University Of Pune

Structure and Syllabus of MCA (Master of Computer Application)
Under Science Faculty Course

(To be implemented from year 2008-2009)

- Course Structure: The entire course is a Three year, six semester course. For the first five semesters there will be six theory courses and one Lab course. The last semester will be Industrial training/ Institutional project.
- Eligibility: Any Science graduate with minimum 50% marks for open category and pass class for reserve category.
- Examination: Out of the six theory courses for each semester, two are Departmental courses, which are evaluated internally for 100 marks. The remaining 4 University courses are evaluated for 80 marks externally and for 20 marks internally.

  The lab courses for semester I, III and V are Departmental courses, evaluated internally for 100 marks. The lab courses for semester II and IV are University courses evaluated externally for 100 marks. Some lab courses have assignments and some lab courses are divided into project work and assignments and the break up is given below for each lab course.

  The Industrial Project will be graded. The grades are O, A+, A, B+, B, C+, C and D. D grade indicated failure.
- Standard of Passing: A student is expected to get minimum 40% marks for passing in a paper.

  For University papers he must get at least 32 out of 80 (external) and at least 40 out of 100 (internal + external).

  For Departmental papers he must get at least 40 out of 100.
- ATKT Rules: For admission to second year, At least four (4) first year University Papers excluding Lab course should be clear.

  For admission to the third year, first year should be clear. (Both University papers and Departmental Papers) and at least four (4) second year University Papers excluding Lab course should be clear.

Structure of MCA Syllabus

SEMESTER I	
CS 101	C-Programming
CS-102	Computer Architecture
CS-103	Mathematical Foundation
CS-104	Business Communication (Departmental)
CS-105	Graph Theory
CS-106	Elective I (Departmental) 1. Problem Solving Techniques 2. Numerical Methods. 3. Multimedia
CS-107	General Laboratory I (Departmental) (Assignments in C-Programming)
SEMESTER II	
CS-201	Data and File Structures using C
CS-202	Theoretical Computer Science
CS-203	Object Oriented Programming (C^{++} Programming)
CS-204	Software Engineering (Departmental)
CS-205	Database Management Systems
CS-206	Elective-II (Departmental) 1. E-Commerce 2. Operations Research 3. Accounts and Financial Management.
CS-207	General Laboratory II (University) (Assignments in Data Structures, Databases and C^{++})
SEMESTER III	
CS-301	Design and Analysis of Algorithm
CS-302	Computer Networks
CS-303	Introduction to System Programming and Operating System Concepts
CS-304	Core Java (Departmental)
CS-305	Event Driven Programming (Win32 SDK)
CS-306	Elective III (Departmental) 1. Cyber Law 2. Artificial Intelligence 3. Computer Graphics. 4. System Administration I
CS-307	General Laboratory III (Departmental) (Assignments in O.S. and SDK and a project in C++ using any concept from TCS, DAA, DBMS, Networks) (50 marks Assignments and 50 marks Project)

SEMESTER IV	
CS-401	Introduction to UNIX and UNIX Internals
CS-402	Advanced Networking and Mobile Computing
CS-403	Distributed Database System
CS-404	Advanced Java (Departmental)
CS-405	Object Oriented Software Engineering
CS-406	Elective IV (Departmental) 1. Modeling and Simulation 2. Embedded Systems. 3. MFC 4. System Administration II 5. Database Administration I
CS-407	General Laboratory IV (University) (Assignments on Unix and Advanced Java and a project in SDK) (50 marks Assignments and 50 marks Project)
SEMESTER V	
CS-501	Cryptography and Network Security
CS-502	Internet Programming.
CS0503	Design Patterns
CS-504	Data Warehousing and Mining (Departmental)
CS-505	Software Testing and Quality Assurance.
CS-506	Elective V- (Departmental) 1. Current Trends and Technology 2. Expert System 3. Foreign Language 4. System Administration III 5. Database Administration II
CS-507	General Laboratory (Departmental) (Assignments on Internet Programming and a project in Java/MFC) (50 marks Assignments and 50 marks Project)
SEMESTER VI	
CS-601	Full Time Industrial Experience (University)

Syllabus for MCA(Under Science Faculty)Part II

CS – 301 Design and Analysis of Algorithms

Total Lectures = 52

Chapter No	Name of Topic	Total No of lectures	References
1	Introduction • Algorithm & Characteristics • Time & Space Complexity • Asymptotic Notations (O,Ω,Θ) • Sorting Algorithm examples and time complexity • Insertion Sort • Heap Sort • Counting Sort • Searching Algorithm Linear Search Iterative Binary Search • Fibonacci & Factorial Using Recursion	8	Book 1 Book 1 Book 1 Book 2 Book1 Book1
2	Divide and Conquer • Control Abstraction • Binary Search(recursive) • Quick Sort (Examples and time complexity) • Merge sort (Examples and time complexity) • Strassen's Matrix Multiplication	7	 Book 1
3	Greedy Method • Control abstraction • Knapsack problem • Job Sequencing with deadlines • Minimum Cost Spanning Tree Prim's Algorithm & Problems Kruskal's Algorithm & Problems • Optimal Merge patterns • Huffman code	8	Book 1 Book2
4	Dynamic Programming • The General Method • 0/1 Knapsack Problem Merge & Purge • All Pairs Shortest Path • Single Source shortest Path • String editing	10	Book 1 Book1

5	• Backtracking • General method • 8 Queens, 'n' Queens • Sum of Subsets (Fixed and variable tuple formulation) • Graph Coloring	6	Book 1
6	Branch & Bound • Introduction • Method • LCBB Search • Bounding Function • FIFO BB Search Problems on the following using LCBB • Traveling Salesman problem Using variable tuple Formulation.	6	Book 1
7	Graph Algorithms Elementary Graph Algorithms • Representations of Graph • DFS & BFS • Topological sort • Strongly Connected Component • Biconnected Component & DFS Single Source Shortest Path • Dijkstra's Algorithm & Problem Maximum Flow • Flow Network • Ford-Fulkerson Method & Problems Maximum Bipartite Matching	6	Book 2 Book1 Book 1 Book 2
8	NP-Hard & NP Complete Problems • Basic Concepts	1	Book 1

Reference Books

Book 1- Fundamentals of Computer Algorithms
Authors - Ellis Horowitz, Sartaz Sahani
Sanguthevar Rajsekaran
Publication :- Galgotia Publications

Book 2 – Introduction to Algorithms (second edition)
Authors :- Thomas Cormen
Charles E Leiserson, Ronald L.Rivest
Clifford Stein
Publication :- PHI Publication

CS-302: Computer Networks

Total Lectures: 48

Ch. No		Total Lectures	Reference Books
1	**Introduction to Computer Networks (Lectures: 9)**		
	Data Communication • characteristics of data communication, components, data representation, data flow	1	FORO. Ch. 1
	Computer Networks • goals and applications	1	TAN. Ch. 1
	Network Hardware • broadcast and point-to-point	1	TAN. Ch. 1
	Network Topologies • mesh, star, bus, ring, hybrid	1	FORO. Ch. 1
	Network Types • LAN, MAN, WAN, Wireless Networks, Home Networks, Internet works, • Protocols and Standards – Definition of Protocol, Defacto and Dejure standard	2	TAN. Ch. 1
	Network Software • Protocol Hierarchies - • layers, protocols, peers, interfaces, network architecture, protocol stack • design issues of the layers – addressing, error control, flow control, multiplexing and de-multiplexing, routing • Connection-oriented and connectionless service • Service Primitives – listen, connect, receive, send, disconnect • The relationships of services to protocol	3	TAN. Ch. 1
2	**Network Models (Lectures: 5)**		
	OSI Reference Model • Functionality of each layer	2	FORO. Ch2
	TCP/IP Reference Model • Introduction to IP, TCP, and UDP TCP/IP Protocol Suite	1	FORO. Ch2
	Comparison of OSI and TCP/IP model	1	FORO. Ch2
	Addressing • Physical, Logical and Port addresses	1	FORO. Ch2

