

DEPARTMENT OF COMPUTER APPLICATIONS



**Scheme and Syllabus
MCA
(Semester I – VI)**

Session w.e.f 2017-2018

**FACULTY OF INFORMATICS AND COMPUTING
YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY,
FARIDABAD**

VISION

“YMCA University of Science and Technology aspires to be a nationally and internationally acclaimed leader in technical and higher education in all spheres which transforms the life of students through integration of teaching, research and character building.

MISSION

- To contribute to the development of science and technology by synthesizing teaching, research and creative activities.
- To provide an enviable research environment and state-of-the art technological exposure to its scholars.
- To develop human potential to its fullest extent and make them emerge as world class leaders in their professions and enthuse them towards their social responsibilities.

DEPARTMENT OF INFORMATION TECHNOLOGY AND COMPUTER SCIENCE

VISION

The department aims to make a place at both national and international level by producing high quality ethically rich computer engineers and IT professionals conversant with the state-of-the-art technology with the ability to adapt the upcoming challenges in information technology and their applications to cater to the ever changing industrial and societal needs. It endeavours to establish itself as a centre of excellence in teaching and research to produce skilled human resources for sustainable nation's growth and having technological impact on the people's life.

MISSION

- To provide the future leaders in the area of computer application and information technology through the development of human intellectual potential to its fullest extent.
- To enable the students to acquire globally competence through problem solving skills and exposure to latest developments in area of computer application and information technologies.
- To educate the students about their professional and ethical responsibilities.

ABOUT THE PROGRAM

The Master of Computer Application (MCA) program has a strong flavour on design and hands-on experience. The program aims at imparting computer science background to students by developing a strong base and depth of knowledge in the subject. The scheme, number of courses, contents of courses is all designed to cater the requirement of industry. The curriculum includes various core computer science courses, skilled enhancements courses and advanced computer courses. Besides the theoretical and laboratory based computer specific curriculum, students are also introduced to audit courses that include personality development courses, language specific enhancement courses, yoga and physical education courses etc. In order to give exposure of real world projects, one complete semester is dedicated to industrial training and project.

This degree provides a solid foundation in core Computer Application disciplines, critical thinking and problem-solving skills. Through the academic program, students also develop excellent written and oral communication skills, learn to work as a team and project management.

DEPARTMENT OF INFORMATION TECHNOLOGY AND COMPUTER SCIENCE

MCA PROGRAMME

PROGRAMME EDUCATION OBJECTIVES

PEO1	To solidify foundation of mathematics, computer science and problem solving methodology for effective implementation in the area of software development.
PEO2	To impart advance knowledge about various sub-domains related to the field of computer science and applications
PEO3	To acquaint students about principles of system analysis, design, development and project management.
PEO4	To inculcate effective communication skills combined with professional & ethical attitude.

PROGRAMME OUTCOMES

PO1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PO13	To develop industrial strength software development skills.
PO14	To prepare computer professional with expert in system design principals and development.

YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY FARIDABAD

SYNOPSIS OF

SCHEME OF STUDIES & EXAMINATIONS

3 YEARS MCA SEMESTER I-VI (2017-2020)

Total Credits: 161+ 4 to 6 credits (MOOCh)

Total Theory Subjects: 27

Total Labs including Seminars, Projects and Mooch course): 24 Industrial Training: 1 (one complete semester)

Total Teaching Schedule:

Lectures	Tutorials	Practical	Total
96	9	71	176

Total Marks:

Sessional	End Term	Total
1350	2775	4125

Itemized Break-up:

	No.	Hours	Marks	Credits
Theory Subjects	27	105	2500	103
Labs	18	71	900	36
Seminar	3	6	150	6
Projects	2	4	100	4
Industrial Training	1	1 semester	500	12
MOOCH	1	4		4 to 6

Total			4150	161+ 4 to 6
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CHOICE BASED CREDIT SYSTEM SCHEME

Program Core Courses (PCC)			
Sr. N.	Name the Subject	No. of Lectures / Tutorial	No. of Credits
1	Mathematical Foundations of Computer Science	4	4
2	Computer Fundamentals and Programming in C	4	4
3	Data Communication and Network Analysis	4	4
4	Internet and Web Designing	4	4
5	Data Base Management Systems	4	4
6	Data Structures	4	4
7	Computer Organization and architecture	4	4
8	Computer Graphics and Multimedia	4	4
9	Object Oriented Programming using C++	4	4
10	Operating System	4	4
11	Analysis & Design Of Algorithms	4	4
12	Principals of System Programming & Compiler Design	4	4
13	Artificial Intelligence and Expert Systems	4	4
14	Software Engineering	4	4
15	JAVA Programming	-	4
16	Advanced Java Programming	4	4

17	Design of Unix OS & Shell Programming	4	4
18	Software Testing & Quality Assurance	4	4
19	Computer based Management System and E Commerce	4	4
20	Visual languages Programming	4	4
21	.Net Technology	4	4
22	Object Oriented Software Engineering	4	4
23	Advanced Data Base Systems	4	4
Total Credits			92

Skill Enhancement Courses(SEC) :Labs			
Sr. No.	Name the Lab	No. of contact hours	No. of Credits
1	FOCP Lab	4	2
2	Web Designing Lab	4	2
3	DBMS Lab	4	2
4	Software Tools Lab	4	2
5	Data Structure lab using C	4	2
6	OOPS Lab	4	2
7	Operating System Lab	4	2
8	Computer Graphics Lab	4	2
9	ADA Lab	4	2
10	System Programming Lab	4	2
11	JAVA Lab	4	2
12	Artificial intelligence lab	4	2

13	Advanced JAVA LAB	4	2
14	USP Lab	4	2
15	VLP Lab	3	2
16	Dot Net programming using C# and / or VB. Net	4	2
17	* ADS (Working with MS SQL Server)	4	2
18	OOSE Lab	4	2
Total credits			36

