M.Sc.
Computer Science

Prospectus No. 20111216

संत गाडगे बाबा अमरावती विद्यापीठ
SANT GADGE BABA AMRAVATI UNIVERSITY

विज्ञान विद्याशाखा
(FACULTY OF SCIENCE)

PROSPECTUS

PRESCRIBED FOR

M.Sc. Semester I & III W-2010

and Semester II & IV S-2011

IN

COMPUTER SCIENCE

2010

Visit us at www.sgbau.ac.in

Price Rs. 8 /-

PUBLISHED BY
Dineshkumar Joshi
Registrar
Sant Gadge Baba
Amravati University
Amravati-444602

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 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 (relevent extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Inprovement of Division (Higher Class) and getting Distinction in the subject and condonation of defficiency of marks in a subject in all the faculties prescribed by the Statute NO.18, Ordinance 2001.
Ordinance No. 9	:	Conduct of Examinations (relevent 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.

Ordinance No. 6/2008	:	For improvement of Division/Grade.
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.

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) Syllabus has been divided into units equal to the number of question 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) Number of question will be in accordance with the unit prescribed in the syllabi for each paper i.e. there will be one question on each unit.

(3) For every question long answer type or short answer type there will be an alternative choice from the same unit. However, there will be no internal choice in a question.

(4) Division of marks between long answer and short answer type question will be in the ratio of 40 and 60

(5) Each short answer type question shall contain 4 to 8 short sub question 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 flip-flops.
Combinational Logic Design :
Standard forms of logical functions, SOP, POS, minterms, maxforms, K-map, IC series for combinational logic.

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

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

Unit-IV : **Register Transfer Logic :** Introduction, inter register 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, generle bus operation, I/O addressing, special processor activities, minimum and maximum mode, instruction formats, addressing modes, important instructions, assembler directives and operators.

Unit-VI : **Special Artchitectural features and programming :**
Stack, structure, interrupts, ISR, NMI & INTR, interrupt programming.
Interfacing memories, I/O ports, ADC , DAC.

Books :

1) Digital Logic and Computer Design - M.Morris Mano Pearson.
2) Digital Integrated Electronics - Taub & Sehilling
3) Modern Digital Electronics - R.P.Jain
4) Digital Fundamentals 3/e (Indian Adaptation) - Floyd & Jain - Pearson.

5) Digital Design - Mano - 3/e - Pearson
6) Digital Design - Wakerly - Pearson
7) Advance Microprocessors and Peripherals - Ray & Bhurchandi - TMH
8) Microprocessors and Interfacing : D.V.Hall (TMH)
9) Microprocessors - M.Rafiquezaman (PHI)
10) Microprocessor based system Design - Ghoshal (M)
11) Microprocessor Architecture and Programming - R.S.Goonkar (PRI)

*****

1MCS2 DATA STRUCTURES AND ALGORITHMS (C++)

Unit-I : **Arrays, Records, Stacks and Queues, linked list :** Algorithms and operations on these data structures.

Unit-II : Tree, tree traversals, threaded binary tree, Height balanced tree, graph, multidimensional array, graph traversals, minimum spanning tree.

Unit-III : **Searching & sorting techniques :** Bubble sorting, insertion sort, selection sort, shell sort, heap sort, merge sort, algorithms, recursive quick sort, sequential searching, binary search, hashing, indexed search techniques.

Unit-IV : **File Organisation :** Sequential File organisation, index sequential files, hash files, file security.

Unit-V : Introduction algorithms and their analysis, divide & conquer, gready methods, optimal storage on type, job requesting, back tracking, 8 queens problem, knapsack problem, branch & bounds, lower bound theory.

Unit-VI : **NP hard and NP complete problems :** Basic concepts, Cook's theorem, NP hard graph problems, NP hard scehduling problems, NP hard code generations.

Books :

1) Data Structures and Algorithms in C++ - B.R.Weiss Pearson (Reference)
2) Kamthane - Int. to Data structure in c - Pearson
3) Computer Algorithms - Baase & Gelder Pearson
4) Data Structure using Java, L/C : Langman - Pearson
5) Introduction to Data Structure - Trenble, Sorenson.
6) Introduction to Data Structure - Bhagat Singh, Nops.
7) Fundamentals of Computer Algorithm : Horowitz & Sahani.
8) Design & Analysis of Comp.Aho & Ullamann- Pearson
9) Algorithms with C - K. London (SPD)
10) Levitin - Int.to Design & Analysis of Algorithms - Pearson
11) Bandopadhyay - Data Structuring C - Pearson
12) Aho - Data Structures & Algo - Pearson

*****

1MCS3 OBJECT ORIENTED PROGRAMMING

Unit-I : **Introduction :** History of C++ and Java, Structured programming, Internet & WWW, basics of Java environment.
Java Application : Introduction, simple program, memory concepts, arithmetic, decision making.
Java Applets : Introduction, Sample applets example.

Unit-II : **Controlled Structures :** if, if-else, while, for, switch, do, break, continue.
Methods : Introduction, definition, math, Java application package, scope rules, recursion, over loading, abstraction.

Unit-III : **Arrays :** Introduction, declarations, allocations, parameters, passing arrays to methods, sorting and searching arrays, multidimentional arrays. String & characters : Class, constructors, methods.

Unit-IV : **Object Oriented Programming :**
Object based programming : Introduction, class scope, controlling, access, creating package, constructors, visuasability, instances, reference, finalisers, abstraction, information hiding.

Unit-V : **Exception Handling & Multithreading :** Exception handling : Introduction, error handling, techniques, throwing, catching.
Multithreading : Thread Class & Method, thread state, priority, scheduling, synchronisation, groups.

Unit-VI : **Graphics & Multimedia :**
Graphics : 2D Graphics, Java 2D API, shapes, GUI Introduction, suins overview, event handling, creating textarea, panel, slider, menus box.
Introduction to Multimedia using Java.

