simple facts in logic, augmenting the representation, structural representation of knowledge: some common knowledge structures, choosing the level of representation, finding the right structure as needed, declarative representation.

UNIT VI :
Natural Language Understanding:
Concept of understanding, key word matching, syntactic and semantic analysis, understanding, language generation and machine translation, foundations of knowledge representation and modeling, knowledge representation, learning, rule based systems, semantic of knowledge representation, knowledge engineering artificial neural net:

Books:
1) Artificial Intelligence by Elaine Rich, Mcgrawhill Inc.
2) Artificial Intelligence and Expert Systems - Jankiraman, Sarukesi
3) Expert System : Theory and Practice - Ermine (PHI)
4) Turbo Prolog - Nath (GP)
5) List Programming - Rajeo Sangal - Pearson
6) Prolog Programming and Applications - Burnhan & Hall
7) ES : Theory and Practice - Emme & Hall
8) Pattern in Modern Pattern Generation - P.C.Verma & Pillay
9) A/V System - Pearson
10) Principles of AI - Nilson
11) Introduction to Expert Systems - Pearson
12) Introduction to Expert Systems - Prentice Hall
13) Expert System - Prentice Hall
14) Artificial Intelligence - Russell
15) Artificial Intelligence - Nilsson
16) Basic Algorithms - Engelman
17) UNIX System V - Prentice Hall
18) UNIX System V - Prentice Hall
19) UNIX System V - Prentice Hall

UNIT A:
Introduction to Parallel Processing:
Parallelism in uniprocessor systems, parallel computer architectures, Architectural classification schemes, Instruction and arithmetic pipelines, Principles of Designing pipelined processors, VLSI design considerations.

UNIT B:
Pipeline computers and vectorization methods:

UNIT C:
SIMD Array Processors, SIMD Interconnection Networks, Parallel Algorithm for Array Processors, Designing Parallel Computers.

UNIT D:

UNIT E:
Artificial Intelligence & Expert System

Satisfactory

Total 50 Marks

Notes:
By Record Book : 06 Marks
II. Viva-Voce (Prepared on 10 Marks) : 02 Marks
II. Practical-I : 12 Marks
II. Practical-II : 12 Marks


UNIT-VI : Data flow computers, VLSI computations and Neural Networks, Data-Driven Computing & languages, Control-flow versus Data flow Computers, Data flow graph and languages, VLSI Arthemetic Modules, Partitioned Matrix Algorithms, Matrix Arithmetic pipelines, Real-time Image processing.

UNIT II : Implementing processes, parallel systems, interprocess communication, process design techniques-II. (For UNIX & WIN NT)

UNIT III : Memory management, Virtual memory, Virtual memory systems, design Techniques III (For UNIX & WIN NT)

UNIT IV : I/O devices, IO systems, file systems, file system organisation. Design techniques IV. (For UNIX & WIN NT), Introduction to resource management & client server.


UNIT VI : CASE STUDY: UNIX
Understanding Unix commands, Utilities (General purpose), file systems, shell, vi editor, file attributes filters, mail, Shell programming, system administration features of LINUX & PERL

BOOKS :
1) Operating system : Design oriented approach : Charles Crowley - TMH
2) Peter Norton's complete Guide to WIN 95 : Peter Norton, John Muller. - TMH
3) UNIX concept & applications : Das - TMH

REFERENCES :
1) Design of UNIX OS - Bach - Pearson
2) Modern O.S. - Tanenbaum - Pearson
3) UNIX - Sanitabh Das - PHI
4) Unix - Sanitabh Das - PHI
5) Modern O.S. - Tanenbaum - Pearson
6) Design of UNIX OS - Bet al. - Pearson

4MCS3 MOBILE COMMUNICATIONS

Unit-I : Mobile Communication :
Applications, history, market, simplified reference model. Frequencies, signals, antennas, signal propagation, introduction to multiplexing, modulation, spread spectrum concept, cellular system.

Unit-II : Medium Access Control :

Unit-III : Satellite Systems :
History, applications, basics, routing, localisation, hardware, examples. Broadcast Systems :
Overview, cyclical repetition of data, digital audio & video broadcasting, convergence.

Unit-IV : Wireless LAN :
Infrared versus Radio Transmission, infrastructure and adhoc network, IEEE 802.11, HIPERLAN, Bluetooth.

Unit-V : Layers :

Unit-VI : Support for mobility :
Introduction to file systems, www, JAVA, WAP, i-mode.

BOOKS :
1) Mobile Communication : Jochen Schiller (PE)
Operating decision support systems, especially with regard to computer applications, provides a powerful tool for decision making. Key skills in this area include understanding the process of making decisions, selecting appropriate decision support systems, and evaluating the effectiveness of these systems. The integration of human and computer intelligence is crucial for effective decision support.

### Unit I: Decision Making and Computerised Support

**Introduction:**
- Managerial issues and the need for decision support systems.
- Game theory and its application to decision making.
- Group support systems (GSS) and expert systems.
- Artificial intelligence (AI) and its role in decision support.
- Neural networks and their application in decision making.

**Books:**
1. *Decision Support Systems and Intelligent Systems* by Turban
2. *Advanced Intelligent Systems* by N. C. Roy

### Unit II: Decision Support Systems

**Introduction:**
- DSS configurations and characteristics.
- DSS components and data management.
- Knowledge management and decision support systems.

**Books:**
1. *Decision Support Systems and Intelligent Systems* by Turban
2. *Advanced Intelligent Systems* by N. C. Roy

### Unit III: Collaborative and Communication Issues

**Introduction:**
- Group support systems (GSS) and their role in decision making.
- Communication and collaboration in decision support.

