

M.Sc
COMPUTER SCIENCE
1st SEMESTER

Ref: LII(1)/BOS/Rev.Syllabi/CSSE/03 dated 21-06-03

With Effect From 2003 – 04 Admitted Batch

Syllabi

Chairman
Board of Studies

Dept of Computer Science and Systems Engineering
College of Engineering
Andhra University
Visakhapatnam

MASTER OF SCIENCE IN COMPUTER SCIENCE
Course Structure and Scheme of Examination
1st SEMESTER

With effect from 2003 – 04 admitted batch
(NoLII(1)/BOS/Rev.Syllabi/csse/03, dated 21-06-2003)

Code	Name of the Subject	Periods/ week		Max Marks		
		T	L	Exam	IA	Total
MSCS1.1	Discrete Mathematical Structures	3	-	75	25	100
MSCS1.2	Computer Organization	3	-	75	25	100
MSCS1.3	Data Structures and Algorithms	3	-	75	25	100
MSCS1.4	Systems Programming	3	-	75	25	100
MSCS1.5	Data Communications	3	-	75	25	100
MSCS1.6	Computer Organization Lab	-	3	50	50	100
MSCS1.7	Data Structures Lab	-	3	50	50	100

Text Book:

Discrete Mathematics and its applications (Fifth Edition), Kenneth H. Rosen
Tata McGraw-Hill Publishing Company.

Reference:

Discrete Mathematics for computer Science & Mathematics(Second Edition),
J.L.Mott, Abroham Kandel, & T.P.Baker. Prentice-Hall of India(Ltd).

MSCS 1.2

Computer Organization

Instruction: 3 Periods/week

External Assessment: 75Marks

Internal Assessment: 25 Marks

Time: 3 Hours

1.Digital Logic Circuits (Review)

4 Periods

Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential Circuits

2.Digital Components

5 Periods

Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit

3.Data Representation

4 periods

Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes

4.Basic Computer Organisation and Design

9 Periods

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic

5.Microprogrammed Control

4 periods

Control Memory, Address Sequencing, Microprogram Example

6.Central Processing Unit

10 periods

Introduction, General Register Organisation, Stack Organisation, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC)

7.Input-Output Organisation

6 Periods

Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA)

8.Memory Organisation

6-Periods

Memory Hierarchy, Main Memory, Auxiliary Memory, Associate Memory, Cache Memory

Text Book:

Computer System Architecture (Third Edition),. Morris Mono - Prentice Hall of India Pvt. Ltd., Eastern Economy Edition, Sept. 2002

MSCS 1.4

Systems Programming

Instruction: 3 Periods/week

External Assessment: 75 Marks

Internal Assessment: 25 Marks

Time: 3 Hours

1. Introduction to Systems Programming 6 Periods
Machine Structure - Machine and Assembly Language Programming with IBM 360/370 -
Grammars -Types of Grammars –Languages, FSM

2. Concepts of Single Pass, Two- Pass and Multi- Pass Assemblers 11 Periods
Design of a Single and Two-Pass Assembler

3. Macros and Macro Processors 11 Periods
Definition - Types of Macros - Macro Instructions - Features of Macro Facility like
conditional Macro Expansion - Macros Calls within Macros - Macro Definitions within
Macros - Design of Macro Processors: Single - Pass and Two - Pass.

4. Loaders: 11 Periods
Absolute Loader - Relocation Loader - Binders - Dynamic Loading and Linking - Design
of Absolute Loader and Direct Linking Loaders.

5. General Model of Compiler 6 Periods
Phase of a Compiler - Detailed Discussion of different Phases

Introduction to Software Tools 3 Periods
Text editors, Interpreters, Program Generators, Debug Monitors.

Text Books:

Systems Programming , John J. Donovan

Systems Programming and Operating Systems, D.M.Dhamdhare

MSCS 1.5

Data Communications

Instruction: 3 Periods/week

External Assessment: 75Marks

Internal Assessment: 25 Marks

Time: 3 Hours

Data Communication networks and open system standards: 3 Periods
Data communication networks, Standards, ISO reference model.

The Electrical Interface: 9 Periods
Transmission media, Attenuation and distortion sources, Signal types, Signal propagation delay, Public carrier circuits, Physical layer interface standards.

Data Transmission: 12 Periods
Data transmission basics, Asynchronous transmission, Synchronous transmission, Error detection methods, Data compression, Transmission control circuits, Communications control devices.

Protocol basics: 12 Periods
Error Control, Idle RQ, Continuous RQ, Link management.

Data link control protocols: 12 Periods
Application environments, Character-oriented protocols, Bit-oriented protocols.

Text book:

Data Communications, Computer Networks and Open Systems, Fred Halsall- Pearson Education, Low Price Edition, 4th edition, 2001.

Reference:

Data and Computer Communications, Williams Stallings, Prentic-Hall India , Eastern Economy Edition, 6th Edition, 2003

MSCS 1.6.