Books :

1) Java How to Program : Dietel & Dietel Pearson
2) Core Java - Vol.II : Advance Features 5th Ed : Hortsman Pearson
3) Inside Servlets - D.R.Callaway Pearson
4) Java A primer - Balguruswamy (TMH)
5) C++ & Java - Sananta (PHI)
6) Java Programming Language - 3rd Ed. Arnold, Gusling, Holmes Pearson
7) Java 2 Essentials - Horstman (W)
8) Java 2 From Scratch - Itecines (Que)
9) Designing Java 2 : I.Hortou (SPD)
10) Cadenhead - Java 2 in 21 days - Pearson

*****

1MCS4 DIGITAL COMMUNICATION & NETWORKING

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

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

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

UNIT-IV : LAN & WAN : Introduction, components, IEEE, Performance,

WAN : DDD, AT&T, WAIS, Dedicated ckt services, ISDN, PSN, ATM, interfacing networks.

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

UNIT-VI : Novelle 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

*****

1MCS5 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-III : **Software Project Management :** Concepts, Software metrics, Software Project Planning, Software Project estimation, models, risk management, project scheduling and tracking, configuration management.

Unit-IV : **Software Maintenance :** Reverse Engineering, SQA, software reliability, ISO standards.
Software Requirements and Analysis : System Engineering, product Engineering, modelling.

Unit-V : **System Design :** Effective design, methods, interface design, documentation design.
Software testing : Methods, Strategies, Art of designing, metrics, test reports.

Unit-VI : Software Engienering : Overview, reverse engineering, forward engineering, metrics for maintainance, Software reuse, CASE tools.

Books :

1) System Analysis and Design - Edwards
2) System Analysis & Design - Don Yates (M)
3) Fundamentals of System Analysis & Design - J.F.Gerald
4) Software Engineering with Java - S.R.Schach (TMH)
5) Software Engineering - Press Man (TMH)
6) Sommerville - Software Engg. - 7th ed. - Pearson
7) Booch - Object Oriented Analysis & Design - Pearson
8) Kendoll - Systems Analysis & Design - Pearson

*****

1MCS 6 COMPUTER LAB - I

Practicles based on subjects 1,4,5.

1 MCS7 COMPUTER LAB-II

Practicles based on subjects 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 anser book.

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"

*****

SEMESTER-II

2MCS1 SYSTEM SOFTWARE AND OPERATING SYSTEM

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

Unit-II : Compilers, phases of compilation, lexical analysis, parsing, compilation of expression, 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, partitious, 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 : Case Study : Unix Operating System & Windows NT O.S. Process Management, memory management, I/O m'ment.

Books :

1) "S.S. & O.S." - D.M.Dhamdhere (TMH)
2) Operating System 3 / e : Nutt Pearson
3) "Operating System Concepts" - Silbershatz (Addision Wesley)
4) "Systems Software" , Leland Beck (Pearson Education)
5) "Operating Systems" William Stallings. (PE) 4th ed.
6) "Operating Systems" A.S.Godbole - TMH
7) "Operating Systems" Crowley - TMH
8) "System Programming" Donovan - TMH.
9) "Modern Operating Systems" - Tenenenbaum Pearson Education.
10) Deitel - Operating Ssytem - Pearson

*****

2MCS2 WINDOWS PROGRAMMING

Unit-I : **Introduction to MFC :** MFC class hierarchy, Cwin ALP, CWnd, C Main Frame classes, handling windows, messages in MFC.
Document / view architecture : C Document and C view, C++ templete classes review, basic MFC Classes : C string, C point, C size, C Rect, C Array, and C List.

Unit-II : **Graphic Device Interface (GDI) :** C Client DC, C Window DC and C Paint DC classes, stock GDI project, color and

fonts, drawing shapes and curves, C Bitmap, C Brush, C Font, C Pallette, C Pen, C Rgn Classes.
Dialog Box : C Dialog, C Edit, C Button, C List Box, C ComboBox classes, Data exchange to / from variables, and controls OK and cancel buttons, tab stops and groups, modeless dialogue.

Unit-III : **Windows Control and Dialogue :** C Progress Ctrl, C Slider Ctrl, C Spin Button Ctrl, C List Ctrl, C Tree Ctrl classes, C file Dialg, C Color Dialog, C Font Dialog, C Print Dialog, classes.
Tool bar, tool tips, and status bar : C tool Bar, C Control Bar, C Status Bar.
Property Sheets Property Page class, MFC text Editing, C edit view, C rich Edit view, C rich Edit Ctrl.
Date time picker, month calender, IP Address Control, extended combobox controls.
Exception Handling : C exception.

Unit-IV : **Menus and Accelerators :** Command Processing C Menu, Cemd UI classes.
Floating popup menus : Keyboard, accelerator, file menus, enabling, disabling menu items.
Multithreading : Multithreading Concepts : C Unit thread.
Thread Synchronisation, critical section : Critical section, C mute X, C semaphore Event signaling, event object Cevent.

Unit-V : **Advance Document Handling :** C List view, C tree View, C form View, C record view.
Document Templates : C doc. templates, C single Doc template and C multi Doc Template.
C frame Wnd, CMDI frame Wnd, C child Frame, CMDI child Wnd, C splitter Wnd, User defined message handling, Central sensitive help.

Unit-VI : **DLL :** MFC Extension DLL : Experting Classes MFC regular DLL.
Basic Component Object Model (COM) : Introduction, Interface definition Language, Z Unknown, Z Class factory interfaces, Zn-Process and out-process servers, marshaling, containment and aggregation, daifference between Active-X and ordinary control. Properties, mapping Active-X Control events.
Case Study : Calender and Web browser controls ODBC, DAO, OLE.

Books :

1) Programming Microsoft Visual C++, 5th edition, Kruglinsli, shephard, wingo (Microsoft Press 98)

*****

2MCS3 MICROPROCESSOR PROGRAMMING AND INTERFACING

Unit-I : **Introduction to Pentium Microprocessor :** Microprocessor introduction, evolution of MP, block diagram, mp operation, hardware/software requirements, PC, developing s/w for PC, Introduction to pentium, real mode, protected mode, software model of the pentium, registers, data, instructions, addressing modes, interrupts previous intel mps.

Unit-II : **Instructions :** Introduction, ALP, pentium instructions, addressing modes, instruction examples: processor flags, data transfer, strings, arithmatic, 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 :** 80 x 87 architecture, preliminary instructions, Bus I/f :
ISA, GISA, VESA, PCI.

Unit-VI : **Advance Programming with I/f :** Programming with DOS and BIOS function, calls, kbd, 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 - Bary 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)

*****

2MCS4 COMPUTER GRAPHICS AND IMAGE PROCESSING

Unit-I : **Geometry and Line Generation :** Overview, pixel, and frame buffers, vector and character generation, displaying frame buffer.
Graphics Premitives : Overview & Introduction, display file, display control, text line style primitives.