3	**The Physical Layer (Lectures: 8)**		
	Basic Concepts • Bit rate, bit length, base band transmission • Transmission Impairments – attenuation, distortion and noise • Data Rate Limits – Nyquist's bit rate formula for noiseless channel and Shannon's law • Problems on above concepts	2	FORO. Ch3
	Performance of the Network • Bandwidth, Throughput, Latency(Delay), Bandwidth –Delay Product, Jitter • Problems on above concepts	1	FORO. Ch3
	Line Coding • Characteristics, Line Coding Schemes – Unipolar, NRZ, RZ, Manchester and Differentia*l* Manchester	1	FORO Ch.4
	Transmission Modes • Parallel Transmission • Serial Transmission – Asynchronous and Synchronous	1	FORO. Ch4
	Transmission Media • Guided Media – Twisted Pair, Coaxial Cable, Fiber Optic Cable • Unguided Media – Radio waves, microwaves, Infrared	2	FORO. Ch7.
	Switching • Circuit Switching, Message Switching and Packet Switching	1	TAN. Ch2
4	**The Data Link Layer (Lectures:6)**		
	Framing • Character Count, Byte Stuffing, Bit Stuffing and Physical Layer Coding Violations	1	TAN Ch3
	Error Control • Hamming Code and CRC	1	TAN Ch3.
	Flow Control • Stop and Wait ARQ for noisy channel	1	TAN Ch3
	Sliding Window Protocols • 1-bit sliding window protocols, Pipelining – Go-Back N and Selective Repeat	3	TAN Ch3.

5	**The Medium Access Sub layer (Lectures:5)**		
	Random Access Protocols • ALOHA – pure and slotted • CSMA – 1-persistent, p-persistent and non-persistent • CSMA/CD • CSMA/CA	2	FORO. Ch12
	Controlled Access • Reservation, Polling and Token Passing	1	FORO. Ch12
	Channelization • FDMA, TDMA and CDMA	2	FORO. Ch.12
6	**Wired LANS (Lectures:5)**		
	Ethernet Standard • Frame Format, Access Method and Physical Layer • Changes In The Standard – Bridged Ethernet, Switched Ethernet, Full Duplex Ethernet • Fast Ethernet – Goals and MAC Sub layer Specifications • Gigabit Ethernet – goals, MAC Sub layer Specifications	4	FORO. Ch.13
	VLANS • Membership, Configuration and Advantages	1	FORO. Ch.15
7.	**The Network Layer (Lectures:10)**		
	Design Issues • Store-and-forward packet switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of Connection Oriented Service, Comparison of Virtual Circuit and Datagram	2	TAN. Ch.5
	Logical Addressing • IPV4 Addresses – Address Space, Notations, Classful Addressing, Classless Addressing, Network Address Translation(NAT) • IPV6 Addresses – Addressing Structure, Address Space	2	FORO. Ch. 19
	IPV4 Protocol • Datagram Format, Fragmentation, Checksum, Options	2	FORO. Ch. 20
	IPV6 Protocol • Advantages, Packet Format, Extension Headers	1	FORO. Ch. 20

	Transition From IPV4 to IPV6 • Dual Stack, Tunneling, Header Translation	1	FORO. Ch. 20
	Routing • Properties of routing algorithm, Comparison of Adaptive and Non-Adaptive Routing Algorithms	1	TAN. Ch. 5
	Congestion Control • General Principles of Congestion Control, Congestion Prevention Policies	1	TAN. Ch. 5

Reference Books:
Computer Networks by Andrew Tanenbaum, Pearson Education.
Data Communication and Networking by Behrouz Forouzan, TATA McGraw Hill.

NOTE:
1) Only conceptual questions should be asked in examination on frame and packet format. Don't ask for entire frame or packet format.

CS-303: Introduction to System Programming and Operating System Concepts

Total lectures : 50

Chapter No.	Name of topic in Chapter	Total No. of lectures	Ref. Book & Page Nos.
1	**Introduction to System Program** • Introduction (Types and comparison of types of software) • Components of System Programming (Definitions only) • Assemblers • Loaders • Macros • Compilers and Interpreters • Editors • Debuggers	3	
2	**Introduction to Operating System** • Definition of operating system • Services provided by OS • Types of OS (Definitions only) • Early System • Mainframe System • Desktop System • System Calls : definition , implementation • Types of System Calls • Process or job control • Device Management • File Management • Information Maintenance • Communication • System call implementation • System Program	4	B3 → pg. 3 B3 → pg. 61 B3 → pg. 7 - 21 B3 → pg. 63 onwards
3	**Process Management** • Introduction and definition of process • Process state transition • Process Control Block • Process Scheduling • Scheduling queues • Types of schedulers • Long Term Schedulers • Middle Term Schedulers • Short Term Schedulers • IO Scheduler	4	B3 → Chapter 4 pg. 95 onwards

	• Context Switch		
4	**Threads** • Multithreading • Threading Issues • P Threads, Solaris – 2, Windows 2000, Linux, Java Threads : Introduction only, no coding)	2	B3 → Chapter 5
5	**CPU Scheduling** • Introduction • Scheduling Concepts • CPU- I/O Burst Cycle • CPU Scheduler • Preemptive and Non-preemptive scheduling • Dispatcher • Scheduling criteria (terminologies used in scheduling) • CPU Utilization • Throughput • Turnaround time • Waiting time • Response time • Scheduling Algorithms • FCFS • SJF (Preemptive & non-preemptive) • Priority Scheduling (Preemptive & non-preemptive) • Round Robin Scheduling • Multilevel Queues • Multilevel Feedback queues • Examples on scheduling algorithms	8	B3 → chapter 6 B3 → Pg. 73
6	**Process Synchronization** • Introduction • Critical section problem • Semaphores • Concept • Implementation • Deadlock & Starvation • Binary Semaphores • Problems of synchronization • Bounded buffer problem • Readers & writers problem • Dining Philosophers problem • Critical Sections • Monitors	6	(B3) →

7	**Deadlocks** • Introduction • Deadlock Characterization • Necessary Condition • Resource allocation graph • Examples • Handling Deadlock • Deadlock Prevention • Mutual Exclusion • Hold & wait • No preemption • Circular wait • Deadlock Avoidance • Safe State • Resource allocation graph algorithm • Bankers algorithm • Examples • Deadlock Detection • Single instance of each resource type • Several instances of a resource type • Detection algorithm usage • Recovery from deadlock • Process Termination • Resource Preemption	7	(B3) → Chapter 8
8	**Memory Management** • Introduction to memory management • Problems with memory management • Logical vs. physical addresses • Dynamic vs. static linking • Overlays (Ref from Ch. 5, Examples only) • Resident monitor • Swapping • Contiguous memory allocation (No Problems, only concept) • Single contiguous memory management module • Multiple contiguous memory management module • Non-contiguous memory allocation (No Problems, only concept) • Paging • Segmentation • Segmentation with paging • Virtual memory • Demand paging • Page replacement algorithms	8	B3 → chapter 9 (B3) → chapter 10

	• FIFO • MRU • LRU • LRU approximation using reference bit • MFU • LFU • Second Chance algorithm • Optimal replacement • Examples on Page replacement algorithm. • Allocation algorithms with minimum no. of frames		Pg. 320
9	**File System** • Introduction & File concepts (file attributes, operations on files) • Access methods • Sequential access • Direct access • Indexed access • File structure • File system mounting and sharing • Allocation methods • Contiguous allocation • Linked Allocation • Indexed Allocation • Free space management • Bit map or bit vector • Linked list • Grouping • Counting • File protection	5	(B3) → chapter 11 Pg. 372 (B3) → chapter 12 Pg. 421
10	**Device Management & I/O System** • Introduction and I/O Hardware • Interrupt (Maskable and non maskable) • Kernel I/O Subsystem • I/O Scheduling • Buffering • Caching • Spooling and device Reservation • Error Handling • Kernel Data Structures • Disk Scheduling • First Come First Served FCFS • Shortest seek time first (SSTF) • Scan • C-Scan • LOOK	3	(B3) → Chapter 13 Pg. 456 (B3) → Chapter 14

	• C-LOOK • Examples on Disk scheduling		Pg. 493

Reference Books :
System Programming and Operating System – D. M. Dhamdhere (B1)
System Software – An introduction to systems programming – Leland L. Beck (Pearson Edition) (B2)
Operating System Concepts – Silberschatz, Galvin, Gagne (B3)