Skill Enhancement Course (SEC) : Projects			
Sr. No.	Name the Lab	No. of contact hours	No. of Credits
1	Minor Project 1 (semester IV)	2	2
2	Minor Project 2 (Semester V)	2	2
3	Major Project	24	12

Discipline Specific Elective (DSE)			
Sr. No.	Name the Subject	No. of contact hours	No. of Credits
DSE Group I	Simulation and Modeling	4	4
	Theory of Computation	4	4
	Neural Networks	4	4
	Advance Computer Networks.	4	4
	Soft Computing.	4	4
	Multimedia and its Application	4	4

	Distributed Operating Systems	4	4
DSE Group II	Open Source Technology.	4	4
	Network Security.	4	4
	Mobile Computing.	4	4
	Digital Image Processing.	4	4
	Software Project Management.	4	4
	Data warehousing & Data Mining	4	4

General Elective Course(Courses offered by IT & CA Department)		
Sr. No	Code	Name the Subject
1	GEC-1	Intelligent Systems
2	GEC-2	Cyber laws and Security
3	GEC-3	Soft Computing
4	GEC-4	Web Technology and Information Retrieval
5	GEC-5	Intellectual Property and Rights

Mandatory Audit Course(MAC) (Mandatory to Qualify)			
Sr. No	Code	Name the Subject	No. of contact hours
1.	AUD 01	German-1	2
2.	AUD 02	German-2(With German-1 as prerequisite)	2
3.	AUD 03	French-1	2
4	AUD 04	French-2(With French-1 as prerequisite)	2

5	AUD 05	Sanskrit-1	2
6	AUD 06	Sanskrit-2(With Sanskrit-1 as prerequisite)	2
7	AUD 07	Personality Development	2
8	AUD 08	Interview and Group discussion skills	2
9	AUD 09	Yoga and Meditation	2
10	AUD 10	Art of living/Living Skills	2
11	AUD 11	Role of NSS in Nation Building	2
12	AUD 12	Physical Education	2

MCA First Year (Semester I)

Paper Code	Course	Course Requirements (Hrs)		Credits	University Exams	Internal Assessments	Total	Couse Type
		Lecture/Pra ctical	Tutorial					
MCA-17-101	Mathematical Foundations of Computer Science	3	1	4	75	25	100	PCC
MCA-17-103	Computer Fundamentals and Programming in C	4		4	75	25	100	
MCA-17-105	Data Communication and Network Analysis	4		4	75	25	100	
MCA-17-107	Internet and Web Designing	4		4	75	25	100	
MCA-17-109	Data Base Management Systems	3	1	4	75	25	100	
MCA-17-111	FOCP Lab	4		2	35	15	50	
MCA-17-113	Web Designing Lab	4		2	35	15	50	
MCA-17-115	DBMS Lab	4		2	35	15	50	
MCA-17-117	Software Tools Lab	4		2	35	15	50	
MCA-17-119	Seminar	2		2		25	25	
	Total	36	2	30	515	210	725	

MCA First Year (Semester II)

Paper Code	Course	Course Requirements (Hrs)		Credits	University Exams	Internal Assessments	Total	Course Type
		Lecture/Practical	Tutorial					
MCA-17-102	Data Structures	3	1	4	75	25	100	PCC
MCA-17-104	Computer Organization and architecture	4		4	75	25	100	
MCA-17-106	Computer Graphics and Multimedia	4		4	75	25	100	
MCA-17-108	Object Oriented Programming using C++	4		4	75	25	100	
MCA-17-110	Operating System	3	1	4	75	25	100	
MCA-17-112	Data Structure lab using C	4		2	35	15	50	SEC
MCA-17-114	OOPS Lab	4		2	35	15	50	
MCA-17-116	Operating System Lab	4		2	35	15	50	
MCA-17-118	Computer Graphics Lab	4		2	35	15	50	
Mentioned above	Audit Course	2		-	75	25	100	
	Total	36	2	28	515	185	700	

MCA Second Year (Semester – III)

Paper Code	Course	Course Requirements (Hrs)		Credits	University Exams	Internal Assessments	Total	Course Type
		Lectures	Tutorial					
MCA-17-201	Analysis & Design Of Algorithms	3	1	4	75	25	100	PCC
MCA-17-203	Principals of System Programming & Compiler Design	3	1	4	75	25	100	
MCA-17-205	Artificial Intelligence and Expert Systems	3	1	4	75	25	100	
MCA-17-207	Software Engineering	3	1	4	75	25	100	
MCA-17-209	JAVA Programming	4		4	75	25	100	
MCA-17-211	ADA LAB	4		2	35	15	50	
MCA-17-213	System Programming Lab	4		2	35	15	50	
MCA-17-215	JAVA LAB	4		2	35	15	50	
MCA-17-217	Artificial intelligence lab	4		2	35	15	50	
	Total	32	4	28	515	185	700	

MCA Second Year (Semester – IV)

Paper Code	Course	Course Requirements (Hrs)		Credits	University Exams	Internal Assessments	Total	Course Type
		Lectures	Tutorial					
MCA-17-202	Advanced Java Programming	4		4	75	25	100	PCC
MCA-17-204	Design of Unix OS & Shell Programming	4		4	75	25	100	
MCA-17-206	Software Testing & Quality Assurance	3	1	4	75	25	100	
MCA-17-208	Computer based Management System and E Commerce	4		4	75	25	100	
MCA-17-210	Visual languages Programming	4		4	75	25	100	
MCA-17-212	Advanced JAVA LAB	4		2	35	15	50	
MCA-17-214	USP LAB	4		2	35	15	50	
MCA-17-216	Minor Project 1	2		2	35	15	50	
MCA-17-218	VLP LAB	3		2	35	15	50	
MCA-17-220	Seminar	2		2		50	50	
Mentioned above	General Elective	3		3	75	25	100	GC
	Total	37	1	33	515	235	750	