Computer Organisation Lab

Practical : 3 Periods/week
Internal Assessment: 50 Marks

External Assessment: 50 Marks
Time: 3 Hours

Experiments in the following areas

T T L Characteristics

T T L I C Gates

Flip-Flops

Counters

Shift Registers

Multiplexers

Decoders

8085 Assembly Language Programming

PC Architecture

Hardware: Demonstration of Software lab environment (configuration & internal parts of PC)

Software: PC assembler (TASM / MASM) - minimum of 10 problems.

Note:

1 Week for Lab. Instruction, 1 Week for Repeat Expts, 7 Week for expts. 1 to 7

4 Weeks for expt. 9, 3 Weeks for expt. 9

MSCS 1.7

Data Structures and Algorithms

Practical : 3 Periods/week

External Assessment: 50 Marks

Internal Assessment: 50 Marks

Time: 3 Hours

1. Implementation of linked lists with insert, delete, display, reverse function.
2. Array implementation of stack to evaluate a given postfix expression after accepting values of single character operands at run time.
3. Circular array implementation of queue with menu option like insert, delete, display, exit.
4. Construction of a Binary search tree and display in-order, pre-order, and post-order sequences of its nodes.
5. Implementation of ADT Binary Tree with create, insert, delete and find height operations.
6. Implementation of Hash Table.
7. Write C++ program for merge sort.
8. Write C++ program for quick sort.
9. Write C++ program for Heap sort.
10. Implementation of Dijkstra's Algorithm.
11. Implementation of Kruskals Algorithm.
12. Finding topological ordering of the nodes of a graph.

M.Sc
COMPUTER SCIENCE
2nd SEMESTER

Ref: LII(1)/BOS/Rev.Syllabi/CSSE/2003 dated 8-10-2003

With Effect From 2003 – 04 Admitted Batch

Syllabi

Chairman
Board of Studies

Dept of Computer Science and Systems Engineering
College of Engineering
Andhra University
Visakhapatnam

MASTER OF SCIENCE IN COMPUTER SCIENCE

Course Structure and Scheme of Examination

FIRST YEAR - II SEMESTER

With Effect From 2003-04 admitted batch

Ref: LII(1)/BOS/Rev.Syllabi/CSSE/2003 dated 8-10-2003

Sub. Ref. No.	Name of the Subject	Periods			Max Marks	
		Lec	Lab.	EA	IA	Total
MSCS2.1	Computer Networks	3	-	75	25	100
MSCS2.2	Computer Graphics	3	-	75	25	100
MSCS2.3	Operating Systems	3	-	75	25	100
MSCS2.4	Artificial Intelligence	3	-	75	25	100
MSCS2.5	Object Oriented Programming	3	-	75	25	100
MSCS2.6	Unix Programming Lab	-	3	50	50	100
MSCS2.7	Data Communications Lab	-	3	50	50	100

MSCS 2.1

COMPUTER NETWORKS

Instruction: 3 Periods/week
Internal Assessment: 25 Marks

External Assessment: 75Marks
Time: 3 Hours

LOCAL AREA NETWORKS:

6.1.1Topology, 6.1.2Transmission Media, 6.1.3 Medium Access Control Methods, 6.2.1CSMA/CD Bus, 6.2.2, Token Ring, 6.2.3Token Bus, 6.3Performance, 6.4 Wireless Lans, 6.4.1Wireless Media, 6.5Protocols, 6.5.1MAC Sub Layer Services, 6.5.2LLC Sub Layer, 6.5.3Network Layer, 7.5Bridges, 7.6Transparent Bridges, 7.7 Source Routing Bridges, 7.7.3 Internetworking With Different Types.

WIDE AREA NETWORKS:

8.1Characteristics Of Public Data Networks, 8.1.1Circuit And Packet Switching, 8.1.2Data Grams And Virtual Circuits, 8.2 Packet Switched Data Networks, 8.2.1 Physical Layer, 8.2.2Link Layer, 8.2.3Network Layer, 8.4ISDN, 8.4.1User Interfaces, 8.4.2Network Access Points, 8.4.3Channel Types, 8.4.4 User Network Interface, 8.4.5User Interface Protocols, 8.4.6Signaling Protocols, 8.4.7Frame Relay Services.

INTERNETWORKING:

9.1Internetworking Architecture, 9.2Internetworking Issues, 9.5Internet IP, 9.5.1 Address Structure, 9.5.2Data Grams, 9.5.4Fragmentation And Reassembly, 9.5.5 Routing, 9.5.6Internet Control Message Protocol, 9.6IPv6, 9.6.1Data Gram Structure, 9.6.2 Multicast Support

TRANSPORT PROTOCOL:

11.1User Data Gram Protocol, 11.2TCP, 11.2.1Reliable Stream Service, 11.2.2 Protocol Operations.

APPLICATION SUPPORT PROTOCOL:

12.1Session Layer, 12.1.1Token Concept, 12.2Presentation Layer, 12.4Data Encryption, 12.4.1Terminology, 12.4.2Basic Techniques, 12.4.3 DES, 12.4.4 RSA, 12.4.5 Message Authentication.