Lab Assignments :
Simulation of
Banker's Algorithm
CPU Scheduling algorithms
FCFS, SJF (Preemptive, Non-preemptive), RR, Priority (Preemptive, Non-preemptive)
Page Replacement algorithms
FIFO, MRU, LRU, MFU, LFU
Disk Scheduling algorithms
FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK

CS-304: Core Java (Departmental)

Total Lectures: 48

Sr.No	Chapter	Book	Chapter in the book	No. of lectures
1	Introduction of Java Programming • Overview of Java platform • Brief History of Java • Technology • Java tools • Java Byte Code • Object Oriented • Programming Principles • Comparison between C++ and Java	1 2	1,2 1	2
2	Elementary Programming Concepts • Variables & Identifiers • Java keywords • Data types • Operators • Expression • Constants • Statements • Arrays • First Java Program	1 2	2,3,4,5 2,3	3
3	Classes & Packages • Introduction and Defining • Classes, methods, fields • Initializing fields • Static members • Constructors and Finalizers referencing objects • Using packages & Sub packages, • Access specifies	1 2	6,7,9 4	4
4	Inheritance, nested and inner class • Extending classes • Abstract class • Interface • Super keyword • Final keyword • Final classes • Constructors & Inheritance • Dynamic Binding • Overloading and Overriding methods	1 2	8, 5,9	4
5	String Handling & Exploring java.lang • String and String Buffer class • String Operations • Character Extractions • Data Conversion • Modifying strings	1	13, 14	3

Sr.No	Chapter	Book	Chapter	No. of lectures
6	Exception Handling and Input and Output package (java.io. package) • Introduction to exception • Try and catch block, throw, throws and finally block • Inbuilt exceptions • User-defined exceptions • Byte streams • Character streams • File IO basics Object serialization – reader and writer	1 2 4	10, 17 6,8	7
7	AWT, Event Handling and Applet programming • Layout Manager Layout • Manager, AWT Controls, Various Events and Listeners ,Adapter classes ,Applet fundamentals, Applet lifecycle, Creating and running applets, advantages and restrictions	1	19,20,21 ,22	10
8	Swings • Swing Features, Model View Controller Architecture for swings • Swing Controls • Component Organizers • JApplet , JFrame, JButton,JcheckBox, JtextField, JtabbedPane, JinternalFrame , JscrollPane, JLabel, JList, JTrees, JTables, JDialog, File chooser, Color chooser ,Menu Handling.	5	6	10
9	Multithreading • What are Threads, Life cycle of threads, • Running Multiple threads • The Runnable interface • Threads priorities Daemon, • Thread states, thread groups Synchronization and Interthread Communication Deadlocks	5 1	1 11	5

NOTE :

80 marks theory and 20 marks Lab assignments to be evaluated internally.

Reference: 1) The Complete Reference java 2 by Herbert Schildt. Tata Mc. Graw Hill

2) Java Programming Advanced topics by Joe Wigglesworth – Paula Lumby. Thomson Learning

3)Programming in java 2 by R. Raja Ram. SciTech Publications India Pvt. Ltd.

4) Core Java I - By Cay S. Horstmann and Gary Cornell

5) Core Java II - By Cay S. Horstmann and Gary Cornell

CS-305-Event Driven Programming (Win 32 SDK)

Total lectures: 47

Chapter No	Chapter Name	No of Lectures	Book	Page No
1	Overview Of Windows Programming • Brief history of windows • The use's perspective • GUI • Consistent user interface • Multitasking advantage • Memory management • Device independent graphics interface • Traditional MS-DOS program model & window program model • Programming in Dos vs programming in windows • Win 32 API • Object –Oriented programming • Message driven architecture	2	B2	20 to 38
2	First Windows Application • Hungarian Notation • Structure of windows application • First windows program[“The hello program] • Winmain() • Registering the window class • Creating the window • Displaying the window • Message loop • Window procedure • Processing the messages • Queued & nonqueued messages • Non-preemptive multitasking& preemptive multitasking	2	B1	41 to 66

3	The WM-Paint Message • Painting with text • The WM-Paint message • Valid & Invalid Rectangles • An introduction of GDI • The device Context(DC) • Getting DC-method1 • Getting DC-method2 • Release DC() • Windows RGB()macro	4	B1	71 to end of chapter
4	• Reading Input • The keyboard • Keyboard driver • Keystrokes & characters • Keystrokes message • The lparam variable • Virtual key codes (wparam variable) • Shift states • Character messages • The caret • Working with character set • The mouse • Mouse basics • Client area mouse messages • Processing shift keys • Mouse double keys • Non client area mouse messages • The hit-test message • Changing the mouse curser • Capturing the mouse • Timer basics • Using timer [method 1,2,3]	4	B1	211 & 273 to end of chapter
5	Window Controls • Child window controls • Button • Static • Edit • List Box • Scroll Bar • Combo ox • Creating common controls	4	B1	357 to end of chapter

	• Sending messages to common controls • Notification messages from controls • Creating a toolbar • Creating a status bar • Property sheets • Creating property sheets			
6	Resources • Icons • Getting a handle on icons • Using icons in your program • Cursor • Using alternate cursors • Moving cursor with the keyboard • Bitmaps • Character String Menus & Accelerators • Menu Structure • Menu template • Referencing the menu in your program • Menu & messages • Defining a menu dynamically • Floating popup menus • Changing the menu • Using bitmap in menu • Using system menu • Accelerators • Keyboard Accelerators • Accelerator table	4	B1	417 to end of chapter

7	Dialog Boxes • Introduction • Model Dialog boxes • Dialog box template • Dialog box procedure • Message boxes • Models Dialog boxes • Difference between model & models dialog box	4	B1	483 to end of chapter
8	GDI • The device context • Getting handle to the device context • The device context attributes • Saving device context • Mapping mode • Device co-ordinate systems	3	B1	71 to end of chapter
9	Drawing Graphics & Bitmaps • Drawing points • Drawin`g lines • Creating, Selecting& Deleting pens • Filling in the Gaps • Drawing modes • Drawing filled areas • Bounding box • Polygon function & polygon filling mode • Brushing the interior • Brushes & bitmaps • Brush alignment • Rectangles • Regions • Bitmaps • Device independent bitmap(DIB) • The DIB file • Displaying a DIB • Creating a DIB • GUI Bitmap object • Bitmap Format • Getting bitmap on the display	4	B1	641&723 to end of chapter

10	Meta Files & Fonts • Meta files • Memory meta files • Disk meta files • Enhanced metafiles • What meta files can do & cannot do • Text • Simple text drawing function • Device context attributes for text • Using stock fonts • Graying character string • Fonts • Types of fonts • Defining a logical font • Creating, selecting & deleting logical fonts • Enumerating the fonts	3	B1	997&1097 to end of chapter
11	Data Exchanges & Link • Clipboard • Clipboard function • Copying text to the clipboard • Pasting text from the clipboard • Pasting bitmap clipboard • Clipboard viewer • Clipment views chain function & messages • Dynamic data exchange • Clipboard transfers • Dynamic link libraries • Dynamic data exchange • The type of conversations	3	B1	5 67 &1243 to end of chapter
12	MDI • The elements of MDI • Initializing a MDI application • Creating the windows • Writing the main message loop • Writing the frame window procedure • Writing the child window procedure • Associating data with child windows	3	B1	1173 to end of chapter

13	Memory Management • Processes & memory space • Virtual address space • Heaps	1	B1	
14	Dynamic Link Libraries (DLL) • Creating a DLL • Implicit Linking • Explicit Linking • DLL entry/exit function	2	B1	1243
15	Multitasking & Multithreading • Modes of multitasking • Non-preemptive multitasking • Preemptive multitasking • Threads • Thread object • Attributes of threads • Multithreaded Architecture • Create thread function • Terminate thread function • Exit thread function • Thread synchronization • Critical section • Mutex object • Event object	2	B1	1197
16	ODBC • ODBC standards • ODBC elements • Environment ,connection & statement • ODBC Administration • SQL statement processing in ODBC	2	B3	Chapter2

Reference Books:

B1)Programming windows by Charles Petzold
B2)Windows programming primer plus by Jim conger.
B3)Microsoft ODBC programmer reference guide.