MCA Third Year (Semester – V)

Paper Code	Course	Course Requirements (Hrs)	Credits	University Exams	Internal Assessments	Total	Course Type
MCA-17-301	.Net Technology	4	4	75	25	100	PCC
MCA-17-303	Object Oriented Software Engineering	4	4	75	25	100	
MCA-17-305	Advanced Data Base Systems	4	4	75	25	100	
MCA-17-307	Elective1 (Chosen from list of electives)	4	4	75	25	100	DSE
MCA-17-309	Elective 2 (Chosen from list of electives)	4	4	75	25	100	
MCA-17-311	Dot Net programming using C# and / or VB. Net	4	2	35	15	50	PCC
MCA-17-313	* ADS (Working with MS SQL Server)	4	2	35	30	50	
MCA-17-315	OOSE Lab	4	2	35	15	50	
MCA-17-317	Minor Project 2	2	2	35	15	50	SEC
MCA-17-319	Seminar	2	2		50	50	
	Total	36	30	515	235	750	

ELECTIVE I

1. Simulation and Modeling
2. Theory of Computation
3. Neural Networks.
4. Advance Computer Networks.
5. Soft Computing.
6. Multimedia and its Applications
7. Distributed Operating Systems

ELECTIVE II

- 1. Open Source Technology.**
- 2. Network Security.**
- 3. Mobile Computing.**
- 4. Digital Image Processing.**
- 5. Software Project Management.**
- 6. Data warehousing & Data Mining**

MCA Third Year (Semester – VI)

Paper Code	Course	Course Requirements (Hrs)	Credits	University Exams	Internal Assessments	Total	Course Type
MCA-17-302	Major Project	24	12	200	300	500	SEC

Procedure for Annual Examination and continuous Assessment of:

(A) Annual Exams Marks

- | | |
|-----------------------|-----------|
| 1. Project Evaluation | 50 Marks |
| 2. Project Seminar | 50 Marks |
| 3. Project Viva | 100 Marks |

(B) Continuous Assessment Marks

- | | |
|------------------------------------|-----------|
| 1. Assessment by Institute Faculty | 100 Marks |
| 2. Assessment by Industrial Guide | 150 Marks |
| 3. Conduct Marks | 50 Marks |

TOTAL

500 Marks

One MOOCH Subject to be qualified in any semester of MCA

Paper Code	Course	Course Requirements (Hrs)	Credits	University Exams	Internal Assessments	Total	Course Type
-----	MOOCH*	4	4 to 6				

*** The Moch subject can be qualified during the duration of the Programme (First to six semester) through Swayam platform (UGC)**

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-101

SUBJECT NAME: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

MCA SEMESTER I

NO OF CREDITS: 4

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre-Requisite: Mathematics

Successive: Principle of system programming and compiler design

Course Objectives

1. To understand Relations and their types, Equivalence and Partial Order relations , POSET, HASSE Diagrams, Lattices, their properties and types.
2. To learn functions their types, Composition and Recursively defined function
3. To understand Propositions, basic operations in propositions, Finding tautologies and contradictions, Quantifiers and Mathematical Induction.
4. To learn Algebraic Structures and their types and understand Cosets and Lagrange's theorem.
5. To understand Graphs, their types and different algorithms based on Graph Theory.
6. To learn Automata Theory. To make the students understand Regular expressions, Regular Language and conversions.
7. To understand NFA, DFA and conversion of various machines.

Course Outcomes (Cos): At the end of program the student acquired knowledge about:

- a. Apply set theory, functions, relations and lattices to solve computational problem.
- b. Apply basic operation in propositions, validate the arguments and formalize the arguments in propositional logic.
- c. Apply algebraic structure to prove theorems like Lagrange's theorem
- d. Apply the core ideas of graph theory, trees and various algorithms to solve the problems based on the same.

- e. Implement finite state machine, equivalent regular expression, and conversion of various machines like Moore, mealy etc.

Syllabus:

Unit- I Relation: Relations, Properties of Binary relation, Matrix representation of relations, Equivalence relations, Partial order relation.

Function: Types, Composition of function, Recursively defined function.

Alg

Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian group, Subgroup, Cyclic group, Cosets, Normal Subgroups, Lagrange's Theorem, Permutation groups.

Unit-II PROPOSITIONAL LOGIC: Boolean algebra, Propositions, logical operations, Tautologies, Contradictions, Logical implication, Logical equivalence, Normal forms, Theory of Inference and deduction. Predicate Calculus: Predicates and quantifiers, Mathematical Induction.

Unit-III LATTICES AND BOOLEAN ALGEBRA: Introduction, Partially Ordered Set, Hasse diagram, well ordered set, Lattices, Properties of lattices, Bounded lattices, Complemented and Distributive lattices.

Unit-IV GRAPHS: Introduction to graphs, Directed and undirected graph , Homomorphic and Isomorphic graphs, Sub graph , Cot Points and Bridges , Multigraph and Weighted graph, paths and circuits, Shortest path in weighted graphs, Eulerian path and circuits ,Hamilton paths and circuits, planar graphs. Euler's Formula.

Unit-V THEORY OF AUTOMATA: Introduction to defining language, Kleene Closure, Arithmetic expressions, Chomsky Hierarchy, Regular expressions, Generalized Transition graph, conversion of regular expression to Finite Automata, NFA, DFA, Conversion of NFA to DFA. Optimizing DFA, FA with output: Moore machine, Mealy machine, Conversions.