TCP/IP APPLICATION PROTOCOLS:

13.1.1Establishing Transport Connection, 13.1.2TELNET, 13.1.3FTP, 13.1.4SMTP, 13.1.5SNMP Worldwide Web (From A. S. Tannenbaum Section 7.6), 14.1Directory Services, 14.1.1 Domain Name System.

Text Book:

Fred Halsall, Data Communications, Computer Networks And Open Systems, Fourth Edition, Addison Wesley [Pearson Education 2000]

Reference Books:

1. Andrew S. Tanenbaum, Computer Networks, Third Edition. PHI, 1999.
2. Larry L Peterson And Bruce S Davie, Computer Networks- A Systems Approach, Second Edition, Harcourt Asia, Pte. Ltd, 2000.

MSCS 2.2

COMPUTER GRAPHICS

Instruction: 3 Periods/week
Internal Assessment: 25 Marks

External Assessment: 75Marks
Time: 3 Hours

1.Vector and Raster Graphic Fundamentals - Line Drawing Algorithms: Simple DDA, Symmetric DDA and Bresenhana's (B11 quadrants). Circle Generator.

2.Different types of Graphical I/O devices and their classification.

3.Co-OrdinateSystems(2D) – Homogeneous Co-Ordinates- Matrix Representation - Windows, Viewports – Windowing transformation

4.Line clipping algorithms - Polygons-Inside Test - Polygon Clipping Algorithm - Scan Conversion algorithms.

5.Two Dimensional Transformations – Matrix Representation - Concatenation of 2D transformations.

6.Display File Segmentation – Compilation – Data Structures used for Implementation Display Files.

7.Three dimensional Transformations – Projections - Viewing Transformation - Curves and Surfaces.

8.GeometricModelsandPictureStructure,

9.DesignofGraphicPackages.

Text Books :

Principles of Interactive Computer Graphics, Newman and Sproull (McGraw Hill)
Computer Graphics, Donald Hearn and M.Pauline Baker (PHI 2nd Edition)

Reference:

Procedural Elements of Computer Graphics, Rogers (McGraw Hill)
Mathematical Elements of Computer Graphics, Rogers (McGraw Hill)

MSCS 2.3

OPERATING SYSTEMS

Instruction: 3 Periods/week
Internal Assessment: 25 Marks

External Assessment: 75Marks
Time: 3 Hours

1. Overview of Operating System Functions, Batch Processing Systems, Multi programming Operating Systems, Time Sharing Systems.
2. Processor Management
Jobs, Programs and Processor, Job Scheduling, Process Scheduling, Process Synchronization, Process Communication, Dead Locks, Process Management in Multiprocessor Operating Systems.
3. Storage Management, Contiguous, Noncontiguous Storage Allocation, Virtual Storage implementation using Paging and Segmentation.
4. Information Management

IO Organisation and Physical IOCS, File Organisation, Logical IOCS, File Systems, The Unix File System

5. Concurrent Programming
Implementing Process Precedence, Software Implementation of Critical Section, Evolution of Languages Features for Concurrent Programming, Monitors, Concurrent Programming in ADA

Text Book:

1. Systems Programming and Operating Systems (Part II – Operating Systems), Dhamdhare, 2nd Edition, TMH
2. Applied Operating System Concepts – Avi Silberschatz, Peter Galvin, Grey Gagne

MSCS 2.4

ARTIFICIAL INTELLIGENCE

Instruction: 3 Periods/week
Internal Assessment: 25 Marks

External Assessment: 75Marks
Time: 3 Hours

1. Introduction to Artificial Intelligence:

Overview of AI – Definition of AI, Relationship between AI Systems and other computing systems, comparison between AI programming and other conventional programming; AI and related fields; Key Issues in AI Research, AI problems- Examples; problem spaces, production systems and characteristics; knowledge – general concepts.

2. Knowledge Representation:

Approaches to knowledge representation, Issues in knowledge representation, Formal systems – basic concepts, Symbolic logics - Syntax and semantics of FOPL, properties of w.f.f, clausal forms, Resolution principle, Examples of Resolution; Structural knowledge – graphs, frames, C.D's and scripts; probabilistic reasoning- Bayesian Networks, Dampster – Shafer theory; Non Monotonic Reasoning – TMS, Model and Temporal logics, Fuzzy sets & Fuzzy logics.

3. Knowledge organisation and Manipulation:

Search and control strategies - Examples of research problems, uninformed search techniques, Informed and Heuristic search techniques; Matching Techniques – Structures used in Matching, Measures of matching, partial matching, Fuzzy Matching Algorithms and RETE Matching Algorithm.

4. AI languages:

LISP – Basic list manipulation functions, predicates, Conditionals, Input, output and local variables, Iteration and Recursion in LISP, property lists and Arrays, Prolog – Introduction, facts, questions, variables, conjunctions, syntax of character, Operators, equality, matching, arithmetic expressions; Goals; Back tracking, cut predicates; Input and output operations.