CS-306 Cyber Law
Elective III (Departmental)

Total Lectures: 48

Ch.No	Chapter Name and Details	**Page number & Reference Book**	**No. of Lectures**
1.	**Introduction to Cyber Law** • Definition, • Objectives of Cyber Law • Scope • Introduction to IT Act 2000 • Features of IT act 2000	Book 1 Page no 324 to 325, page 477	**2**
2.	**Cyber Crime in the Information age** • Concept of Cyber crime • Crimes on the net • Hacking(introduction) • Software Piracy • Cyber stalking • Virus on the internet • Defamation, Harassment & email abuse • Cyber Pornography • Monetary Penalties, adjudication and appeal under IT Act 2000	Book 1 Page 54,55 page 92,112,113 Page 67 Book 2 page 69 Page88	10
3.	**Intellectual Property Rights and Cyber Law** • Introduction • Objects of copyright • Requirement and Meaning of copyright • Copyright as bundle of rights • Framing • Linking & infringement • Information Technology act related to copyright and Acts which are not infringement of • Music & copyright infringement • Moral rights and internet prospective on intellectual property rights • Domain name Disputes	page183 page 147 to 173	8

4.	**Hacking – unauthorized Access to computer Material** • Introduction • Problem of hacking & basic hacking offence • Hackers • Kinds of hacker • Five common methods of attack • Destruction of digital information • Worms • Jurisdiction issues of hacking • Legislation in India		5
5.	**Security Aspects** • Encryption • Technical Aspects of Encryption • Encryption In crime and terrorism • Secret keys (password) • Firewalls • Role based Access control List • Steganography • Remote storage & audit disabling • Cellular phones & cloning • Terrorists get more tech-savvy	Page21 to 31 Page 37	8
6.	**Digital Signature** • How Digital Signature works(Asymmetric Cryptography & symmetric Cryptography)) • Creation and Verification of Digital signature • Certifying Authority to issue Digital signature • Controller of certifying Authorities • Refusal or renewal of license • Difference between handwritten signature and Digital signature	Page 229 to 242 Page 482	4
7.	**Cyber Law and Ecommerce** • Introduction to Ecommerce • The technical & economic context • Types of Ecommerce • Legal issues • Benefits and disadvantages of E-commerce • E-banking • Risk of Ecommerce • Cyber law & Ecommerce	Page 206 to 210	4
8.	**Defective Hardware or software** • Product liability • Negligence • Contractual liability • Development risk defense • Criminal Liability caused by computer defect	Page 443 to 452	3

9.	**Electronic Governance** • Legal Recognition of electronic records • Legal recognition of digital signatures • Use of electronic records and digital signatures in Government and its agencies • Retention of Electronic records • E-Gazette • 9.6 Attribution Acknowledgment & dispatch of electronic records	Page 483 to 486	2
10	**New Horizon in field of Information Technology by year 2020** • The death of distance • Improved connections • Increased mobility • More competition • Loss of privacy • Openness as Strategy • The rise of English • Global peace	Page 422 to 425	2

Reference Books:

1) Cyber Laws Dr Gupta & Agrawal , Premier publishing Company
2) Cyber Law simplified – Vivek Sood ,Tata MaGraw-Hill
3) Nature of Cyber Laws S.R. Sharma , Anmol Publications
4) Dimensions of Cyber Crime S.R. Sharma, Anmol Publications
5) Computer Forensics & Cyber Crimes Marjie Britz (pearson)

CS-306: Artificial Intelligence
Elective III (Departmental)

Total Lectures: 48

Chapter No.	Name of Topic	No. of Lectures	Reference Book
1	**Introduction to Artificial Intelligence** • What is AI? • Early work in AI • AI and related fields • AI problems and Techniques	2	Book 1(Pg 3) & Book 2 (Pg 1) Book 2 (Pg 5) Book 2 (Pg 7) Book 1 (Pg 8)
2	**Problems, Problem Spaces and Search** • Defining AI problems as a State Space Search: example • Production Systems • Search and Control Strategies • Problem Characteristics • Issues in Design of Search Programs • Additional Problems	4	Book 1 (Pg 29–61)
3	**Heuristic Search Techniques** • Generate-and-test • Hill Climbing • Best First Search • Problem Reduction • Constraint Satisfaction • Mean-Ends Analysis	6	Book 1 (Pg 63–97)
4	**Knowledge Representation** • Representations and Mappings • Approaches to Knowledge Representation • Knowledge representation method • Propositional Logic • Predicate logic • Representing Simple facts in Logic • Representing Instances and Isa relationships • Computable Functions and Predicates • Resolution • Forward and backward chaining	12	Book 1 (Pg 105–115) Book 1 (pg 131–164) Book 1 (Pg 177)
5	**Slot – and – Filler Structures** • Weak Structures • Semantic Networks • Frames • Strong Structures	7	Book 1 (Pg 251–275) Book 1 (Pg 277–295)

	• Conceptual Dependencies • Scripts		
6	**Game Playing** • Minimax Search Procedures • Adding alpha-beta cutoffs	2	Book 1 (Pg 310–314)
7	**Planning** • An example Domain: The Blocks world • Component of a planning system • Goal state planning • Nonlinear planning • Hierarchical Planning	4	Book 1 (Pg 329-356)
8	**Natural Language Processing** • Introduction • Syntactic Processing • Semantic analysis • Discourse and Pragmatic Processing	2	Book 1(pg 377-415)
7	**Learning** • What is learning • Rote Learning • Learning by taking advice • Learning in problem solving • Learning from examples • Explanation based learning	3	Book 1 (Pg447–471)
8	**Introduction to AI Programming Language** • PROLOG • Introduction to TURBO PROLOG • PROLOG variables • Simple Input and Output • Basic Rules of Recursion • Arithmetic Operations	6	Book 3 (Pg 1-23) Book 3 (Pg 45-52) Book 3 (Pg 70-78) Book 3 (Pg 96-100) Book 3 (Pg 115-127)

Note:
80 marks theory and 20 marks Lab assignments to be evaluated internally.

Reference Books:

Artificial Intelligence, Tata McGraw Hill, 2nd Edition, by Elaine Rich and Kevin Knight
Introduction to Artificial Intelligence and Expert System, Prentice Hall of India Pvt. Ltd., New Delhi, 1997, 2nd Printing, by Dan Patterson.
Introduction to TURBO PROLOG, BPB Publication, by Carl Townsend

CS-306 Computer Graphics
Elective III (Departmental)

Total Lectures: 48

Chapter No.	Name of Topics in Chapters	No. of lectures	Reference book and Chapter no.
1	**Introduction to Graphics :** • Advantages of Computer Graphics • Applications of Computer Graphics • Raster scan Display Devices • CRT Introduction to Pixels Frame Buffers • Direct View Storage Tube • Flat Panel Display • Emissive Display • Non Emissive Display • LCD • Input Devices Keyboard , mouse, track ball , Space ball, joy stick , Digitizer , Image scanner , touch panel and light pen. • Random Scan • Aliasing & anti-aliasing	3 lectures	R2: Chap 1 R4 : chap2
2	**Line Generation and Area Filling :** <u>Line Generation Algorithm</u> • Digital Differential Analyzer (DDA) algorithm • Bresenham's Line Generation Algorithm • Mid-Point Algorithm • Rubber band technique <u>Polygon Filling</u> • Scan Line Algorithm • Flood Fill Algorithm • Boundary Fill Algorithm • 4-Connected Polygon • 8- Connected Polygon • Inside Outside Test <u>Circle Generation Algorithm :</u> • Properties of circle • DDA Algo. • Bresenham's Algorithm • Mid Point Algorithm	6	R4: Chap 3 Section 3.1 to 3.7 R2 : Chap 3 section 3-1, 3-2, 3-5, 3-11.