Text / Reference Books:

1. C.L.Liu: Elements of Discrete Mathematics McGraw Hill.
2. Lipschutz, Seymour: Discrete Mathematics, Schaum's Series.

3. Babu Ram: Discrete Mathematics, Vinayek Publishers, New Delhi.
4. Trembley, J.P. & R. Manohar: Discrete Mathematical Structure with Application to Computer Science, TMH.
5. Kenneth H. Rosen : Discrete Mathematics and its applications, TMH
6. Doerr Alan &Levasseur Kenneth; Applied Discrete Structures for Computer Science, Galgotia Pub. Pvt. Ltd.
7. Theory of Computer Science; K.L.P. Mishra. N. Chandrasekaran
8. Hopcroft J.E., Ullman J.D.: Introduction to Automata theory, Languages and Computation, Narosa Publishing House, New Delhi.
9. Any other book(s) covering the contents of the paper in more depth.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-103

SUBJECT NAME: COMPUTER FUNDAMENTALS AND PROGRAMMING IN C

MCA SEMESTER I

NO OF CREDITS: 4

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: None

Successive: COA, OOPS, OS, DS, CGM

Course Objectives

1. To understand the major components of computer system, the types and functions of OS.
2. To know about different programming languages and their corresponding Translators and to learn about the basic concepts of Networking.
3. To understand the building blocks of C language like variables, data types, managing I/O etc.
4. To understand the different statements like sequential, decision making, iterative such as if-else, loops.
5. To understand derived data types like arrays and structures.
6. To learn about the concept of Pointers, understand functions and also to understand file handling and dynamic memory allocation schemes.

Course Outcomes: At the end of program the student acquire knowledge about:

- a. Acquire knowledge about components of a computer system and fundamentals of Operating Systems and Networking.
- b. Acquire knowledge about building blocks of C language like variables, data types, managing I/O etc.
- c. Solve basic problems using different statements like sequential, decision making, iterative such as if-else, loops and derived data types like arrays and structures.
- d. Apply Pointers, functions, file handling and dynamic memory allocation schemes for efficient programming

Syllabus:

- Unit-I AN OVERVIEW OF COMPUTER SYSTEM AND OPERATING SYSTEMS:** Fundamentals: Evolution of computers, Hardware organization of a computer. Introduction to microprocessors, generation of microprocessors, commonly used CPUs. Input/output Devices, Input/output ports and connectors Different Number Systems:- Decimal Number System, Binary Number System, Octal Number System, Hexadecimal Number System, and their inter- conversions. Operating System Basics: Introduction to Operating system, Functions of an Operating Systems, Classification of Operating Systems, Basic introduction to DOS, UNIX/LINUX OS, Windows XP, working with Windows. Introduction to computer viruses.
- Unit-II BASIC INTRODUCTION TO PROGRAMMING LANGUAGES:** Machine Language, Assembly Languages, High level Languages, Types of high level languages, Compiler, Interpreter, Assembler, Loader, Linker, Relationship between Compiler, Loader and Linker.
- Unit-III BASIC INTRODUCTION TO COMPUTER NETWORKS:** Data Communication, modulation, Network devices, LAN, LAN topologies, WAN, OSI Reference model Introduction to Internet and protocols: TCP/IP ref. model, Backbone network, Network connecting devices. Hypertext documents, HTTP, DNS, Network Security.
- Unit-IV AN OVERVIEW OF C:** Constants, Variables and Data types, operators and Expressions, managing I/O operations, Decision Making and branching, Decision Making and looping, Arrays, Character Arrays and Strings, User Defined Functions
- Unit-V STRUCTURE AND UNION IN C:** Defining structure, declaring variables, Accessing structure members, structure initialization, copying and comparing structures variables, and operations on individual members, Array of structure, structure with structure, unions, and size of structure.
- Unit-VI POINTERS IN C:** Introduction, Understanding Pointers, Accessing the address of a variable, Declaring Pointer Variables, Initialization of Pointer Variables, Accessing a variable through its pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factors, pointers and Arrays, Pointer and Character Strings, Arrays of Pointers, Pointers as Function Arguments, Functions Returning Pointers, Pointers to Functions

***Unit-VII* DYNAMIC MEMORY ALLOCATION AND FILE MANAGEMENT IN C:**

Introduction, Dynamic memory allocation, allocating a block of memory: Malloc, allocating multiple blocks of memory: Calloc. Releasing the used space: Free, Altering the size of block: Realloc, Defining and opening file, closing file, I/O operation on files, error handling during I/O operations, Random Access to files and command line arguments.

Text / Reference Books:

1. Fundamental of Information Technology by A.Leon&M.Leon.
2. UNIX Concepts and Application(4/e) by Sumitabha Das
3. Programming Languages (4th Edition) by Pratt IW
4. Fundamentals of Computers and Programming with C by A. K. Sharma Dhanpat Rai publications
5. Computer Networks (4th Edition) by Andrew S. Tanenbaum
6. Digital Principles and Application by Donald Peach, Albert Paul Malvino
7. Operating System Concepts, (6th Edition) by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-105

SUBJECT NAME: DATA COMMUNICATION AND NETWORK ANALYSIS

MCA SEMESTER I

NO OF CREDITS: 4

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: None

Successive: JAVA, .NET, Network Security

Course Objectives

1. To understand basic computer network technology, Data Communications System and its components, different types of network topologies and protocols.
2. To understand the layers of the OSI model and TCP/IP, function(s) of each layer and to identify the different types of network devices and their functions within a network.
3. To know basic protocols of data link layer, how they can be used to assist in network design and implementation, IEEE standards for LAN and MAN.
4. To analyze the features and operations of network layer, application layer protocols including various switching mechanism

Course Outcomes: At the end of program the student acquire knowledge about

- a. Acquire knowledge about basic computer network technology, Data Communications System and its components, different types of network topologies and protocols.
- b. Understand the layers of the OSI model and TCP/IP, function(s) of each layer and identify the different types of network devices and their functions within a network.
- c. Apply protocols of data link layer in network design and implementation, IEEE standards for LAN and MAN.
- d. Analyze the features and operations of various network layers, application layer protocols including various switching mechanism.