Text Books:

1. Artificial Intelligence by Elaine RICH and Kevin Knight – TMH
2. Introduction to AI & Expert systems by O.W. Patterson – PHI
3. Artificial Intelligence by N J Nilsson HARCOURT ASIA (Pvt) Ltd.

Reference Books:

1. Programming prolog by Clockson & Mellish - Narosa
2. Artificial Intelligence by P.H Winston - AWL

MSCS 2.5

Object Oriented Programming

Instruction: 3 Periods/week
Internal Assessment: 25 Marks

External Assessment: 75Marks
Time: 3 Hours

1. Object oriented systems development and designing:

Traditional and object oriented software cycles, Objectives of OOP, Object oriented analysis

2. Object oriented programming in C++:

Concepts of data abstraction, encapsulation, Introduction to objects, classes and instances, static members, inheritance, polymorphism, Overloading and information hiding – function overloading, operator overloading in C++, Memory management – constructors, overloading of constructors, copy constructors, destructors, constructors and information hiding, concepts of file handling in C++.

3. Inheritance and polymorphism in C++:

Inheritance – derived and base classes, protected member, overriding member function, class hierarchies, multiple inheritance – containership, virtual functions, late binding – pure virtual functions – abstract classes – friend functions, Friend classes, static functions, this pointer, templates- function templates, class templates, Exception Handling in c++

4. Object oriented Mechanism in JAVA:

Class definition in JAVA, constructors, inheritance, polymorphism in JAVA, Access specifications in JAVA, Interfaces and packages in JAVA, Error & exception handling in JAVA, Building JAVA Applets and Applications in JAVA

Multi threads in JAVA - introduction to threads, the thread class, the runnable interface, thread states, thread priorities, thread groups & synchronization.

Graphics in JAVA

Text Books:

1. Object Oriented Programming in C++, Robert Lafore, Galgotia
2. Object Oriented programs, Bala Guruswamy, TMH
3. Programming in JAVA, Dietel & Dietel, AWL
4. Introduction to JAVA programs, Y.Danial Liang, PHI
5. Complete Reference JAVA, 3ed, Peter Naughton & H.Schimalt – TMH

MSCS 2.6

UNIX PROGRAMMING LAB

Instruction: 3 Periods/week
Internal Assessment: 50 Marks

External Assessment: 50 Marks
Time: 3 Hours

STUDY OF LABORATORY ENVIRONMENT:

Hardware Specifications: system details, network details

Software Specifications: O.S. details, compilers

FAMILIARIZATION OF UNIX COMMANDS and UTILITIES

Simple programs using *make* utility

Simple programs to display process group Ids: PID, PPID, GID

SIMPLE UNIX-C PROGRAMS:

Display “Unix Programming Lab.” N times using LIBRARY FUNCTION CALLS and user Defined function *dsply(int)* . N is an integer given through keyboard upon prompting.

Display “Unix Programming Lab.” N times using SYSTEM CALLS and user defined function *dsply(char *)* . N is an integer given through keyboard upon prompting.

Write “Unix Programming Lab.” N times in a file: outfile.txt in current directory using LIBRARY FUNCTION CALLS and user defined function *writefile(int)* . N is an integer given through a file infile.txt.

Write “Unix Programming Lab.” N times in a file: outfile.txt in current directory using SYSTEM CALLS and user defined function *writefile(char *)* . N is an integer given through a file infile.txt.

PROGRAMS using system calls that provides some error checking

1.Checking error numbers with externally declared integer **errno** and using **perror** library function

2.Display all of the available system error messages in a numbered two-columns-per-line-format.

3.Write your own error messaging function that is called when a file manipulation failure occurs. The function should provide a more descriptive, user-friendly interface than **perror**. It might be helpful to examine the header file<sys/errno.h>and the manual page entry for Intro in section 2(i.e., man -s2 Intro) prior to start.

4. Display process group ID information.

5. Displaying system limits like Max size of argv,Max #Child Processes,etc using sysconf

PROGRAMS using Processes:

1.Chain of processes

2.Fan of Processes

3.Write a program that determines by trial and error the number of files a process can have simultaneously open. Be sure to remove (investigate the unlink system call) any files that you generate.

4.Predict what will happen when a process forks a child process and the child process issues a chdir system call – will the current directory for the parent be changed as well? Write a Program that substantiates your answer.

PROGRAMS using COMMAND LINE ARGUMENTS

PROGRAMS for Simple Shell and Complex Shell with cd command, editor command, etc.)