Polygons : Representation, entering & filling polygons.

Unit-II : **Transformations :** Scaling, Sin & Cos, Rotations, translation other transformations and display procedures.
Segments : Operations on segment, Image transforms, display file structure.
Viewing : Transformation, implementation.
Clipping : Various clipping Operations.

Unit-III : **Interaction :** Input device handling, event handling, interactive techniques.
3D Geometry : Overview, transformations, projections algorithms for hidden surfaces and lines shading and curves.

Unit-IV : **Image Processing :** Overview of image processing techniques, two dimensional systems and methematical preliminaries.
Image Reception : Introduction, visual system, color mechanism.

Unit-V : **Image Sampling and Quantisation :** Introduction, Sampling theory, image quantisation.
Image Transform : Introduction, unitary transforms, DFT, Cosine and Sin transforms. Noncausal representation of Image, Spectral, facterisation, Image decomposition.

Unit-VI : **Image Enhancement :** Introduction, Poin Operations, Histogram modelling, Special operations, introduction to image filters and restoration.

Books :

1) Computer Graphics A Programming Appraoch : Stevens Harington (MEH)
2) Computer Graphics - 2nd Edition - Hearn & Baker - Pearson
3) Fundamentals of Digital Image Processing : A.K.Jain Pearson
4) Digital Images : A Practical Guide - Greenberge & Greenberge (TMH)
5) Understanding Digital Signal Processing : 2/e : Lynos (PE)
6) Digital Image Processing using MATLAB 1/e : Gonzalez (PE)
7) Cooles - The Essence of Computer Graphics - Pearson.

*****

1MCS5 (1) ADVANCE COMPUTER NETWORK

Unit-I : Introduction, overview, Network Core, medias, dalays, models, Internet backbones, NAP & ISP, History.

Unit-II : **Appllication 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,

principles of reliable data transfer, TCP, Introduction to congestion control.

Unit-IV : **Network Layer & Routing :** Introduction and network service model, Routing Principles, Hierarchical Routing, IP, Introduction to Routing & Routers, IPV6.

Unit-V : **Link Layer and LAN :** Introduction, Services, Errors, MA P, LAN addresses and ARP, basics of ethernet, hubs, bridges, switches.
Concepts of IEEE 802.11, PPP, ATM, X.25, game relay.

Unit-VI : **Multimedia Networking :** Multimedia Networking Applications, Accessing Audio & Video Pro web serves, RTSP, RTP basics, Security in Computer Networks & Network Management.

Books :

1) Computer Networking : Kurose & Ross Pearson
2) Computer Networks & Internet : D.E.Comer, 4th Ed. Pearson

*****

2MCS5 (2) MODELLING & SIMULATION

Unit-I : **System Models and System Studies :-**

Basic Concepts of Systems and System Modelling-Static and Dynamic/Physical and Mathematical Models-Principles used in Modellingcorporate Models-Analysis, Design and Postulation of Systems.

Unit-II : **Basic Concepts and Continuous Systems :-**

Techniques used-comparison of Analytical Methods and Simulation Numerical Techniques-Distributed log models and Cobweb Models-continuous system Models-Analytical Equations and Methods of obtaining solutions-analog and Hybrid Computers and Simulations Cssls Examples of diffeent Continuous Systems.

Unit-III : System Dynamics, Probability concepts and basic principles of Descrete Simulation :-

Growth and Decay Models and system dynamics diagrams examples Stochastic Process-probability functions and their evealuation-Random number generation-rejection method-comparison of Monte-Carlo method and Stochastic Simulation-examples.

Unit-IV : Queueing Theory, Inventory control and forecasting :- Arrival patterns-service Time-different distributions queueing discplines and measures grade of service simulation of queues.

Unit-V : Descrete System Simulation and design and evaluation of simulation experiments :-

Discrete events-length of simulation runs and representation of time variance reduction techniques-experimental layout and Validation-generation of arrival patterns-examples statistical reports-utilisation and occupancy-choice of simulation language.

Unit-VI : Simulation Languages and Introduction of

GPSS:diffeent special purpose languages used for continous and discrete systems and comparison-factors affecting the selection of a discrete system simulation language-comparison of GPSS and Simscript. A detailed study of GPSS with examples.

Text books :-

1) Groffrey Gordon, "System Simulation" Second Edition PHI
2) Narsingh Deo, "System Simulation with Digital Computers", PHI
3) Shannon R.E. "System Simulation : The Art and Science" Prentice Hall, Englewood Cliffs, NY.
4) Gordon, G. "The Application of GPSS v to Discrete System Simulation" Prentice Hall, Eglewood Cliffs NY.
5) Discrete Event System Simulation - Banks, Carson, Nelson Pearson.

*****

2MCS5 (3) MULTIMEDIATECHNIQUES

Unit-I : **Introduction :** Multimedia overview, applications, goal and objectives, multimedia building blocks, multimedia and internet multimedia configuration.
Multimedia PC workstation components, multimedia platforms, multimedia development tools, authoring tool, interactivity, high end multimedia architectures.

Unit-II : Multimedia O.S., File system (file format : TIFF, BMP, PCX, GIF etc.) process management, multimedia communication system, multimedia database management system.

Unit-III : **Multimedia Audio :** Basic sound concepts, audio capture, music speech sound processor, sound recovery techniques, VOC4WAV file format for sound.

Unit-IV : **Multimedia Graphics :** 2D/3D Animation, fundamental, digital imaging : Capture, animation, processing recovery, AVI file format, NTSC, PAL, GECAM, HPTV system, conferencing, streaming, motion synchronisation.

Unit-V : **Image Compression :** LZW, DCT run length coding, JPEG,

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.

Unit-VI : **Multimedia Devices :** Mass storage system; Magnetic devices, CDROM, DVD, Scanner.
Windows Support : Multimedia database in oracle, mm function calls, windows support to sound, animation, movies, music, midi controls.mm and Unix.

Books :

1) Multimedia : Computing, Communication, Applications : Steinmetz - Pearson.
2) Multimedia in Practice : Technology and Applications - Judith (PH)
3) Fund of Multimedia by DREW - PEarson (Practical Approach)
4) Multimedia Comm. by Halsall - Pearson
5) Multimedia - Buford - Pearson.