Syllabus:

Unit-I DATA COMMUNICATION: Theoretical basis of data communication; analog and digital signals; asynchronous and synchronous transmission; data encoding and modulation, techniques, broadband and base band transmission; pulse code modulation, bandwidth, channel, baud rate of transmission; multiplexing; transmission medium; transmission errors, error detection and correction.

Unit-II: NETWORK CLASSIFICATION AND DATA COMMUNICATION SERVICES: Local area networks, metropolitan area network, wide area network, wireless network, internetworking; switched multi-megabit data services, X.25, frame relay, narrow band and board ISDN asynchronous transfer modes. Network Reference Models: Layered architectures, protocol hierarchies, interface and services: ISO-OSI reference model, TCP/ IP reference model; internet protocol stacks.

Unit-III: DATA LINK LAYER FUNCTIONS AND PROTOCOLS: Framing, error control, flow-control; sliding window protocol; Data link layer of Internet and ATM. Medium Access Control Sub-layer: CSMA/CD protocol switched and fast Ethernet, token ring, IEEE standards for LAN and MAN; satellite networks.

Unit-IV: NETWORK FUNCTIONS AND PROTOCOLS: Switching mechanism: Circuit switching, message switching, packet switching, cell switching, routing and congestion control, TCP/IP protocol architecture. Network Applications: File transfer protocol, electronic mail, World Wide Web.

Text / Reference Books:

1. A.S. Tanenbaum : Computer Networks (4th ed.), Prentice-Hall of India.
2. W. Tomasi : Introduction to Data Communications and Networking, Pearson, Education.
3. P.C. Gupta : Data Communications and Computer Networks, Prentice-Hall of India.
4. Behrouz Forouzan and S.C., Fegan : Data Communications and Networking, McGraw Hill.
5. L.L. Peterson and B.S. Davie : Computer Networks : A system Approach, Morgan Kaufmann.
6. William Stallings : Data and Computer Communications, Pearson Education.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-107

SUBJECT NAME: INTERNET AND WEB DESIGNING

MCA SEMESTER I

NO OF CREDITS: 4

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: None

Successive: JAVA, .NET, Network Security

Course Objectives

1. To understand the basic concepts of internet, its history and ways to connect to internet.
2. To provide a detailed understanding of search engines
3. To learn fundamental language of internet i.e. HTML and cascading style sheets.
4. To learn basics of client side JavaScript and server side programming constructs
5. To design multimedia pages over web.

Course Outcomes At the end of the program the student would be

- a. Acquainted with the basics of internet, its applications and ways to connect to it
- b. Learned the basics and types of search engines
- c. Hand on practice on HTML and learned the need and basics of CSS and the concepts of client side JavaScript
- d. Acquainted with the difference between client side and server side scripting
- e. Import multimedia pages over web.

Syllabus:

Unit-I INTRODUCTION TO INTERNET AND WWW: Hypertext Transfer Protocol (HTTP), URL, HTML: Internet Language, Understanding HTML, Create a Web Page, Linking to other Web Pages, Publishing HTML Pages, Text Alignment and Lists, Text Formatting Fonts Control, E-mail Links and link within a page, Creating HTML Forms.

Unit-II CREATING WEB PAGE GRAPHICS: Putting Graphics on a Web Page, Custom Backgrounds and Colours, Creating Animated Graphics. Web Page Design and layout, Advanced Layout with Tables, Using Style Sheets. Introduction to Client side programming using Java script

Unit-III DNS WORKING: Configuring Internet Connection, Connecting LAN to Internet. Single User, Multi User, Server, Workstation, Client-Server environment, E-Mail Concepts - configuring E-Mail Program, Sending and Receiving Files through E-Mail, Fighting Spam, Sorting Mail, and Avoiding E-Mail Viruses.

Unit-IV ARCHITECTURE OF WEB BROWSERS: Different setting for browser, Surfing the Net, Online Chatting , Messaging, and Conferencing Concepts, E-Mail mailing lists, Usenet newsgroup concepts- Reading usenet newsgroups, internet Relay Chat, Instant messaging, Web-Based chat rooms and discussion boards, Voice and Video conferencing. Streamlining Browsing, Keeping track of Favorite Web Sites, Web Security, Privacy, and Site-Blocking. Search Engines, Categories of search Engines, Searching Criterion, Searching the Web – Audio and Video on the Web.

Text/Reference Books

1. Dick Oliver: Tech Yourself HTML 4 in 24 Hours, Techmedia.
2. Craig Zacker: 10 minutes Guide to HTML Style Sheets, PHI.
3. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi.
4. Margaret Levine Young: Internet - The Complete Reference.
5. Harley Hahn: The Internet - Complete Reference, TMH.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-109

SUBJECT NAME: DATA BASE MANAGEMENT SYSTEMS

MCA SEMESTER I

NO OF CREDITS: 4

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre- Requisite: None

Successive: VLP, ADBMS

Course Objectives:

1. To study about the basics of DBMS, client server architecture and database models.
2. To understand relational model and relational algebra calculus.
3. To study about the various normalization forms.
4. To study about the transaction management and concurrency control mechanisms

Course Outcomes: At the end of program student acquired the knowledge about:

- a. Understand the basics of DBMS, client server architecture and database models.
- b. Apply the concept of relational model and relational algebra calculus to create database.
- c. Apply the concept normalization on database.
- d. Implement transaction management and concurrency control mechanisms

Syllabus:

Unit-I OVERVIEW OF DATABASE MANAGEMENT SYSTEM: Database, Database Management system, Advantages of DBMS over file processing systems, Database Languages, Database Users and Administrator, Database system Structure, Storage Manager, Query Processor. Introduction to Client/Server architecture, Various views of data, three levels architecture of Database Systems, database Models, Attributes and Entity sets, Relationship and Relationship sets, mapping Constraints, Keys, Entity Relationship Diagram, Reduction of E-R diagram into tables.