PROGRAMS for Primitive Communications: Lock Files, Signal and Signal management Calls

PROGRAMS using Pipes: Unnamed Pipes, Named Pipes

PROGRAMS using Message Queues: Creating a Message Queue, A Client-Server Message Queue

PROGRAMS using Semaphores: Creating and Accessing Semaphore Sets, Semaphore Operations

PROGRAMS Using Shared Memory: Creating Shared Memory Segment, Using a File as Shared memory

PROGRAMS using RPCs: Executing Remote Commands in a C program

MSCS 2.7

DATA COMMUNICATIONS LAB

Instruction:

3 Periods/week

External Assessment: 50 Marks

Internal Assessment: 50 Marks

Time: 3 Hours

DATA COMMUNICATIONS EXPERIMENTS

- 1.1 **PC-to-PC COMMUNICATIONS UNDER DOS WITH NULL MODEM**
 - a) Using Serial Ports and RS-232 C Cable Connection
 - b) Using Paralell Ports and Parallel Cable Connection
- 1.2 **PC-to-PC COMMUNICATIONS UNDER DOS WITH MODEM and 4-LINE EXCHANGE**
Using Communication Software: COMIT or XTALK
- 1.3 **PC-to-PC COMMUNICATIONS UNDER WIN 98's DIRECT CABLE CONNECTION with NULL MODEM**
 - a) Using Serial Ports and RS-232 C Cable Connection
 - b) Using Paralell Ports and Parallel Cable Connection
- 1.4 **PC-to-PC COMMUNICATIONS UNDER WIN 98's DIAL-UP NETWORKING WITH MODEM and 4-LINE EXCHANGE**
- 1.5 **PC-to-PC COMMUNICATIONS UNDER WIN 98's HYPER TERMINAL WITH MODEM and 4-LINE EXCHANGE**
- 1.6 **PC as TERMINAL** using Terminal Emulator Software to Connect 8085/8086 μ P. trainer
- 1.7 **INERNET CONNECTION SET-UP USING DIAL-UP NETWORKING**

LAN EXPERIMENTS:

- 2.1 **THIN ETHERNET LAN WITH BUS TOPOLOGY** with a minimum of two systems
 - a) Windows Peer-to-Peer Network
 - b) Windows NT Client-Server Network
- 2.2 **THIN ETHERNET LAN WITH STAR TOPOLOGY** with a minimum of two systems
 - a) Windows Peer-to-Peer Network
 - b) Windows NT Client-Server Network
- 2.3 **THICK ETHERNET LAN WITH BUS TOPOLOGY** with a minimum of two systems
 - a) Windows Peer-to-Peer Network
 - b) Windows NT Client-Server Network
- 2.4 **THIN ETHERNET LAN WITH BUS TOPOLOGY** with a minimum of two systems
 - a) Novell Peer-to-Peer Network
 - b) Novell Client-Server Network

- 2.5 **THIN ETHERNET LAN WITH STAR TOPOLOGY** with a minimum of two systems
a) Novell Peer-to-Peer Network b) Novell Client-Server Network
- 2.6 **TERMINAL NETWORK WITH UNIX/LINUX SERVER** and one or two Terminals
- 2.7 **TERMINAL NETWORK WITH UNIX/LINUX SERVER, Terminal Server,** and one or two terminals

M.Sc
COMPUTER SCIENCE
3rd SEMESTER

Ref: LII(1)/BOS/Re.Syllabi/CSSE/2003, Dated 20th May 27, 2004

With Effect from 2003 – 04 Admitted Batch

Syllabi

Chairman
Board of Studies

Dept of Computer Science and Systems Engineering
College of Engineering
Andhra University
Visakhapatnam

MASTER OF SCIENCE IN COMPUTER SCIENCE
Course Structure and Scheme of Examination
III SEMESTER
With Effect From 2003-04 admitted batch

Sub. Ref. No.	Name of the Subject	Periods			Max Marks	
		Lec	Lab.	EA	IA	Total
MSCS3.1	Object Oriented Software Engineering	3	-	75	25	100
MSCS3.2	RDBMS	3	-	75	25	100
MSCS3.3	Network security	3	-	75	25	100
MSCS3.4	Theory of Computation	3	-	75	25	100
MSCS3.5	Elective	3	-	75	25	100
MSCS3.6	RDBMS Lab	-	3	50	50	100
MSCS3.7	Visual Programming Lab	-	3	50	50	100

Electives:

1. Embedded Systems
2. Data Warehousing & Data Mining
3. Bioinformatics
4. Image Processing

MSCS3.1 OBJECT ORIENTED SOFTWARE ENGINEERING

Instruction : 3 Periods /Week
Univ. Exam : 3 Hours

Sessional Marks : 25
Univ. Exam Marks:75

1. Software & Software Engineering
The nature of software, software engineering and as branch of engineering profession, stakeholders in software engineering, software quality, software engineering projects,
2. Developing requirements
Domain analysis, software project's starting point, problem definition and scope, What is requirement?, type of requirements, gathering and analyzing of requirements, requirements document types, reviewing, managing change in requirements,
3. Modeling with classes
UML, essentials of UML class diagrams, associations and multiplicity, generalization, instance diagrams,
4. Using design patterns
Pattern introduction, the abstraction-occurrence pattern, general hierarchical pattern, the play-role pattern, the singleton pattern, the observer pattern, the delegation pattern, the adaptor pattern, the façade pattern, the immutable pattern, the read-only interface pattern and the proxy pattern.
5. Focusing on users and their tasks
User-centred design, characteristics of users, developing use case models of systems, the basics of user interface design, usability principles, evaluation users interfaces
6. Modeling interactions and behavior
Interaction diagrams, state diagrams, activity diagrams
7. Architect ring and designing software
The process of design, principles leading to good design, techniques for making good design decisions, software architecture, writing a good design document
8. Testing and inspecting to ensure high quality
Basic definitions of defect, error and failure, effective and efficient testing, defects in ordinary and numerical algorithms, defects in timing and coordination, defects in handling stress and unusual situations, documentation defects, writing formal test cases and test plans, strategies for testing large software, inspections, quality assurance in general