*****

2MCS5 (4) COMPUTATIONAL SCIENCE

Unit-I : **Set Theory :** Introduction, Set Elements, discriptive, types, Venn-Euler diagram. Basic set operations, fundamental products, partition sets, minsets, algebra of sets and duality, relations, functions, recursion.

Unit-II : **Graph Theory :** Introduction, notations, and definitions, path and connectivity types, sub graphs, isomorphic graphs, representation, Eulerian and nonmiltonian graph, trees.

Unit-III : **Algebric Structures :** Introduction, operation, semigroup, monoids, groups, subgroups, ring.
Lattices : Introduction, types, pradicate calculus, propositional calculus, boolean algebra.

Unit-IV : **Finite Automata :** DFA, NFA, equivalence, properties, regular expressions.

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

Unit-VI : **Turing Machine :** Definition, computing, combining, examples, extensions, NTM. Uncomputability, computational complexity.

Books :

1) Discrete mathematics : J.K.Sharma (M)
2) Elements of Theory & Computations - Levvis & Papadimitron - PHI
3) Introductory Theory of Computer Science - V.Krishnamurthy (EWP)

4) Automata & Theoretical Computer Sc- Regade - Pearson.
5) Introduction to Automata Theory - Hopcuft 2/e -- Pearson
6) Discrete Mathematical Structures - Kolman - Pearson.
7) Discrete Mathematics - Johnsonbaugh - Pearson.

*****

2MCS5 (5) COMPILER WRITING

Unit-I : **Introduction to Compilers :** Overview, Structure, implementation.
Programming Language Grammers : Inter Language grammers, derivation, reduction, syntax tree, ambiguity, regular grammers & expressions.

Unit-II : **Scanning and Parsing Techniques :** The Scaner, parser, translation, elementary symbol table organisation, structures.

Unit-III : **Memory Allocation :** Static and dynamic memory allocation, array allocation and access, allocation for strings, structure allocation, common & equivalance allocation.
Introduction to Complition of expressions.

Unit-IV : **Compilation of Control Structures :** Control transfers, procedural calls, conditional execution, interation control constructs.

Unit-V : Error detection, indication & recovery.
Compilation of I/O Statements : Compilation of I/O list, compilation of FORMAT list, IOSUB, file control.

Unit-VI : **Code Optimisation :** Major issues, optimising transformations, local optimisations, program flow analysis, Global Optimisation, writing compilars.

Books :

1) Compiler Construction - D.M.Dhandhere (M)
2) Compiler Writing - Tremble-Sorenson (TMH)
3) Computers : Princ, Techniques cools by Aho - Person.
4) The Essence of Compilers by Hanter - Pearson.

*****

2MCS6 COMPUTER LAB.-III

Practicals based on subjects 8 and 10.

2MCS7 COMPUTER LAB.-IV

Practicals based on subjects 9, 11 and 12.

*****

"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 anser book.

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"

*****

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

3MCS1 WEB TECHNOLOGIES AND PROGRAMMING

Unit-I : **Internet :** History, growth, architecture, applications, impact on society, services on internet, protocols, IP adresses, computer networks, DNS, setting up internet, WWW : Web and internet evolution, features of www, browsers, HTTP, URL, Hypertext, search engine. IE & NN, Book marks, history, copkies, progress indicator, automising browsers, handling web pages, browsing tricks.
E mails - 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 web, EC adaption, issues, applications, future. EC practices, b2b, b2c, c2c,b2g, g2b,g2b, g2c benefits, limitations, EC payment, transactions, EC model, online banking, EC for B2B & e-governance.

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

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

Unit-V : **Javascript :** Using JS, arithmatic, 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 ASPexample, server side active X components, file system objects, session tracking cookies, accessing database for ASP. Introduction JSP, Web authoring tools.

Books :

1) IT Tools and Application - (M)
2) Bridge to Online Store Front - Agrawala & Agrawala (M)
3) Internet and Web Design - (M)
4) Internet and WWW How to programm - Dietel & Dietel Pearson
5) Developing E-Commerce Sites - Sharma & Sharma Pearson
6) Web 101 : Lehnert Pearson
7) Active Server Pages 3.0 : N.Chare (Que)
8) Frontiers of E-Commerce - Kolkata & Whitson Pearson

*****

3MCS2 ADVANCED DATABASE MANAGEMENT

Unit-I : Introduction to DBMS, Data Models, Transaction management, DBA, wers, E-R models, relational model.

Unit-II : Object Oriented Databases, data models, OO languages, concurrency control, recovery system.

Unit-III : Database system architecture, (Centralised systems, cls systems, parallel systems, distributed system), Parallel databases, distributed data bases.

Unit-IV : Introduction to Data mining, were housing & visualization. What can a Data warehouse do?, Foundations of Data mining & data visualization.

Unit-V : Data warehouse Introduction : Data warehouse architecture, Metadata.

Unit-VI : Introduction to data mining, MOLAP, ROLAP, techniques used to mine the data, market basket analysis, current limitations and challenges to D.M., Data visualization.

Books :

1) Database System Concepts - S'lberschatz, Korth, Sudarshan (MacMillan)
2) Database Systems by Connolly - Pearson.
3) Fund of Data base systems by Elmasri - Pearson. 4/e
4) Modern Data Warehousing, mining and visualization - George Marakas (Pearson Edition)
5) Introduction to DBMS - Atul Kohate (Pearson Edition)
6) Database Management System Pote (M)

7) Data Mining Techniques - A.K.Pujari (UP)
8) Data Mining : Introductory and Advance Topics 1/e : Dunham (PE)

*****

3MCS3 ADVANCE MICROPROCESSOR DEVICES

Unit-I : 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 IBMC PC :
Support chips : 8284, Bus controller, 8259, 8253, 8255A, 8237. Mother board functions, Reset logic, CPU logic, other logics, and I/F.

Unit-III : **Peripheral Controller :** Introduction, Interface, Hardware overview FDC. Overview, FDC, FDD, IC, Commands, 9216, 9229.

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, moventire maintaining, computer faults, diagnostic progress & hols.

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

Books :

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

*****

3MCS4 CLIENT - SERVER COMPUTING

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 servlets, Important methods of class http servlet, Hipp servelet request, Http servlet response, Httpget servlet, Http post & get, cookies, methods of class cookies, sersion tracking, C-S application using servlet.