Unit-II RELATIONAL MODEL: Introduction to the Relational Model, Integrity Constraints Over relations, Enforcing Integrity constraints.

Relational Algebra and Calculus: Relational Algebra, Selection and projection set operations, renaming, Joins, Division, aggregate operations, Relational calculus-Tuple relational Calculus, Domain relational calculus, Query processing and Optimization.

Unit-III NORMALIZATION: Problems Caused by redundancy, Decompositions, Problem related to decomposition, Functional dependencies, Minimal Cover, Attribute Closure, FIRST, SECOND, THIRD Normal forms, BCNF, Lossless join Decomposition, Dependency preserving Decomposition, Schema refinement in Data base Design, Multi valued Dependencies, Fourth and Fifth Normal Form.

Unit-IV OVERVIEW OF TRANSACTION MANAGEMENT: ACID Properties, Transaction States, Transactions and Schedules, Concurrent Execution of transaction. **Concurrency Control:** Serializability and recoverability, Introduction to Lock Management, Lock Conversions, Specialized Locking Techniques, Time stamp based concurrency control, dealing with Dead Locks, Introduction to crash recovery, Log based recovery, Check points.

Text/Reference Books

1. ElmasriNavate: Data base Management System, Pearson Education
2. Raghurama Krishnan: Data base Management Systems, Johannes Gehrke, Tata McGraw Hill Latest Edition.
3. Siberschatz, Korth: Data base System Concepts, McGraw Hill, and latest edition.
4. P. Radha Krishna: Database Management Systems, HI-TECH Publications.
5. C.J. Date: Introduction to Database Systems, Pearson, Education.
6. Rob & Coronel: Data base Systems design, Implementation, and Management, latest Edition, Thomson.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-102

SUBJECT NAME: DATA STRUCTURES

MCA SEMESTER II

NO OF CREDITS: 4

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre- Requisite: CFPC

Successive: ADA

Course Objectives:

1. To demonstrate major algorithms and data structures.
2. To analyze performance of algorithms.
3. To choose the appropriate data structure and algorithm design method for a specified application.
4. Learn abstract properties of various data structures such as stacks, queues, lists, trees and graphs.
5. To use various data structures effectively in application programs.
6. To understand of various sorting algorithms, including bubble sort, insertion sort, selection sort, merge sort, quick sort and heap sort.
7. To solve problems using Tree traversals, Graph traversals, and shortest paths.
8. To understand of various searching algorithms.
9. To compare different implementations of data structures and to recognize the advantages and disadvantages of the different implementations

Course Objectives: At the end of program students acquired the knowledge about:

- a. Acquire concepts of data structure, data types and how basic data structure like arrays, records, linked list, stacks, queues, trees and graphs are represented in memory and are used in various applications.
- b. Implement standard algorithm for sorting and searching.
- c. Analyze algorithm and determine their complexity.
- d. Solve fundamental algorithmic problems using Tree traversal, graph traversal and their applications.
- e. Implement complex data structures like file system.

Syllabus:

Unit-I OVERVIEW OF 'C': Introduction, Flow of Control, Input output functions, Arrays and Structures, Functions

Data structures and Algorithms: an overview: concept of data structure, choice of right data structures, types of data structures, basic terminology Algorithms, how to design and develop an algorithm: stepwise refinement, use of accumulators and counters; algorithm analysis, complexity of algorithms Big-oh notation.

Arrays: Searching Sorting: Introduction, One Dimensional Arrays,

Operations Defined: traversal, selection, searching, insertion, deletion, and sorting. Multidimensional arrays, address calculation of a location in arrays, sparse matrix, sparse matrix representation.

Searching: Linear search, Recursive and Non recursive binary Search.

Sorting: Selection sort, Bubble sort, Insertion sort, Merge sort, Quick sort, Shell sort, Heap sort

Stacks and queues: Stacks, array representation of stack, Applications of stacks. Queues, Circular queues, array representation of Queues, Deque, priority queues, Applications of Queues.

Unit-II POINTERS: Pointer variables, Pointer and arrays, array of pointers, pointers and structures, Dynamic allocation.

Linked Lists: Concept of a linked list,. Circular linked list, doubly linked list, operations on linked lists. Concepts of header linked lists. Applications of linked lists, linked stacks linked Queues.

Unit-III TREES: Introduction to trees, binary trees, representation and traversal of trees, operations on binary trees, types of binary trees, threaded binary trees, B Trees, Application of trees.

Graphs: Introduction, terminology, 'set, linked and matrix' representation, Graph traversal techniques: BFS, DFS, operations on graphs, Minimum spanning trees, Applications of graphs.