3.	**2D Transformation :** • Homogenous Coordinates • Translation and Scaling • Shearing • Rotation about an arbitrary point • Rotation about origin • Reflection with respect to coordinate Axis • Reflection with respect to any arbitrary point • Reflection with respect to arbitrary line • Composite Transformation	7	R2, chapter 5 R4: chapter 4
4	**Viewing and Line Clipping Algorithms :** Window to View port Transformation • Clipping in 2D • Point Clipping • Clip window • Line Clipping Cohen – Sutherland line clipping Algorithm • Polygon Clipping • Sutherland- Hodgeman • Text Clipping • Bit- Map Graphics	5	R4: chapter 6 R2: chapter 6 Section 6-1 to 6-8. R3 :Page no. 156 R3 : Page no. 59
5.	**3D Viewing and Projections :** • Parallel Projections • Orthographic • Cavalier Oblique and Cabinet Oblique • Isometric • Perspective Projections • Transformation matrices • General parallel projection • Oblique projection • Perspective Projection • (single point) • Vanishing Points • 1-point and 2-point vanishing points • Principal vanishing Point • (no problem on two point vanishing point) *** Prerequisite : All 3D plane transformation (translation , rotation , scaling , reflection) should be covered in 2 lecture	8	R4 : chapter 7 R2: chapter 9 Section 9-1 Chapter 12; Section 12-1 to 12-4

6.	**Hidden surface elimination** • Hidden Surface Algorithms • Depth –Buffer • (Z buffer) Method • Scan-line Method • Depth Sorting Method Area Subdivision Method	6	R2 : Chapter 13 R4 : Chapter 8
7	**Light Color and Shading :** • Diffuse Illumination • Point- source Illumination • Shading Algorithm • Phong Shading • Halftone Shading • Gourand Shading • Constant intensity Shading • Ray Tracing • Ray Surface Intersection Calculation • Reducing Object- Intersection Calculation • Antialiased Ray Tracing • Refraction of light • Achromatic Light • Color Models • RGB , CMY , HSV and HLS color models • Colorimetry • Perceived color	8	R4 : chapter 9 R3 : page 294
8	**Computer Animation :** • Design of Animation sequences • Raster Animation • Key-Frame Systems • Motion Specifications	5	R2 : Chapter 16

NOTE :
80 marks theory and 20 marks Lab assignments to be evaluated internally.
References :

R1: **Computer Graphics: Principles and Practice**, J. Foley, A.van Dam, S. Feiner, J.Hughes, Addison Wesley Pub., 1997
R2: **Computer Graphics, D. Hearn, M. P.Baker**, Prentice Hall, 1997
R3: **Computer Graphics and geometric Modelling implementation and algorithm,** Max . K. Agoston
R4: **Computer Graphics , A.P .Godse**

MCA

CS- 306 (System Administration- I) Elective Departmental

Semester-III

Total Lectures 48

1. Network Administration [4]

- What is network administration
- Study of LAN component: File Server, Workstation, Types of Cables,- Cat5 Cable and Cat6 Cable Structure, connectors, Types of switches – Managed and Unmanaged, NIC, IEE802.3 Ethernet- traditional, fast and gigabit, Gateways- types, Routers – Wired and Wireless
- Physical Setup of LAN- selection of cables, cabling types: crossover cable and straight through. Concept of color codes, Crimping tools
- Managing Resources- h/w resources, disk quota, files and directories, software installation/upgrades, email application, network printing.

2. Managing Network Performance [4]

- Potential network performance problems: physical layer issues, network traffic, address resolution problems, internetworking issues.
- Tools and techniques- ping, trace route, network analyzer, h/w troubleshooting

3. Protecting the Network [6]

- Ensuring data integrity
- Protecting user data
- Firewalls
- Diskless workstation
- Encryption
- Virus shields
- RAID

4. Troubleshooting and Preventing Problems [4]

- Logical fault isolation – ADJUST method.
- Common Networking Problems
- Tools for gathering information

5. Installing, Administering, and Configuring MS Windows XP Professional [6]

- Installation of Windows XP Professional - devices drivers - boot process-desktop settings – security settings - networking Settings

6. Managing and Maintaining a MS Windows Server 2003 Environment [8]

- Installing Windows Server 2003
- Create & Populate - Organizational units user computer accounts - Groups - Access to resources - printing - Implement Group Policy - hard disks data storage - Disaster recovery - Device drivers- Audit accounts and resources - Monitor system performance - Maintain software update by using Microsoft SUS.

7. Implementing a MS Windows Server 2003 Network Infrastructure [16]

- *Network Hosts (i)*
  TCP/IP architecture - IP addressing - Calculate a subnet mask - subnets - VLSM - CIDR - Static IP -Dynamic IP - IP routing process - name servers - Isolate common connectivity issues.

- *Network Services (ii)*
  Install, configure and manage Routing and Remote Access Service (RRAS) - Dynamic Host Configuration Protocol (DHCP) - Windows Internet Name Service (WINS) - Domain Name System (DNS)- IP Security (IPSec) - Virtual Private Network (VPN) - dial-up Client - Wireless Lan (WLAN) Client.

Reference:

1. Computer Networks BY- Andrew Tanenbaum 4th Edition EEE
2. Data Communication and Networking By- Behrouz Forouzan 3rd Edition TMH
3. Complete Guide to Networking By- Peter Norton Techmedia
4. Microsoft Windows Server 2003 Administrator's Companion
   Charlie Russel, Sharon Crawford, Jason Geren- PHI
5 Microsoft® Windows Server™ 2003 by Microsoft Press

CS-401 Introduction to UNIX and UNIX Internals

Total Lectures : 48

Chapter No.	Name of topic in chapter in Chapter	Total No. of lectures	Ref. Book & Page Nos.
1	**Introduction to UNIX OS** • Features of UNIX • UNIX System Organization • Operating System Services • Assumption about Hardware • UNIX / Linux Commands • Redirection and Pipe	3	 B2 B2 B1 → Ch. 1.4 B1 → Ch. 1.5 B3 B2& B3
2	**Shell Programming** • Shell and Types of Shell • Shell commands • Environment Variables & Shell Meta characters • Operators & Statements used in shell script (Decision, Loop Control Statements) • File status statements • Examples of Shell Scripts	3	(B2) →
3	**Overview of a System** • Architecture of UNIX Operating System • Introduction to System Concept • Kernel Data Structure • System Administration	2	(B1) → Chapter 2
4	**The Buffer Cache** • Buffer Header • Structure of Buffer Pool • Buffer Retrieval • Reading and writing disks blocks • Advantages and disadvantages	3	(B1) → Ch. 3
5	**Internal representation of files** • I-nodes • Structure of a regular file • Directories • Conversion of pathname to an inode • Super block • I-node assignment to a new file • Allocation of disk block	4	(B1) → Ch. 4
6	**System calls for the file system** • Open • Read	10	(B1) → Ch. 5

	• Write • File and record blocking • Adjusting the position of file I/O - lseek • Close • File creation • Creation of Special Files • Change directory and change root • Change owner and change mode • Stat and fstat • Pipes • Dup • Mounting and Unmounting file systems • Link • Unlink • File System Maintenance		
7	**The Structure of Process** • Process states and transitions • Layout of system memory • The context of a process • Saving the context of a process • Manipulation of a process address space • Sleep	6	(B1) → Ch 6.
8	**Process Control** • Process creation • Signals • Process termination • Awaiting process termination • Invoking other programs • The user-id of a process • Changing the size of a process • The shell • System boot and init process	10	(B1) → Ch. 7
9	**Process Scheduling and time** • Process scheduling • System calls for time • Clock	3	(B1) → Ch. 8
10	**Memory Management Policies** • Swapping • Demand paging • Hybrid system with swapping and demand paging	5	(B1) → Ch. 9

Reference Books :

The Design of the UNIX Operating System→ Maurice J. Bach (Pearson Education)
UNIX Shell Programming → Y. P. Kanetkar (BPB)
UNIX Concepts & Applications → Sumitabha Das (THM)
Advanced Programming in UNIX Environment → Richard Stevens (Pearson Education)
Vijay Mukhi's The C Odyssey UNIX The Open Boundless C→ Meeta Gandhi, Tilak Shetty, Rajiv Shah (BPB Publication)

NOTE: Questions on writing algorithms should not be asked in the University Examination.