Unit-III : **RMI :** Temperature Server interface, class temperature server Impl., weather Into. class definition, temperature client class definition, wether Item class definition, uniregistery running, uinte object exerution & running. C-S application using RMI.

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 Box, property, move curser, resize cursor, selecting event, target selecter line, interaction between Explicit Butten and Juggler.

Unit-VI : **Java beans Contd. :** File dilog, other dilog, applet, applet running, standalone application, contents of logoanimator jar, loading bean, animation, setting up event, class slider field panel, selecting property.

Books :

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

*****

3MCS5 (1) EMBEDED SYSTEMS

Unit-I : **Embeded Systems :** Introduction, Design goals, real time, Multitasking, Embeded processors, Languages, Kernel, building, Embeded applications and proforms.

Unit-II : **Data Representations :** Fixed Precision - Binary Numbers, Binary Representation of Integers & real No. ACSII, BCD. Programmers View of Computer Organisation, overview of intel architecture, introduction to Microcontrollers and its use in ES.

Unit-III : **Using C :** Integer data types, mixing data types, type defination and define, manipulating bytes in memory, manipulating bytes in I/O ports, accessing I/O devices, structures, variant access.

Unit-IV : **Mixing C & Assembly :** Programming in ALP, register usage, rise of addressing options, instruction sequencing, procedure call and return, parameter passing, retrieving parameters, pass by value, temporary variables. I/O Programming, interrupt I/O driver, DMA.

Unit-V : **Concurrent Software and Scheduling :** Programmed / back ground systems, multithreading, programming, shared resources and critical section, scheduling : methods, deadlocks, watchdog times.

Unit-VI : **Memory Management and System :** Initialization : Objects in C, Scope, lifetime, Automatic Allocation, Static Allocation, Difference Dynamic Allocation, Recursions using share memory concept and its access. Introduction to system initialisation.

Books :

1) Fundamentals of Embeded Softwares : Lewis Pearson
2) An Embeded Software Primer - Simon Pearson
3) 8051 Microcontroller and Embeded System - Mazidi and Mazidi. Pearson

*****

3MCS5 (2) OBJECT ORIENTED TECHNOLOGY

Unit-I : **Need for object Oriented Programming :** Procedural Languages, object oriented approach, advantages, characteristics, characterisation 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, redation types, object behavioural 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, check point 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 Data bases :** Relational Vs object oriented databases, the architecture of OO data bases, 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 Nosterdam)
2) C++ Programming Language 3/e - Stroustrap
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

6) Bhave - oop with C++ - Pearson
7) OOP with Ansh & Turbo C++ by Kamthane - Pearson

*****

3MCS5 (3) NETWORK SECURITY

Unit-I : **Introduction :** Terminology, Notation, Networking, Altasks, layers and cryptography, authorisation, tempest, keys, viruses, woury, trosan hasses, multilevel model of security, legal issues.

Unit-II : **Cryptography :** Introduction, breading on encrypti scheme, three hinds of cryptographic function, respective algorithms, standards and modes & operation, Hashes and messages.

Unit-III : **Authentication :** Overview of authentication system protocols, keys, intermediatouries authentication of people, security hardshake pitfalls : login only, actual authentication, integrity / encryption for data, mediated authentication, performance consideration.

Unit-IV : **Standards :** Kerbrose Vs : ASN.1, Names, Delegation of rights, Ticket lifetimes, Key versions, optimisations, algorithms, messages, Introduction to Real time communication security.
IPSec, AH & ASP : Overview of IPSEC section, IP & IPV6, AH, ESP.

Unit-V : **E-mail Security :** Distribution lists, store and forward, security services for e-mail, Establishing Keys, Privacy, Authentication of source, Message Integrity, Non repetation, Proof of Submission & delivery, confidentiality, anonymity, containment other issues, PEM & MIME, PGP.

Unit-VI : **Firewalls :** Packet filters, application level gateways, Encrypted tunnels, comparisons.
Security Systems : Network V4, Windows.
Web Issues : URLS, HTTP, Cookies, other Web Security ploplems.
Other Secutiry Measures.

Books :

1) Network Security : Kaufman, Perlman, Speciner- (PE)
2) Network Security : Ankit Fadia (M)
3) Network Security Essential by stallings - Pearson
4) Cryptography & Network Security by Stallings - Pearson

*****

3MCS5 (4) SOFTWARE TESTING

Unit-I : **Testing :** Introcution and Outline - Introduction to testing and test outline, sample application, incremental testing approach, outline approach steps, evaluation and schedule estimation.

Unit-II : Introduction to test outline to test cases, creating test cases, documentation short cuts, introduction to using taples and shpreadsheets, sample applications, Documenting test cases.

Unit-III : Other types of tablets, slate machite, test care table with multiple inputs, decision tables, application with complete data, managing tests, testing objectoriented software, comparison system testing example, Unit testing of Classes.

Unit-IV : **Testing Web Applications :** Introduction, sample application, functional and sability issues, configuration and compalicity 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 indentify problem neas, combination schemes, trading selected test cases.

Unit-VI : **Creating Quality Software :** Introduction, development environmental infrastructure software testing environment, software testing tools, applying software standards to test documentation.

Book :

1) Introducing Software Testing : Louise Tamres (PE)
2) Software Testing in the Real World by Kit - Pearson

3MCS5 (5) Computer Oriented Numerical & Statistical Methods and Optimization Techniques

UNIT-I : **Iterative methods :** Introduction, Roots of equations, Transcedental equation & its solution, Bisection method, false position method, NR method, Direct sub.method.Solution of Simultaneous equation; Gauss elimination, Gauss Seidal, Gauss Jordan methods, Interpolaion techniques.

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

UNIT-III : Sampling, Frequency distribution, Measures of Control tendency & Dispersion, Moments, Discrete distribution, Binomial Distribution, Poisson distribution, Hypergeometric distribution, Numerical Characteristics.

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, Graphic soluion, Constraints, Minimisation, Simplex method, Transportation problem.
Inter programming, Branch & Bound algorithm & applications, Inventory models, Introduction to sequencing problem.