9. Managing the software process

Project management, software process model, cost estimation, building software engineering teams, project scheduling and tracking, contents of a project plan

Text Book: Object-Oriented Software Engineering Practical software development using UML and Java by Timothy C. Lethbridge & Robert Langanieri , Tata Mcgraw-Hill Co

MSCS3.2 RELATIOINAL DATA BASE MANAGEMENT SYSTEMS

Instruction : 3 Periods/Week
Univ. Exam : 3 Hours

Sessional Marks : 25
Univ. Exam Marks:75

Introduction to Organization of Databases – Components of DBMS – Data Models – Entity Relationship Model

Basic file Systems: Introduction – Secondary Storage Devices – Files and Buffer Management – File Organization
Sequential File Organization – Indexed Sequential File Organization –Creation and Manipulation of Indexed Sequential File – Hashing – key to address transfer – Overflow Management in Hashed Files.

B-Tree based Indexed File organization – Secondary Indexes:
Organization and usage – File Organization based on Dynamic Hashing with Deferred Splitting – Linear Splitting.

Relational Data Model - Relational Algebra- ISBL – Relational Calculus – The Domain Calculus system - SQL.

Relational Database Design: Integrity Constraints
Functional Dependency – Logical implication of Dependencies – Normal Forms – Decomposition of Relational Schemes – Design Procedures

Security: Introduction – Access control – Crypto-systems – Statistical Database Security.

Concurrency control and Data base Recovery: Transaction – Data Base System Architecture – Serializability – Locking – Non-Locking Schedules – Data Base Recovery.

Text Book:
Data Base Management Systems
Arun K Majumdar and Pritimoy Bhattacharya
Tata-McGrahill Publishing Co Ltd 1996

MSCS3.3

NETWORK SECURITY

Instruction : 3 Periods /Week
Univ. Exam : 3 Hours

Sessional Marks : 25
Univ. Exam Marks:75

Introduction:

Attacks, services, mechanisms-security attacks-security services-Model for network security-Internet standards.

Conventional encryption and message confidentiality:

Conventional encryption principles-conventional encryption algorithms-cipher block modes of operations-location of encryption devices-key distribution

Public Key cryptography and authentication:

Approaches to message authentication-Secure Hash Functions and HMAC-Public Key Cryptography Principles_ Public Key Cryptography Algorithms-Digital signatures-Key management

Authentication & E mail Security:

Kerberos-X.509 Directory Authentication Services-PGP-S/MIME.

IP Security:

IP security overview-IP Security Architecture-Authentication Header-Encapsulating Security Pay load-Combining Security Associations-Key Management.

Web Security:

Web Security Requirements-SSL and Transport Layer Security-SET-Network Management Security.

System Security:

Intruders-viruses-related threats-Fire Design principles-Trusted Systems

Text Book:

Network Security Essentials Applications and Standards, by William Stallings
Pearson Education Asia, New Delhi

Reference Books:

- 1) Network Security: Private Communication in a Public World, Kaufman
Pearson Education Asia, New Delhi.
- 2) Cryptography and Network Security, by William Stallings
Pearson Education Asia, New Delhi.

MSCS3.4

THEORY OF COMPUTATION

Instruction : 3 Periods /Week
Univ. Exam : 3 Hours

Sessional Marks : 25
Univ. Exam Marks:75

1. Finite Automate & Regular Expression
Basic concepts of Finite state systems. Deterministic and non Deterministic Finite Automata, Regular Expressions, Relationship between Regular expression & Finite Automate Minimization of Finite Automata Mealy & Moore Machines.
2. Regular sets to Regular Grammars.
Basic Definition of Formal Language and Grammars Chomsky Hierarchy of Languages and Automata. Regular Sets and Regular Grammars, closure property of Regular sets, Pumping lemma for Regular sets, Decision Algorithms for Regular sets, Myhill-Nerode theory & Organization of Finite Automata.
3. Context Free Languages & pushdown Automata, context free grammars, single derivation of context free grammars, Normal forms. Pumping lemma for CFL, closure property of CFL, Push down automata, Language accepted by PDA, Relation between CFL & PDA
4. Computability & Recursion
Basic definition of computable and non-computable functions, primitive Recursive, Recursive and partial Recursive functions, RICE theorem and Greibach theorem, PCP and undecidability
5. Turing Machines
Turing Machine Models, Organization and Representation of Turing Machines, Computable Languages and Functions of Turing Machines. Techniques for Construction of Turing Machines, Universal Turing Machines, Halting Problem, Modifications of Turing Machines.