CS-402: Advanced Networking and Mobile Computing

Total Lectures: 48

Ch. No		Total Lectures	Reference Books
1	**Introduction to Mobile Networks (Lectures: 9)**		
	Applications of Mobile Networks • Vehicles, Emergencies, Business, Replacement of Wired Networks, • Location Dependent Services	1	Schiller. Ch.1
	Wireless Transmission • Signal Propagation Effects – Path loss, Multi-path Propagation, multiplexing and modulation	2	Schiller.Ch.2
	Spread Spectrum • Direct Sequence and Frequency Hopping	2	Schiller.Ch.2
	Cellular Systems • Advantages and disadvantages, Cluster	1	Schiller.Ch.2
	MAC Layer Protocols • Problems with CSMA/CD – Hidden and Exposed terminal • SDMA,FDMA, TDMA – DAMA, Polling, ISMA CDMA	3	Schiller.Ch.3
2	**GSM (Lectures: 6)**		
	Mobile Services • Bearer, Tele Services and Supplementary Services	1	Schiller.Ch.4
	System Architecture • Radio Subsystem, Network and Switching Subsystem, and Operation Subsystem	2	Schiller.Ch.4
	Localization and Calling • MOC, MTC	1	Schiller.Ch.4
	Handover • Reasons for a handover, handover scenarios	1	Schiller.Ch.4
	GPRS • Architecture	1	Schiller.Ch.4
	Introduction to Generators • 1G, 2G, 2+G,3G		
3	**Wireless LAN (Lectures: 3)**		
	IEEE 802.11 • System Architecture, • MAC Sublayer – Distributed Coordination Function(DCF), • Point Coordination Function(PCF), Addressing Mechanism	2	FORO. Ch.14
	Bluetooth	1	FORO. Ch. 14

	• Architecture – piconet, scatternet • Radio Layer, Baseband Layer – TDMA and Physical Links		
4	**The Mobile Network Layer (Lectures:6)**		
	Mobile IP • Goals, Assumptions and Requirements, Entities and Terminology, IP Packet Delivery • Agent Discovery – Agent Advertisement, Agent Solicitation • Registration, Tunneling and Encapsulation – IP-in-IP, Minimal and Generic • Optimizations, Reverse Tunneling	4	Schiller. Ch.8
	Mobile Ad-Hoc Networks • Advantages, Routing Problems in Ad-hoc Networks	2	Schiller. Ch.8
5	**The Transport Layer (Lectures:10)**		
	Process-to-Process Delivery • Client Server Paradigm, • Multiplexing and De-multiplexing, • Connectionless Vs Connection-Oriented Service, • Reliable Vs Unreliable	1	FORO. Ch.23
	User Datagram Protocol UDP) • Datagram Format, Checksum, UDP operations, Use of UDP	1	FORO. Ch.23
	Transmission Control Protocol (TCP) • TCP Services, • TCP Features, • TCP Segment, • TCP Connection, • Flow Control, Error Control	2	FORO. Ch.23
	TCP Congestion Control • Slow Start Mechanism	1	FORO. Ch.24
	TCP in Mobile Environment • Improvements on TCP – • Indirect TCP, • Snooping TCP, • Mobile TCP, • Fast Retransmit/Fast Recovery, • Transmission/time-out Freezing, • Selective Retransmission, • Transaction-Oriented TCP	4	Schiller. Ch. 9
	Introduction to SCTP	1	FORO. Ch. 23

	• Comparison of UDP, TCP and SCTP • SCTP Services – • Process-to-Process Communication, • Multiple Streams, • Multihoming, • Full Duplex Communication, • Connection-Oriented Service, • Reliable Service		
6	**The Application Layer (Lectures:8)**		
	Domain Name System (DNS) • Name Space, • Domain Name Space, • Distribution of Name Space, • DNS in the Internet, Name – Address Resolution	1	FORO. Ch.25
	TELNET • Timesharing Environment, • Logging, NVT, Embedding, Options, • Mode of Operations	1	FORO. Ch.26
	E-MAIL • Architecture, • User Agent, • Message Transfer Agent-SMTP, • Message Access Agent-POP, IMAP, • Web Based Mail	3	FORO. Ch.26
	File Transfer Protocol (FTP) • Communication over control connection, • Communication over Data Connection, • Anonymous FTP	1	FORO. Ch. 26
	WWW • Architecture, • WEB Documents	1	FORO. Ch. 27
	HTTP • HTTP Transaction, • Persistent and Non-persistent Connection, • Proxy Server	1	FORO. Ch. 27
7.	**Internetworking Devices (Lectures:2)**		
	Physical Layer Devices • Repeaters, Hubs		FORO. Ch. 15
	Data Link Layer Devices • Bridges – Transparent and Source Routing Bridges, • Bridges Connecting Different LANs		FORO. Ch. 15
	Network Layer Devices • Routers		FORO. Ch. 15
	Gateways		FORO. Ch. 15

8.	**Wireless Application Protocol (WAP) (Lectures: 4)**		
	Architecture • WDP, WTLS, WTP, WSP, WAE,WTA, • Push Architecture	4	Schiller. Ch. 10

Reference Books:
Mobile Communications by Jochen Schiller, Pearson Education
Data Communication and Networking by Behrouz Forouzan, TATA McGraw Hill.

NOTE:
1) Only conceptual questions should be asked in examination on frame and packet format. Don't ask for entire frame or packet format.

CS-403 Distributed Database System.

Total Lectures : 54

Name of the Topic	No of Lectures	Text Book Chap. No.
1. Introduction to DDBMS • Distributed Data Processing • Introduction to DDBS • Introduction to DDBMS • Promises of DDBMS • Complicating factors and problem areas in DDBMS	3	1
2. Distributed DBMS Architecture • DBMS Standardization • Architectural models of DDBMS • DDBMS architectures and global directory issues.	5	4
3. Distributed Database Design • Alternative design strategies • Distributed design issues • Fragmentation and allocation	8	5
4. Overview of Query Processing • Query Processing problems • Objectives of query processing • Complexity of relational algebraic operations • Characterization of query processing • Layers of query processing	4	7
5. Query Decomposition and Data Localization • Query decomposition • Localization of distributed data	6	8
6. Optimization of Distributed Queries • Query optimization • Centralized query optimization • Join ordering of fragmented queries • Distributed query optimization	8	9
7. Transaction Management • Definition of transaction • Problems of transaction • Types of transaction • Architecture revisited	2	10
8. Distributed Concurrency Control • Serilizability Theory • Taxonomy of concurrency control mechanisms • Locking based concurrency based protocols • Timestamp based concurrency based protocols	10	11

• Optimistic concurrency control • Deadlock management • Relaxed concurrency		
9. Distributed DBMS Reliability • Reliability concepts and measures • Failures & fault tolerance in distributed systems • Failures in DDBMS • Local reliability protocols • Distributed reliability protocols • Dealing with site failures • Network partitioning	8	12

Text Book : Principles of Distributed Database Systems; 2nd Edition
By M. Tamer Ozsu and Patrick Valduriez
Published by Person Education Asia
ISBN 81-7808-375-2

References : Distributed database principles
By Stefano Ceri and Giuseppo Pelagatti
Published by McGraw-Hill International Editions
ISBN 0-07-010829-3

CS-404 Advanced Java (Departmental)

Total Lectures : 52

Sr.No	Chapter	Book	Chapter in the book	No. of lectures
1	JDBC • The design of JDBC, • Basic JDBC programming concepts • Making the connection, Statement and Result set , Executing SQL commands , Executing Queries, Scrollable and Updatable Result Sets, • MetaData, • (Databases : Mysql/ SQL Server/ PostgreSQL/Oracle)	2	4	5
2	Collections Framework • Collection Interface, o List, Sets, • Sorted Set • Collection classes, • Linked List, • Array Lists • Vectors, • Hash Set, • Tree Set • Using Iterates and • Enumerators, • Working with Maps • Map Interface • Map classes	2 1	2 15	5
3	Networking • Networking Basics • Socket Overview, • Client/Server, • Reserved Sockets, • Proxy Servers, • Internet Addressing • Inet Address, • Factory methods • Instance methods • TCP/IP client socket, • URL, URL Connection, • TCP/IP Server sockets, Datagrams, • Developing small application with sockets	1 2	18 3	6

4	Servlets • What are Servlets?, Advantages of Servlet, • Lifecycle of servlet, • Using Tomcat for servlet development, • javax.servlet package, • The Servlet Interface • The ServletConfig • Interface • The ServletContext • Interface • ServletRequest • ServletResponse • SingleThread Model • GenericServlet Class • ServletInputStream • ServletOutputStream • ServletException • javax.servlet.http package, • HttpServletRequest, • HttpServletResponse • HttpSession • The Cookie class, • HttpServlet class • Handling HTTP Requests and Responses • GET requests • POST requests • Servlet - JDBC • Session Tracking, • Security Issues.	1	27	10
5.	Remote Method Invocation • Introduction to Remote Objects, • RMI architecture, • registry, • stubs and skeleton, • Setting up Remote Method Invocation, • Using RMI with Applets	2	5	5

Sr.No	Chapter	Book	Chapter	No. of lectures
6.	JavaBeans • What is Bean?, • Advantages • Using the Bean Development Kit (BDK) • Introduction to Jar and manifest files, • The Bean Writing process, • The Java Beans API	1	25	5
7.	Introduction to EJB • Introduction and purpose of Application Servers • Introduction to EI.			5
8	Introduction to JSP • Components of JSP – directives, tags and scripting elements. • Building a simple application using JSP	3	11	5
9	XML • An introduction to XML, • Parsing an XML Document, Using SAX Parser, Generating XML Documents,	2	12	6

NOTE : 80 marks theory and 20 marks practical assignments to be evaluated internally.