Unit-IV FILE HANDLING AND ADVANCED DATA STRUCTURE: Introduction to file handling, Data and Information, File concepts, File organization, files and streams, working with files. AVL trees, Sets, list representation of sets, applications of sets, skip lists

Text/ Reference Books:

1. Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
2. Data Structures using C by A. K. Sharma, Pearson
3. Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition. Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983, AW
4. Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
5. Data Structures and Program Design in C By Robert Kruse, PHI,
6. Theory & Problems of Data Structures by Jr. Seymour Lipschitz, Schaum's outline by TMH
7. Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
8. Data Structure and the Standard Template library – Willam J. Collins, 20

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-104

SUBJECT NAME: COMPUTER ORGANIZATION AND ARCHITECTURE

MCA SEMESTER II

NO OF CREDITS: 4

SESSIONAL: 25

L P

THEORY EXAM: 75

4 0

TOTAL: 100

Pre- Requisite: CFPC

Successive: None

Course Objectives

1. To become familiar with how Computer Systems work & its basic principles
2. To become familiar with how to analyze the system performance.
3. To become familiar with concepts behind advanced pipelining techniques.
4. To become familiar with the current state of art in memory system design
5. To become familiar with how I/O devices are being accessed and its principles.
6. To provide the knowledge on Instruction Level Parallelism

Course Outcomes:

- a. Acquainted basic principles on how computers works, how they are designed and their different architectures?
- b. Learned different type of instructions and their formats used by the computer to perform operations.
- c. Learned depth architecture and organization of a modern computer with its various processing units (control units).
- d. Analyze the performance measurement, data representation and memory Hierarchy of the computer system.

Syllabus:

Unit I BASIC PRINCIPLES AND GENERAL SYSTEM ARCHITECTURE: Data Representation: Fixed Point, Floating Point, Stored program control concept, Flynn's classification of computers (SISD, MISD, SIMD, and MIMD), control and data path

of a typical register based CPU, Register Transfer Language, Bus structures, Micro-operations: Arithmetic, Logic, Shift.

Unit II COMPUTER ORGANIZATION AND DESIGN: Instruction cycle, Fetch-Decode-Execute cycle (typically 3 to 5 stages), Instruction code, computer registers, computer instructions, type of instructions, memory reference, register reference, I/O reference, Hardwired controlled unit.

Unit III MICRO PROGRAMMED CONTROL: Micro programmed controlled unit, Control memory and address sequencing, Design of Control Unit.

Unit IV CENTRAL PROCESSING UNIT : General Register Organization, Stack Organization, Addressing Modes: register, immediate, direct, indirect, indexed, Operations in the instruction set: Arithmetic and Logical, Data Transfer and Manipulation, Program Control, RISC Vs. CISC architectures.

Unit V MEMORY HIERARCHY & I/O TECHNIQUES: The need for memory hierarchy (Locality of reference) Main Memory, Associative Memory, Cache Memory, Auxiliary Memory, memory parameters (access/ cycle time, cost per bit) Virtual Memory, Memory Management Hardware Input/output Organization: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct Memory Access.

Unit VI INTRODUCTION TO PARALLELISM: Goals of parallelism (Exploitation of concurrency, throughput enhancement), Amdahl law, Parallel computer structure, Architectural classification schemes, Parallel processing Applications.

Text/ Reference books

1. Mano, M.M. : Digital Logic and Computer Design, Prentice- Hall of India.
2. Stallings, William : Computer Organization & Architecture.
3. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organization, University Science Press (Laxmi Publications), New Delhi.
4. Kai Hwang : Advanced Computer Architecture, McGraw Hill International.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-106

SUBJECT NAME: COMPUTER GRAPHICS AND MULTIMEDIA

MCA SEMESTER II

NO OF CREDITS: 4

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: CFPC

Successive: Multimedia and Application

Course Objectives:

1. To learn the principles of hardware and software behind the graphical environment. To learn about the design and implementation of graphical object by understanding basic algorithms for scan conversion of different graphical primitives and filling their inner areas.
2. To learn about transformation and modeling of original primitive and their clipped version into dimensional space by understanding the different algorithms.
3. To learn projecting any graphical primitive from higher dimensional space to 2-D space.
4. To learn the various aspects of rendering visible surfaces.
5. To learn the creation of animated objects and their images by knowing various aspects of media and learn the concept of audio, images and videos. Also, to learn minimization of memory requirements for graphical objects by rendering objects and surfaces and compressing Images.

Course Outcomes: At the end of program student acquired the knowledge about:

- a. Understand the basics of computer graphics, different graphics systems and applications of computer graphics. Implement the various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- b. Apply geometric transformations on original and clipped graphics objects and their application in composite form in 2D and 3D.
- c. Apply projection techniques for improving the object appearance from 3D scene on 2D screen.
- d. Implement interactive graphics applications and games that use animation techniques, audio, video by minimizing memory requirements through compression techniques.

Syllabus:

Unit-I AN INTRODUCTION TO GRAPHICS SYSTEM: Computer Graphics and Its Types, Application of computer graphics, Graphics Systems : Video Display Devices, Raster Scan Systems, Random Scan Systems, Graphics Monitors and Work Stations, Input Devices, Hard Copy Devices, Graphics Software.

Unit-II OUTPUT PRIMITIVES AND ATTRIBUTES OF OUTPUT PRIMITIVES: Output Primitive Points and Lines, Line Drawing Algorithms, Circle Generating Algorithms, Scan-Line Polygon Fill Algorithm, Inside-Outside tests, Boundary-Fill Algorithm, Flood Fill Algorithm, Cell Array, Character Generation, Attributes of Output Primitives : Line Attributes, Color and Grayscale Levels, Area fill Attributes, Character Attributes, Bundled Attributes, Ant aliasing.

Unit-III TWO-DIMENSIONAL GEOMETRIC TRANSFORMATIONS: Basic Transformations, Matrix Representation and Homogeneous Coordinates, Composite Transformations, Reflection and Shearing. Two-Dimension Viewing : The viewing Pipeline, Window to view port coordinate transformation, Clipping Operations, Point Clipping, Line Clipping, Polygon Clipping, Text Clipping, Exterior Clipping Three-Dimensional Concepts : Three Dimensional Display Methods, 3D Transformations, Parallel Projection and Perspective Projection.