Text Books:

1. Introduction To Automata Theory, Languages & Computation by J.E Hopcraft & JD Ullman, Narosa Publications.

Reference Books:

1. Mathematical theory of computation By Mannaz
2. Theory of Computer Science by KLP Mishra & N.Chandra Sekharan, PHI
3. Mathematical Foundations of Computer Science by BECKMAN
4. Introduction to Languages & Theory of Computation By J.C. Martin, TMH

MSCS3.5 EMBEDDED SYSTEMS (Elective)

Instruction : 3 Periods /Week
Univ. Exam : 3 Hours

Sessional Marks : 25
Univ. Exam Marks:75

1. Examples of Embedded Systems, Hardware Fundamentals,
2. Microprocessors and Microcontrollers, The 8051 Architecture
3. 8051 Assembly Language Programming: Moving Data, Arithmetic and Logical Operations, Jump and Call Instructions
4. Interrupts and Survey of Software Architectures
5. Introduction to Real-Time Operating Systems
6. Operating System Services
7. Basic Design Using a Real-Time Operating System
8. Embedded Software Development Tools

TEXT BOOKS:

1. The 8051 Microcontroller, Architecture, Programming, & Applications,
by Kenneth J.Ayala, Penram International Publishing(India), Second
Edition1996 (Ch.1,Ch3.,Ch5,Ch6,Ch7,Ch8)
2. An Embedded Software Primer , David E. Simon, Pearson Education Inc., 1999
(Ch.2, Ch.3, Ch.4,Ch5,Ch.6,Ch.7,Ch.8,Ch9)

REFERENCE BOOKS:

1. Embedded Systems, Architecture, Programming and Design, by Raj Kamal
TMH, 2003
2. Embedded Real Time Systems Programming, by Sriram V Iyer and Pankaj Gupta,
TMH, 2004

MSCS3.5 DATA WAREHOUSING (Elective)

Instruction : 3 Periods /Week
Univ. Exam : 3 Hours

Sessional Marks : 25
Univ. Exam Marks:75

1. Introduction to Data Ware housing.
2. Data warehousing Environment: Architecture perspectives.
3. Modeling and Design Techniques for the Central Data Warehouse.
4. Multi – Dimensional Data Modeling.
5. Data Warehouse Usage
6. Populating Data Warehouse Environment.

Text Book:

An Introduction to Building the Data Warehouse by IBM, Prentice Hall of India.

Reference Books :

1. Data Warehousing in the Real world by Sam Anahory & Murray Addison Wesley.
2. Building the Data warehouse by W.H Inmon , 3rd Edition John Wiley & Sons Incorporation.

MSCS3.5 BIOINFORMATICS (Elective)

Instruction : 3 Periods /Week
Univ. Exam : 3 Hours

Sessional Marks : 25
Univ. Exam Marks:75

Motivation and Expectation:

Students are expected to know the fundamentals of Engineering in Medicine and biology, which is emerging as an interesting field. Students are expected to use The Internet extensively to understand the subject.

1. Introduction:

Definitions, Sequencing, Biological sequence/structure, Genome Projects, Pattern recognition an prediction, Folding problem, Sequence Analysis, Homology and Analogy.

2. Protein Information Resources

Biological databases, Primary sequence databases, Protein Sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases.

3. Genome Information Resources

DNA sequence databases, specialized genomic resources

4. DNA Sequence analysis

Importance of DNA analysis, Gene structure and DNA sequences, Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches, Gene hunting, Profile of a cell, EST analysis, Effects of EST data on DNA databases

5. Pair wise alignment techniques

Database searching, Alphabets and complexity, Algorithm and programs, Comparing two sequences, sub-sequences, Identity and similarity, The Dotplot, Local and global similarity, different alignment techniques, Dynamic Programming, Pair wise database searching.

6. Multiple sequence alignment

Definition and Goal, The consensus, computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments and searching

7. Secondary database searching

Importance and need of secondary database searches, secondary database structure and building a sequence search protocol

8. Analysis packages

Analysis package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

Text Books:

1. Introduction to Bioinformatics, by T K Attwood & D J Parry-Smith
Addison Wesley Longman

Reference:

1. Bioinformatics- A Beginner's Guide, Jean-Michel Claveriw, Cerdric Notredame, WILEY DreamTech India Pvt. Ltd
2. Sequence Analysis in A Nutshell by Scott Markel & Darryl Leon O'REILLY

MSCS3.5

IMAGE PROCESSING (Elective)

Instruction : 3 Periods /Week

Univ. Exam : 3 Hours

Sessional Marks : 25

Univ. Exam Marks:75

1. Fundamentals of Image Processing

Image Acquisition, Image Model, Sampling, Quantization, Relationship between pixels, distance measures, connectivity, Image Geometry, Photographic film.

Histogram: Definition, decision of contrast basing on histogram, operations basing on histograms like image stretching, image sliding, Image classification.

Definition and Algorithm of Histogram equalization.