Reference:

1) The Complete Reference java 2 by Herbert Schildt. Tata Mc. Graw Hill 5th edition.

2)Core Java –II. By Cay S. Horstmann and Gary Cornell

3) Book Complete Reference J2EE by Jim Keogh

CS 405 : Object Oriented Software Engineering

Total Lectures : 50.

Chap No.	Chapter Name	No. of Lect.	Reference Book
1	Object Oriented Concepts and Modeling • What is Object Orientation? (Introduction to class, Object, inheritance, polymorphism) • Model & Domain Model • Importance of Modeling • Principles of Modeling • Object Oriented Modeling	6	R2-22,R4-134 R1-26 R1-29 R1-32
2	Object Oriented System Development • Introduction to Function/data methods • Object Oriented Analysis • Object Oriented Design • Object Oriented Testing	2	R3-436 R3-471
3	Introduction to UML • Overview of UML • Conceptual Model of UML • Architecture • S/W Development Life Cycle	3	R1-36 R1-39 R1-52 R1-55
4	• Basic and Advanced Structural Modeling Classes • Relationship • Common mechanism • Diagrams • Class Diagrams • Interfaces, Types, and Roles • Packages • Instances • Object diagrams	6	R1-69 R1-83 R1-97 R1-113 R1-127 R1-177 R1-191 R1-205 R1-217
5	Basic Behavioral Modeling • Interactions • Use cases • Use case diagram • Interaction diagram • Activity Diagram • State Chart diagram	4	R1-227 R1-241 R1-255 R1-265 R1-279 R1-353

6	Architectural Modeling & Re-Engineering • Components • Component diagram • Deployment diagram • Reverse Engineering • Forward Engineering	4	R1-365 R1-415,R4-653 R1-429 R4-878 R4-884
7	Object Oriented Analysis • Inception • Categories of Requirement • Use case model • Actor, Kinds of Actor • Use cases in Iterative Method • Elaboration • Construction • Transition	4	R4-48 R4-56 R4-64 R4-66 R4-95 R4-128 R4-33 R4-33
8	Object Oriented Design • Generic components of OO Design model • System Design process - Partitioning the analysis model - Concurrency and subsystem allocation - Task Mgmt component - Data Mgmt component - Resource Mgmt component - Inter sub-system communication • Object Design process	4	R5 – 579 R5 – 611 R5 - 618
9	Object Oriented Testing • Overview of Testing and object oriented testing • Types of Testing • Object oriented Testing strategies • Test case design for OO software • Inter class test case design	4	R5 – 632 R5 – 633 R5 - 636 R5 - 637 R5 - 645
10	Iterative, Evolutionary and Agile • Unified Process, Rational Unified Process • UP Phases • UP Disciplines • Agile UP • Agile Methods and Attitudes • Agile Modeling	5	R4-18 R4-33 R4-34 R4-31 R4-27 R4-30
11	Case Studies on UML	6	R6 & Ref Books

References :
R1 : The Unified Modeling Language User Guide by Gr.Booch,Rumbaugh,Jacobson
R2 : The Unified Software Development Process by Ivar Jacobson,Booch,James Rumbaugh
R3 : Software Engineering Principles and Practice by Waman Jawadekar
R4 : Applying UML and Patterns by Craig Larman
R5 :Software Engineering by Pressman Fifth Edition
R6 : Object Oriented Software Engineering by Ivar Jacobson

Other References :
UML in NutShell by O'Relly
Object Oriented Design by Peter Coad, Edward Yourdon

CS 406 Modeling And Simulation
Elective IV (Departmental)

Total Lectures : 52

Ch.No.	Name of the Chapter	Total no of lectures	Ref books and page nos
1	Random Number Generators • Properties of a good random number generator. • Linear Congruential Generators • Testing Random Number Generators Chi-Square Test Run Test	4	R1: 7.1 R1: 7.2 R1: 7.4.1
2	Review of Basic Probability and Statistics • Random Variable and their properties o Discrete and Continuous random variables o Probability distribution of a discrete and o continuous random variable. o Distribution Function. o Mean and Variance o Joint Probability distribution for a o discrete and continuous random var. o Marginal Probability distributions. o Covariance and Correlation	12	R1: 4.2
3	Selecting Input Probability Distributions • Introduction • Useful Probability Distributions ▪ Discrete Distributions: Binomial, Discrete Uniform, Geometric, Poisson ▪ Continuous Distributions Uniform, Exponential, Gamma, Normal, Parato • Techniques for assessing sample Independence • Hypothesizing families of distributions ▪ Summary Statistics ▪ Histograms ▪ Quantile Summaries • Estimation of parameters • Determining how representative the fitted distributions are ▪ Density/Histogram overplots ▪ Distribution function difference plot ▪ Probability plots(P-P and Q-Q) ▪ Chi Square test for goodness of fit	12	R1: 6.1 R1: 6.2.3 R1: 6.2.2 R1: 6.3 R1: 6.4 R1: 6.5 R1: 6.6

	▪ Kolmogorov Smirnov Test		

4	Generating Random Variates • Inverse Transform • Generating Discrete random variates Uniform, Binomial, Geometric, Poisson • Generating Continuous random variates Uniform, Exponential, Normal	4	R1: 8.2.1 R1: 8.4 R1: 8.3
5	Basic Simulation Modeling • Nature of Simulation and application areas of simulation • Systems, Models and Simulation • Discrete Event simulation Time-Advance Mechanisms Components and organization of a Discrete-Event Simulation model • Simulation of a Single Server Queuing System ▪ Manual simulation with an illustration ▪ Program Organization and Logic • Simulation of a Two Server Queue • Simulation of an Inventory system ▪ Manual Simulation with an illustration ▪ Program Organization and Logic • Continuous Simulation (Examples) • Monte Carlo Simulation (Examples) • Advantages, Disadvantages of Simulation	14	R1: 1.1 R1: 1.2 R1: 1.3 R2: 17.8 R3: 73-75 R3: 76-81 R2: 17.11-1 R1: 1.5.1-1.5.2 R3: 15-27 R2: 17.10 R1: 1.9
6	Output Data Analysis • Introduction • Statistical analysis • Obtaining Specified precision	4	R1: 9.1 R1: 9.4.1
7	Validation and Verification	2	R1: 5

Note: 80 marks for theory and 20 marks for practical assignments.