UNIT-VI : Random variable concept, Polynomial & Simple regression, Decision theory, Game theory : Minimax-Maxmin pure strategies, Solution of 2 x 2 games, Brorron's Algorithm.
Introduction to PERT, Introduction to quening 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)
4. Mathematical Statistics - J.N. Kapoor(MCG)
5. Statistics - Murray R. Spiegel(MCG)
6. Probability & Statistical for Engineers - Irwin Miller John E. Ereund (PHI)
7) Operations Research by Natarajan - Pearson
8) Operations Research - Taha - Pearson
9) Mathematical Statistics by Hogg - Pearson

*****

3MCS6 COMPUTER LAB.-V

Practicals based on subjects 1, 5.

3MCS7 COMPUTER LAB.-VI

Practicals based on subjects 2, 3 & 4.

*****

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 anser book.

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

*****

SEMESTER-IV

4MCS1 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM DESIGN

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 recongnition, level of the model, criteria for success, problems and problem spaces, defining the problems, production systems, control strategies, futuristic search, problem characteristics, decomposition of problems, solution steps, predictability, absolute and relative solutions.

Unit-III : Basic problem solving methods, resoning, 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 represention of knowledge: some common knowledge structures, choosing the level of represention, finding the right structure as needed, declarative representation.

Unit VI : Natural Language Understanding : Concept of understanding, keywork matching, synetactic and symantic analysis, understanding,language generation and maching

translation.
General concepts of implementation of ai systems.
Introduction to pattern recognisition.
Rule based systems, symantics of cfl, semantic n/w, frames, frame kit. Application, introduction to knowledge engineering artificial neural n/w : introduction, learning : single & multilayer networks-i

Books :

1) Artifical Intelligence by Elaine Rich, Mcgrawhill Inc.
2) Artificial Intelligence and Expert Systems - Jankiraman, Sarukesi (M)
3) Expert System : Theory and Practice - Ermine (PHI)
4) Turbo Prolog - Nath (GP)
5) List Programming - Rajeo Sangal - (TMH)
6) Rule Based Expert System - M. Sasikumar (Narosa)
7) Artificial Intelligence - Russell - 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 Applications - Burnhan & Hall
13) ES : Theory and Practice - Ermine - PHI

******

4MCS2 PARALLEL COMPUTER ARCHITECTURE

UNIT-I : Introduction to Parallel Processing :
Parallelism in uniprocessor systems, parallel computer structures, Architectural classification schemes, parallel Processing Applications.
Pipe lining : An overlapped parallelism, Instruction and arthmetic pipelines, Principles of Designing pipelined procecessors, Vector Processing Requirements.

UNIT-II : Pipeline computers and Vectorization Methods :
The space of pipelined computers, Early vector Processors, Scientific Attached Processors, Recent Vector Processors, The architecture of cray-1, cray-2, pipeline Chaining and vector loops, The architecture of Cyber-205, Vector processing in Cyber-205 and CDC-NASF, Fugistu VP-200 and special features, vectorization and optimization methods language features in vector processing, Design of vector operations, Optimization of vector operations, Performance Evaluation of pipelined operations computers.

UNIT-III : SIMD Array Processors, SIMD Interconnection Network, Parallel Algorithm for Array Processors, Associative Array

Processing, The space of SIMD computers, The Illiac-IV and the BSP Systems, The Massively parallel processor, The MPP system Architecture, processing Array, Memory and control, Image processing on the MPP, Performance Enhancement methods, parallel memory Allocation, Array processing languages, performance Analysis of Array processors, Multiple-SIMD computer organization.

UNIT-IV : Loosely coupled Multiprocessors, Tightly coupled Multiprocessors, Processor characteristics for multiprocessing, Time shared of common Buses, Crossbar switch and Multiport Memories, Multistage Networks formultiprocessors, Performance of interconnection networks, Parallel memory organization, Multiprocessor operating systems, Exploiting concurrency for multiprocessing, Interprocess communication mechanisms, System deadlocks and prtection scheduling strategies, parallel algorithms for multiprocessors, performance of parallel Algorithms.

UNIT-V : **Example Multiprocessor Systems :**
The space of multiprocessor systems, Exploratory systems commercial multiprocessors, The C.mmp multiprocessor system. The C.mmp multiprocessor Architecture, The hydra Operating system, Performance of the C.mmp, The S-1 Multiprocessor, The S-1 System Architecture, Multiprocessing uniprocessors. The S-1 software development, The HEP Multiprocessors, The HEP system Architecture process, Execution Modules, Parallel Processing on the HEP, Mainframe Multiprocessor systems, IBM 370/168MP, 3033 and 3081, Operating system for IBM Multiprocessors Univac 1100/80 and 1100/90 series, the Tandom Nonstop System, Cray X-MP System Architecture, Multitasking on Cray X-MP, performance of Cray X-MP.

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, Advantages and potential probelms, data-flow computer Architectures, Static Data flow computers, Dynamic Data flow computers, Data Flow Design Alternatives, VLSI Computing structures, The systolic Array Architecture, Mapping Algorithm into systolic Arrays, Reconfigurable Processor Array, VLSI Matrix Arithmatic processors, VLSI Arthemetic Modules, Partitioned Matrix Algorithms, Matrix Arithmetic pipelines, Real-time Image processing.

Introduction to Neural networks, capabilitities of human brain in the computer.

TEXT BOOKS :

1) Computer Architecture and parallel processing by Kai Hwang & Faye A Briggs (McGraw Hill.)
2) Fundamental of Parallel Processing - Jordan, Alaghband (PE)
3) Parallel and Distributed Programming Using C++ - Hughes, Hughes (PE)
4) Introduction to Parallel Processing - M.Sasikumar (PHI)
5) Parallel Computing Ghoshal - (UP)
6) An Introduction to Distributed and Parallel Computing - J.M.Crichlow - (EEE)

REFERENCES:

1) Computer Architecture and Organisation - 6th Edition, - W.Stallings (PE)
2) Computer System Organisation and Archaitecture - J.D.Carpinelli (PE)
3) Computer Architecture and Design - P.Pal Choudhari - (PHI)
4) Parallel Computer Architecture and Programming - Rajaraman Murthy - (PHI)
5) Advanced Computer Architecture - Sima, Fountain, Kacsule (AW) (PE)
6) Advanced Computer Architecture - Kai Hwang - (TMH)
7) Design Efficient Algorithms for parallel computers- by Quinn McGraw Hill.
8) Principles of Parallel an Multiprocessing - by Descrochers McGraw Hill.
9) Parallel Computing : Methods, Algorithms & Applications, 1989 - by Evans Academic Publishers.
10) VLSI Risc Architecture and Organization - by Further Academic publishers.
11) Computer and Information Sciences current Trends in Applications - Editors V.B. Kaujalgi, Computer Society of India Tata McGraw Hill.
12) An introduction to distributed and parallel computing - Crichlow - PHI
13) Elemants of parallel programming - Rajaraman - PHI
14) Practical parallel programming - Wilson - PHI
15) An Int. to Parallel Computing - Grama - Pearson

******

4MCS 3 (1) OPERATING SYSTEM DESIGN

UNIT I : Introduction, The H/W interface, OS interface, design Techniques-I (for Unix & Win NT)

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 V : Windows 95 anatomy, Architecture, memory management, file system, desktop, applets, DDE, OLE exploiting H/W & S/W, mouse, keyboard, video configurations, networks & security.