2. Image Transforms:-

A detail discussion on Fourier Transform, DFT,FFT, properties

A brief discussion on WALSH Transform, WFT, HADAMARD Transform, DCT.

3. Image Enhancement: (by SPATIAL Domain Methods)

a Arithmetic and logical operations, pixel or point operations, size operations,

b. Smoothing filters-Mean, Median, Mode filters – Comparative study

c.. Edge enhancement filters – Directorial filters, Sobel, Laplacian, Robert, KIRSCH Homogeneity & DIFF Filters, prewitt filter, Contrast Based edge enhancement techniques. – Comparative study

d. Low Pass filters, High Pass filters, sharpening filters. – Comparative Study

e. Comparative study of all filters

f. Color image processing.

4. Image enhancement : (By FREQUENCY Domain Methods)

Design of Low pass, High pass, EDGE Enhancement, smoothing filters in Frequency Domain. Butter worth filter, Homomorphic filters in Frequency Domain

Advantages of filters in frequency domain, comparative study of filters in frequency domain and spatial domain.

5. Image compression: Definition, A brief discussion on – Run length encoding, contour coding, Huffman code, compression due to change in domain, compression due to quantization Compression at the time of image transmission. Brief discussion on:- Image Compression standards.

6. Image Segmentation: Definition, characteristics of segmentation.

Detection of Discontinuities, Thresholding Pixel based segmentation method.

Region based segmentation methods – segmentation by pixel aggregation, segmentation by sub region aggregation, histogram based segmentation, spilt and merge technique. Use of motion in segmentation (spatial domain technique only)

7. Morphology:-

Dilation, Erosion, Opening, closing, Hit-and-Miss transform, Boundary extraction, Region filling, connected components, thinning, Thickening, skeletons , Pruning
Extensions to Gray – Scale Images

Application of Morphology in I.P

Text Book:

Digital Image Processing , by Rafael C. Gonzalez and Richard E. Woods
Addision Wesley

Reference books:

1. Fundamentals of Electronic Image Processing by Arthyr –R – Weeks, Jr.
(PHI)
2. Image processing, Analysis, and Machine vision by Milan Sonka vaclan
Halavac Roger Boyle, Vikas Publishing House.

MSCS 3.6

RDBMS LAB

Lab : 3 Periods /Week
Univ. Exam : 3 Hours

Sessional Marks : 50
Univ. Exam Marks:50

File Structures

Reading a stream of fields, record structures and its length indicators, Mixing of numbers and characters, Use of a hex dump, Retrieving records by keys using sequential search, direct access

Indexing and indexed sequential files

Index file, inverted file operations, usage of B and B⁺⁺ trees

Hashing files

Hashing functions, algorithms, record distribution and collision resolution by progressive over flow, Extendable hashing and hashing performance

Above will be implemented in C⁺⁺

RDBMS

Each student is assigned with a problem. The student is to develop a logical and physical database design for the problem.

A. The logical design performs the following tasks:

1. Map the ER/EER diagrams to a relational schema. Be sure to underline all primary keys, include all necessary foreign keys and indicate referential integrity constraints.
2. Identify the functional dependencies in each relation
3. Normalize to the highest normal form possible

B. Perform physical design based above logical design using Oracle on Windows platform

C. Perform DML and DLL using PL/SQL

Reference books:

1. Oracle SQL and PL/SQL handbook by John Adolph Palinski
Pearson Education
2. Oracle PL/SQL Programming, by Steven Feuerstein
O'Reilly Publishers

MSCS 3.7 VISUAL PROGRAMMING LAB

Lab : 3 Periods/Week
Univ. Exam : 3 Hours

Sessional Marks : 50
Univ. Exam Marks:50

Experiments using java AWT/swing (JFC)

- Reading Data From Key Board
- Handling Buttons, Labels, Text Fields, Text Areas, Scroll Bar
- Handling Check Boxes, Radio, List Box, Sliders
- Handling Menu
- Handling Swing Components Like Progress Bars
- Handling Databases Using JDBC Native Driver

Experiments using VC++

- Reading Data From Key Board
- Handling Buttons, Labels, Text Fields
- Handling Check Boxes, Radio, List Box, Sliders.
- Handling Menu. Tool Bars
- File Handling
- Internet Programming
- Creative Active X Controls

Reference books:

1. VC++, by Steven Holzner, BPB publisher
2. JAVA tutorial, Person Education.

M.Sc
COMPUTER SCIENCE
4th SEMESTER

Ref: LII(1)/BOS/Re.Syllabi/CSSE/2003, Dated 20th May 27, 2004

With Effect from 2003 – 04 Admitted Batch

Chairman
Board of Studies

Dept of Computer Science and Systems Engineering
College of Engineering
Andhra University
Visakhapatnam

M.Sc (COMPUTER SCIENCE)
With Effect From 2003-04 admitted batch
Scheme of Examination

IV SEMESTER

SL.NO.	NAME OF THE SUBJECT	EXTERNAL EVALUATION
MSc(CS)	Project Work	100 Marks