Reference Books:

R1: Simulation Modeling And Analysis: Averill M.Law , W. David Kelton
Tata McGraw-Hill Edition
R2:Operations Research: S.D.Sharma
R3: System simulation with Digital Computer: Narsingh Deo
Prentice-Hall of India

CS 406 Embedded Systems
Elective IV (Departmental)

Total Lectures: 50

Chapter No.	No. of lectures	Name of book
Chapter 1 • Introduction • Definition of Embedded system • Embedded system block diagram • Classification of Embedded systems • Embedded system-on-chip (SoC) and use of VLSI circuit design • Design process • Design metrics • Examples of Embedded systems	3	Embedded system Design --- Steve heath
Chapter-2 **8051 and Advanced Processor Architectures, Memory organization and Real world Interfacing** • 8051 Architecture – (Block diagram, explanation of block diagram) • A brief about 8051 Instruction Set (??) • Device addresses in Real world interfacing- address bus, data bus, control bus, memory mapping techniques- I/O mapped I/O, memory mapped I/O • Interrupts in 8051 processor (??) • Introduction to advanced architectures: • 80x86 architecture, ARM processor, DSP processor (Block diagram level), CISC,RISC • Instruction level parallelism (pipelining and superscalar architecture) (??) • Memory : ROM : Masked ROM, EPROM,EEPROM,OTP ROM, Flash memory, RAM : SRAM,DRAM, SDRAM,RDRAM, Address allocation in memory. • Peripheral Devices: Different I/O types, serial devices, parallel port devices, timers and counters, watchdog timer, RS232, USB, UART, parallel bus device protocol --- parallel communication using ISA,PCI, PCI-X and advanced buses.	10	Embedded system Design --- Steve heath, Embedded system— Raj kamal

Chapter 3 **Device drivers and Interrupt Service Mechanism** • ISR concept • Interrupt sources • Interrupt servicing mechanism • Multiple interrupts • Device driver programming (virtual device drivers, parallel port drivers in system, serial port drivers in a system, device drivers for internal programmable timing devices.	6	Embedded system Design --- Steve heath
Chapter 4 **Real Time Operating System** • Process, process states, context switch, scheduler, priority inversion, reentrant function, shared data, Inter process communication, (enabling and disabling of interrupt, event flags, semaphore, pipe, message, mailbox) • Commercial real time operating systems • Basic design using RTOS • RTOS task scheduling models, Interrupt latency and response of tasks • Hard real time scheduling considerations	10	Embedded system Design --- Steve heath, Embedded system design and RTOS --- Micheal barr Embedded system Design – David E Simon
Chapter 5 **Programming concepts and Embedded programming in 'C'** • Software programming in Assembly language and high level language 'C' • C extensions for embedded system • Case study(??) • Concept of porting of kernel • Creating library • Using standard library	10	Embedded system Design --- Steve heath
Chapter 6 **Testing, Debugging and simulation techniques** **Compilation process** • Cross compilation (concept only) • Linker/Loader, linker/loader options • High level language simulation • Low level language simulation • Onboard debugger • Emulation techniques : JTAG, OnCE	6	Embedded system Design --- Steve heath

Chapter 7 **Real time performance without using RTOS** • Choosing the software environment • Scheduling the data sampling • Deriving the real time performance from non real time system	5	Embedded system Design --- Steve heath

Reference Books:
Embedded system design --- Steve heath
Embedded system Design --- Frank Wahid
Embedded system Design – David E Simon
Embedded system Design --- Raj Kamal
Real time operating system --- Micheal Barr

CS 406: MFC
Elective IV (Departmental)

Total Lectures: 45

Topics	Reference	
	Book No.	Page No
Chapter – 1**: Introduction** (No. of Lectures 3)		
1. The Windows Programming Model • Message Processing • Windows Graphics Device Interface • Memory Management • Dynamic Link Libraries • Win32 Application Programming Interface	1	3
2. Visual VC++ Components • Code compilation • Resource compilation • Linker	1	6
3. "Hello World" program • Example	1	33
Chapter – 2: **Application Framework** (No. of Lectures 2)		
1.What is application Framework?	1	22
2. Uses of Application Framework • Framework use a standard structure • Framework are small and fast • Reduce coding drudgery	1	17
3. Application Framework Example	1	26
Chapter – 3**: Graphics Device Interface, Colors & Fonts** (No. of Lectures 12)		
1. Event handling • Message Map Function • Invalid Rectangle • Window's client area	2	27
2. Device Context Classes • CClientDC Class • CWindowDC class • CPaintDC Class • Constructing & Destroying CDC Objects	1	75
3. GDI Object • CBitmap,CBrush,CFont,CPalette • CPen,CRgn • Constructing & Destroying GDI bject	2	54

4. Mapping Mode • GDI Mapping Modes • Cordinate conversion	2	46
5. Windows Common Controls • Progress Bar • Track Bar • List Control • Tree Control • SpinControl • Slider	1	131
6. Windows Message Processing • Timer • On-idle Processing • Multithreaded Programming	2	805
Chapter – 4**: Windows Common Dialogs** (No. of Lectures 5)		
1. Dialog Controls • Edit Box • Radio Button • Button • List Box • Static Text • Combo Box • Horizantal Scroll Bar • Vertical Scroll Bar	2	315
2. Modal Dialog Box • Example	1	103
3. Modaless Dialog Box • Example	1	147
4. Windows Common Dialogs • CFileDialog • CFontDialog • CPrintDialog • CFileDialog • CColorDialog	1	156
Chapter – 5: **The Document View Architecture** (No. of Lectures 12)		
1.Menus,Keyboard Accelerator,Rich Edit Control • Command Processing • Command Message Handling classes • CEditView Classes • CRichEditView Class • CRichEditCtrl	1,2	287,177

2. Property Sheet • Buliding a Property Sheet, • Property Sheet Data Exchang	1	301
3. ToolBar & Status Bar • Button States • Toolbar & Command Messages • ToolTips • Status Bar Definition • The Message Line • Status Indicator	1	323
4. Splitting Windows • The Splitter Window • Dynamic & Static Splitter Windows	2	639
5. SDI Application • Serialization • SDI Application	2	302
6. MDI Application • MDI Application	2	610
Chapter –6: **Component Object Model** (No. of Lectures 2)		
1. Component Object Model • Introduction • COM Interface • COM with the MFC library	1	639
Chapter – 7: **ATL & ActiveX Controls** (No. of Lectures 5)		
1. ATL • Introduction to ATL	1	784
2. ActiveX Controls • What is ActiveX Control? • Creating & Developing ActiveX Control	1	
Chapter – 8: **Database Management with Microsoft ODBC** (No. of Lectures 4)		
1. Advantages of Database Management	1	898
2. The ODBC Standard • MFC ODBC Classes • MFC CRecordView Classes • Microsoft Data Access	1	899

Note: 80 marks for theory and 20 marks for practical assignments.
Reference Books:-
Programming Microsoft Visual C++
By David Kruglinski.
Programming Windows With MFC : By Jeff Prosise.

CS 406:System Administration II(Linux/Unix)
Elective IV (Departmental)

Objective :

- To meet the ever increasing demand for Linux skills
- To promote thinking in terms of functionality rather than software
- To acquire the basic skill of System Administration
- This course is aimed to provide detailed know how of the GNU/Linux system to the user at level where the person after the successful completion of the course will have a understanding of the OS, will be able to manage/install/upgrade packages. Basic system tweaking, modifying run levels, modify services status, security setup etc.

Total Lecture : 48

Sr.No.	Contents	No. of Lectures
1	**Introduction** • Know Your PC • Unix and Linux History • Different Linux Distribution	2
2	**System Administration Overview** • Daily tasks of system Administrator • Responsibilities of System Administrator	2
3	**Linux Installation** • Text VS Graphics • Partitioning & Disk mgt • Package mgt • GUI Configuration	3
4	**File manipulation Under Linux** • Copy rename,delete & move • File & directory listing • File handling & I/O redirection • File systems and their types • Names & contents of important Unix/Linux file directories • Compatibility of file Systems • Fsck & Disk check Commands • Log files	6
5	**Command Line Interface** • Text Manipulation Commands e.g. cut,grep,egrep,split,paste • Vi editor • su,ps,find,make,df/du • Introduction to Regular expression • awk,sed,passwd,wc,Antivirs,utilities,tar,gzip/gunzip,accessing pen drive,C.D.,gdb	6

6	**Users and Groups** • Concept of users & groups • Owner creator • Primary and Secondary group • Types of file and directory permission	3
7	**Startup/shut down** • Booting • Run Levels • /etc/init tab • shut down • crashes	2
8	**Basic system Administration** • Managing Users and groups(from console & GUI modes) Using command like adduser, userdel, groupadd, groupdel etc. • Basic Network Setup Setting hostname, IP address of the machine. Setting a dialup connection. • Installing and removing packages. Using the RPM, source package installation, URPMI. • Managing Partitions Understanding the/etc / fstab • Boot loader management Understanding the lilo and grub boot loader and its configuration files. • Configuring services, chkconfig, ntsys, start, Resart & stop Service	10
9	**Networking** • Internetworking with windows(samba) • Ping Telnet, ftp, ssh program • NIS, NFS, Tomcat web server	10
10	**Print Services** • Prints Installation & Addition • Print sports • Print command	4