**Books:**
1. *Decision Support Systems and Intelligent Systems* by Turban
2. *Advanced Intelligent Systems* by N. C. Roy

### Unit IV: Fundamentals of Intelligent Systems

**Introduction:**
- Knowledge-based decision support systems.
- Expert systems (ES) and their working.
- Problem areas and benefits of ES.

**Books:**
1. *Decision Support Systems and Intelligent Systems* by Turban
2. *Advanced Intelligent Systems* by N. C. Roy

### Unit V: Advanced Intelligent Systems

**Introduction:**
- Neural computing and its application to DSS.
- Artificial intelligence and its role in advanced systems.

**Books:**
1. *Decision Support Systems and Intelligent Systems* by Turban
2. *Advanced Intelligent Systems* by N. C. Roy

### Unit VI: Implementation, Integration and Impacts

**Introduction:**
- Implementation issues and strategies.
- Integration of ES and DSS.
- Impact of MIS and intelligent systems.

**Books:**
1. *Decision Support Systems and Intelligent Systems* by Turban
2. *Advanced Intelligent Systems* by N. C. Roy

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**Robotics and Computer Vision**

**Unit I:** Basic concepts in Robotics
- Advantages and applications of Robotics.
- Basic structures of Robots.
- Numerical controls of machine tools.

**Unit II:** Hydraulic systems
- Direct current servomotors.
- Control approaches of robots.

**Unit III:** Necessity of Interpolators
- Trajectory planning.
- Interpolator structure.

**Unit IV:** Specifications of Robots
- Robot systems.
- Co-ordinate systems.

**Unit V:** Rossum's universal Robots
- Basic concepts in Robotics.
- Advantages and applications.

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**Decision Support Systems**

**Unit I:** Introduction to DSS
- Decision support. Support systems. Decision support systems.
- Decision support systems: a review.

**Unit II:** Decision support systems: a review
- Decision support systems: a review.
- Decision support systems: a review.

**Unit III:** Decision support systems: a review
- Decision support systems: a review.
- Decision support systems: a review.

**Unit IV:** Decision support systems: a review
- Decision support systems: a review.
- Decision support systems: a review.

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**Books:**
1. *Decision Support Systems and Intelligent Systems* by Turban
2. *Advanced Intelligent Systems* by N. C. Roy

Installation of a Robot, a plant survey, selecting a Robot, Economic analysis, A case study, Robot safty.

UNIT-V: Sensor and Intelligent Robots, Environment - Robot interaction in automatic gripping as monitored by proximity sensor, Infrared proximity detection, object detection, ... visual information, optical illusions and image comprehension by a Robot, Cameras for industrial robots, choice of systems.

UNIT-V: Application of Robots: Handling, loading and unloading single - machine tool, several single machine tool, several machines, The manufacturing process. Task programming, Features of Assembly Robots, Design for Automatic assembly, Drilling, Deburring metal parts.

BOOKS:
1. Introduction to Robotics - J.J.Craig - (AW)
3. Robotic Engineering & Integrated Approach - Klafter, Chmielewski, Negin (PHI)
4. Robotic Technology Volume-I: Modelling & Control - Parent
5. Robotic Technology Volume-I: Control & Robots - Parent
7. Robotics Revolution - Peter B.Scott.
9. Robot Technology Volume-II (Kogan Page Ltd., London NI) [Unit 5]

REFERENCES:
1. Introduction to Robotics - Niku - Pearson
2. Decision Support Systems & Intelligent Systems - Turban - Pearson

PROJECT/SEMINAR:
1. Each student shall be asked to prepare a project report based on the practical work done in the laboratory.
2. The project report shall be submitted in the format prescribed by the examination board.
3. The project report shall be submitted to the project coordinator.

APPLICATION AREAS:
2. Robotics.
5. Intelligent Systems.
8. Neural Networks.

4MCS 4COMPUTER LAB-VII
Practicals based on 1, 2 & 3.
Distribution of Marks for Computer Lab.-I & Lab.-II
A) Each student shall perform two practicals.
B) Questions slip for each examinee, shall be based to answer books.
C) Marks should be given on the basis of the following break up:
   I) Practical-I: 12 Marks
   II) Practical-II: 12 Marks
   III) Viva-Voce (Each practical 10 marks): 20 Marks
   IV) Record Book: 06 Marks
   ----------------------------------------Total: 50 Marks
   ----------------------------------------

4MCS V & VIPROJECT/SEMINAR:
Should be selected on most current topic. Most of the advance feature should be included. Report be submitted in two copies in CD form.
(Note: Education tour / industrial visits may be arranged time to time and as per need.)
a) Distribution of Marks For Project/Seminar:

A) Each student has to submit project report he has undertaken neatly typed / handwritten.

B) Each student has to demonstrate his project to the examiner and has to face Viva-voce from which marks be allotted as follows:

- Internal performance:
  - Regularity -- 2.5
  - Performance (Internal Examiner) -- 2.5
  - Job Work -- 2.5

- External performance:
  - Contents -- 2.5
  - Viva-voce (External Examiner) -- 2.5
  - Demonstration -- 2.5

Total -- 150

b) For Seminar (By Internal Examiner Only):

- Contents -- 10
- Presentation / Delivery -- 10
- Viva-voce -- 15
- Reference / Topic Section / Literature Survey -- 15

Total -- 50

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### M.Sc. Semester I to IV Examination in Computer Science

**Prospectus No.20101216**

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