UNIT VI : **CASE STUDY : UNIX**
Understanding Unix commands, Utilities (General purpose), file syste, 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 programming environment - Kerninghan - Pearson
5) C & Unix programming - Kutti - TMH
6) Unix Programming on 80286/386 - Deilmah - BPB
7) Linux the complete reference - R. Peterson - TMH

******

4MCS3 **MOBILE COMMUNICATIONS**

Unit-I : **Mobile Communication :** Applications, history, market, simplified reference model. Frequencies, signals, antenas, signal propogation, introduction to multiplexing, modullation, spread spectrum concept, cellular system.

Unit-II : **Medium Access Control :** Introduction, SDMA, FDMA, TDMA, CDMA, comparison of S/T/F/CDMA. Telecommunication system : Introduction to GSM & DECT, TETRA, UMTS & IMT-2000.

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

Unit-IV : **Wireless LAN :** Intrared versus Ratio Transmission, infrastructure and adhoc network, IEEE 802.11, HIPERLAN, Bluefooth.

Unit-V : **Layers :** Mobile Network Layer : Mibole If, protocol, mobile adhoc networks.
Mobile Transport Layer : Traditional TCP, improvements 2 SG / 3 G network.

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

Books :

1) Mobile Communication : Jochen Schiller (PE)

*****

4MCS3 **OBJECT ORIENTED MODELLING AND DESIGN**

Unit-I : **Review of Object Modelling :** New paradigm, object oriented thinking - rethinking, objects and classes, links and anociation, Generalisation and specialisation, Inheritance, Grouping concepts, agregation abstract classes, polymorphism, metadata, constraints, reuse, dynamic modelling, event states, operations, concurrency.

Unit-II : **Importance of Modelling :** Brief overview of objects, OMP, Booch Methodology, use CASE drive approach, overview of CRC card method.

Unit-III : **Overview of UML :** Efforts of Standardisation, integration, OMG approval & UML:, scope of UML, conceptual model of UML, architecture - Metamodel, mechanisms, unified software development life cycle, UML diagrams.

Unit-IV : **UML Diagrams :** Advance Class Diagrams : Advnace relationship, interface types and rules, packages common modeling techniques, modeling groups aof elements modeling architectural view.

Unit-V : **Instances and object diagrams :** Modeling concrete / prototypical instances, links, objects interactions, colaborations, use cases, interaction diagrams, state transition diagram.
Architectural Modeling : Component Diagram, Development Diagram, pattern and framework.

Unit-VI : **Introduction to Component Technology, concepts of distributed objects systems :** COM, DCOM, CORBA, object oriented data bases.

Books :

1) UML users guide : Booch / Ram bough Pearson
2) Object - Oriented Modelling & Design - R umfaugh - Pearson
3) UML in a multishell - Ram boough (PHI)

*****

4MCS3 DECISION SUPPORT SYSTEMS

Unit-I : **Decision Making and Computerised Suport : An Overciew-** Introduction, Managerial Issues, the need, Game work, concept, GSS, EZS, Expert System and intelligent agents, ANN, knowledge management systems, supporting ERP and supply chain Management, hybrid support systems. Decision making, systems, modelling and support.

Unit-II : **DSS :** Introduction, DSS configurations, characteristics and capabilities, components, Data Management Systems, Model Management Systems, knowledge Broad Management Systems, User Interface sub systems, the user, DSS hardware, DSS & MIS, classifications. Detaware housing, Accers, Analysis, mining and visualisation, DSS development.

Unit-III : **Collaboration, Communication, Enterprise DSS and knowledge management :**
GSS : Introduction, communication support, collaboration support, GSS & Technologies, GSS meeting procers, Distance Learning, other issues.
Enterprise DSS : Introduction, Evolution, Role and needs, Characteristics and capabilities.
Knowledge Management : Development, Methods, Success, Tools, Technologies, Al, other issues.

Unit-IV : **Fundamentals of Intelligent Systems :** Knowledge based decision support : Introduction, types, ES, working of ES, examples, problem areas, benefits, limitations, success factor & types, internet, intranet and web.
Introduction to : Knowledge acquisition and validation, knowledge presentation, inference Techniques, intelligent system developments.

Unit-V : **Advanced Intelligent Systems :** Neural Computing : Introduction, ML, NC, biology analogy, fundamentals, application development, data collection and preparations, Neural Network : Architecture, preperation, training, algorithms, tooling, implementation, software and hardware, example, benefits and limitations, NN & ES, NN for DSS.
Introduction to : Neural computing Application, advanced Al systems & applications, intelligent software agents.

Unit-VI : Implementation, integration and Impacts :
Implementation : Introduction, major issues, strategies.
ES & DSS integration, integrating EIS, DSS & ES and global integration, intelligent DSS.
Impact of MIS.

Book :

1) Decision Support Systems and Intelligent Systems : Turban

*****

4MCS3 ROBOTICS AND COMPUTER VISION

UNIT-I : Basic concepts in Robotics, Advantages and applications, Nonindustrial applications, Basic structures of Robots, Numerical controls of machine tools, Resolution, Accuracy and Repeatability, Position representation.

Point-to-point and continuous-path systems, control loops of Robotic systems, Cartesian coordinate Robots, Cylindrical coordinate Robote, Spherical coordinate Robots, Articulate Robots, Direct and indirect drives, The wrist motion and the Gripper, structure of continuous-path Robot systems.

UNIT-II : Hydraulic systems, Direct-current servomotors, control approaches of Robots, control loops using current amplifier, control loop using voltage amplifier, Elimination of stationary position Errors, Control loop of CNC systems, Mechanical transmission systems.
Direct kinematics problem in Robotics, Geometry-based Direct Kinematic Analysis, Coordinate & vector Transformations using matrices, Denavit-Hartenberg convention, Application of the DH method, Quaternion & Rotation vector Representations.

UNIT-III : Necessity of Interpolators, the generation of Motion commands, The tragectories planning, Basic structure of Interpolators, The solvability of the inverse kinematic problem, Particular solutions for the Inverse kinematics problem using Rotation vectors.
Energy sources, Effect of gravity vibration problems, operational peripherals, Maximum effort manipulators, methods for programming a programmable controller, Implicit programming by training, Manual teaching, Lead-through teaching, programming languages for Robots, programming with graphics, programming of serve controlled industrial Robots by training, storing and operating task programs, CAD for Robotics.

UNIT-VI : Prospects for knowledgebase Robots, Robot and Artificial intelligence - parallel developments, Experts systems and knowledgebased languages, production rule expert systems, future prospects for knowledge-based Robots.

Installation of a Robot, a plant servey, 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, Measurement of distance, Recognition of objects.

Vision systems, Artificial vision to Robot, Pattern recognition as applied to Robots, image processing, Positioning of visual sensors, sensor and depth reconstitution, Image sensors, Representation of visual information, optical illusions and image comprehension by a Robot, Cameras for industrial robots, choice of systems.

UNIT-VI: **Application of Robots :**

Handling, loading and unloading single - machine tool, several single machine tool, several machines, The manufacturing cell. The cellular concept, Optimatization of the production Rate, Welding, Spot welding, Arc welding, spray painting, features of spray painting robots, Task programming, Features of Assembly Robots, Design for Automatic assembly, Drilling, Deburring metal parts.

BOOKS :-

1. Introduction to Robotics - J.J.Craig - (AW)
2. Robotics for Engineers, 1987 by Yoram Koren (McGraw Hill)

REFERENCES :

1. Robotic Engineering & Integrated Approach - Klafter, Chmielewski, Negin (PHI)
2. Robotic Technology Volume-I : Modelling & Control - P.Coiflets - (KP)
3. Robotics Revolution - Peter B.Scott.
4. Robot Technology Volume 4, Robot Components and Systems by Francois Lhote (Kogan Page Ltd., London NI) [Unit I & II]
5. Robot Technology Volume 5, Logic & Programming by Michel Parent and Clande Laurgeals (Kogan page Ltd., London NI) [Unit 3]
6. Robot Technology Volum 6, Decision & Intelligence by Igor Aleksander, Henri Farreny & Malik Ghallib (Kogan Page Ltd., London NI) [Unit 4]

7. Robot Technology Volume 5, Interaction with the Environment by Philippe Coiffet (Kogan Page Ltd., London NI) [Unit 5]
8. Int.to Robotics - Niku - Pearson
9. Decision Support Syst & Intelligent Supt. 6/e - Turban - Pearson

*****

4MCS 4 COMPUTER 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 anser book.

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 & VI PROJECT/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\ Hard Copy (One for Guide & One for Department Library).

(Note : Education tour / industrial visits may be organised time to time and as per need.)

a) Distribution of Marks For Project/Seminar :-

A) Each student has to submit project report he has under taken 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:-

A)	Internal performance : Regularity	–	25
	(Internal Examiner) Performance	–	25
	Job Work	–	25
b)	External performance : Contents	–	25
	(External Examiner) Viva-voce	–	25
	Demonstration	–	25
	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

*****

INDEX

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

(Prospectus No.20101216)

Sr.No.	Subject Code	Paper/Practical	Page Nos.
1.	-	Special Note	1
2.	-	Ordinance No.4 of 2008 Direction No. 26 & 27 of 2010	3
		M.Sc.Part-I Semester-I	
4.	1MCS1	Digital System & Microprocessor	9
5.	1MCS2	Data Structure & Algorithm (C++)	10
6.	1MCS3	Object Oriented Programming	11
7.	1MCS4	Digital Communication & Networking	12
8.	1MCS5	System Analysis, Design & Software Engineering	12
		M.Sc.Semester-I Practical	
9.	1MCS6	Computer Lab - I	13
10.	1MCS7	Computer Lab-II	13
		M.Sc.Part-I Semester-II	
11.	2MCS1	System Software & Operating System	14
12.	2MCS2	Windows Programming	14
13.	2MCS3	Microprocessor Programme & Interfacing	16
14.	2MCS4	Computer Graphics & Image Processing	17
15.	2MCS5	Electvie-I	
		1. Advanced Computer Network	17
		2. Modelling & Simulation	18
		3. Multimedia Techniques	19
		4. Computational Science	20
		5. Compiler Writing	21
		M.Sc.Semester-II Practical	
16.	2MCS6	Computer Lab-I	21
17.	2MCS7	Computer Lab-II	21
		M.Sc.Part-II Semester-III	
18.	3MCS1	Web Technique & Programming	22
19.	3MCS2	Advance Database Management	23
20.	3MCS3	Advance Microprocessor Devices	24
21.	3MCS4	Client Server Computing	24
22.	3MCS5	Elective-II	
		1. Embeded Systems	25
		2. Object Oriented Techniques	26
		3. Network Security	27
		4. Software Testing	28
		5. Computer Oriented Numerical & Statistical Methods & Optimiziation Techniques	28
		M.Sc.Semester-III Practical	
23.	3MCS6	Computer Lab-I	29
24.	3MCS7	Computer Lab-II	29
		M.Sc.Part-II Semester-IV	
25.	4MCS1	Artificial Intelligence & Expect System Design	30
26.	4MCS2	Parallel Computer Architecture	31
27.	4MCS3	Specialisations -	
		1. Operating System Design	33
		2. Mobile Communications	34
		3. Object Oriented Modelling & Design	35
		4. Decision Support Systems	36
		5. Robotics and Computer Vision	37
		M.Sc.Semester-IV Practical	
28.	4MCS4	Computer Lab-I	39
		M.Sc.-II Semester-IV Project/ Seminar	
29.	4MCS5	Project	39
30.	4MCS6	Seminar (Educational & Ind. Visits)	39