Unit- IV MULTIMEDIA: Introduction to Multimedia : Classification of Multimedia, Multimedia Software, Components of Multimedia – Audio : Analog to Digital conversion, sound card fundamentals, Audio play backing and recording Video, Text : Hyper text, Hyper media and Hyper Graphics, Graphics and Animation : Classification of Animation. Authoring Process and Tools. Case Study: A graphics software Mat Lab, Use of Mat Lab in graphics application, Features of Mat Lab, Generalize application by using Mat Lab.

Text/Reference Books:

1. Donald Hearn and M. Pauline Baker : Computer Graphics, PHI Publications.
2. Plastock : Theory & Problem of Computer Gaphics, Schaum Series.
3. Foley & Van Dam : Fundamentals of Interactive Computer Graphics, Addison-Wesley.
4. Newman : Principles of Interactive Computer Graphics, McGraw Hill.
5. Tosijasu, L.K. : Computer Graphics, Springer-Verleg.
6. S. Gokul : Multimedia Magic, BPB Publication.
7. Bufford : Multimedia Systems, Addison Wesley.
8. Jeffcoate : Multimedia in Practice, Prectice-Hall.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-108

SUBJECT NAME: OBJECT ORIENTED PROGRAMMING USING C++

MCA SEMESTER II

NO OF CREDITS: 4

SESSIONAL: 25

L P

THEORY EXAM: 75

4 0

TOTAL: 100

Pre- Requisite: CFPC

Successive: JAVA, VLP

Course Objectives:

1. To learn object oriented programming and compare with the procedural programming.
2. To learn basic concept and syntax of the language.
3. To implement program using more advanced C++ features such as composition of objects, operator overloading, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, templates etc.
4. To implement C++ classes using encapsulation and design principles.
5. Improve the problem solving skills.
6. Be able to apply object oriented or non-object oriented techniques to solve bigger Real World Computing problems.

Course Outcomes: At the end of program students acquired the knowledge about:

- a. Understand the differentiate between various programming paradigms available and familiar with the basic concept of the C++
- b. Implement the classes using proper syntax and applying the various features of the language.
- c. Implement the advanced concepts of the language into the classes like inheritance, polymorphism, templates, pointers, exception handling and file I/O
- d. Apply the object oriented concepts to the real world problems

Syllabus:

Unit-I INTRODUCTION TO C++: Introduction; Characters used in C++; Basic data types, Data type modifiers; C++ Tokens –identifiers, keywords, constants, variables; Input – Output statements, structure of a C++ program; **Escape Sequence (Backslash**

Character Constants); Operators and Expressions – arithmetic, relational, logical, and conditional operator; special operators – sizeof(), comma, assignment operators; Flow of control – compound statement, the if and if-else, and switch statements, the while, do-while, and for loops, break and continue statements, exit() function; Arrays – one dimensional and multi-dimensional arrays, array initialization; Structures – referencing structure elements, arrays of structures, initializing structures, assigning structures, nested structures; Functions – prototypes, calling a function, parameter passing , call by value, call by reference, array parameters, returning values from functions.

Unit-II POINTERS: Introduction to pointers- the ‘&’ and ‘*’ operators; pointer variables; dangling pointers; pointers and arrays; array of pointers; pointers and structures; dynamic allocation; self-referential structures, introduction to linked structures and lists;

Unit-III PROGRAMMING TECHNIQUES- A SURVEY: Introduction to programming paradigms – unstructured programming, structured , procedural, and modular programming; drawbacks of structured programming; Object Oriented programming.

Unit-IV CLASSES AND OBJECTS: Introduction to objects; classes – declaration in C++, abstraction and encapsulation, creating objects; array of objects; objects as function arguments, scope resolution operator, static data members; properties of classes and objects.

Unit-V FUNCTIONS: ADVANCED CONCEPTS: Polymorphism, Function overloading; inline functions; friend functions- Member functions of a class as friends of another class, Friend Function as a bridge between two classes; friend classes; recursion – types of recursion: linear, binary, tail recursion

Unit-VI CONSTRUCTORS AND DESTRUCTORS: Constructors – types of constructors: default, user defined, parameterized, copy constructors, and constructors with default arguments; rules for constructor definition and usage; destructors - rules for destructor definition and usage.

Unit-VII INHERITANCE: EXTENDING CLASSES: Introduction to code reuse; containership-aggregation; inheritance – visibility modes, ‘Open Close Principle’(OCP) types of inheritance: multilevel, multiple inheritance; function overriding – virtual functions, ‘Liskov’s Substitution Principle’ (LSP), pure virtual functions; roles of constructors and destructors in inheritance; virtual base class – graph inheritance.

Unit-VIII TEMPLATES: CODE SHARING (GENERICITY):: Introduction to code sharing; templates; generic classes; templates with more than one generic parameter;

Unit-IX OPERATOR OVERLOADING: Introduction to operator overloading, overloading of binary operators, arithmetic assignment operators; overloading of unary operators; overloading of input-output operators; rules of operator overloading.

Unit-X FILE HANDLING IN C++ : File concepts; files and streams; opening and closing of files – functions get(), getline(), put() etc., opening files using function open(); reading and writing blocks and objects into the files; detecting ‘end of file’ (eof)

Unit-XI EXCEPTION HANDLING: Introduction – traditional error handling; exception handling in C++ - ‘try, throw, and catch blocks’, multiple throw and multiple catch blocks, throwing objects; situations of usage of exception handling.

Text/ Reference Books:

1. C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall
2. Object Oriented Programming in Turbo C++ by Robert Lafore ,1994, The WAITE Group Press.
3. Programming with C++ By D Ravichandran, 2003, T.M.H
4. Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-110

SUBJECT NAME: OPERATING SYSTEM

MCA SEMESTER II

NO OF CREDITS: 4

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre- Requisite: CFPC

Successive: None

Course Objectives:

1. To understand evolution, types and functions of OS
2. To learn about Processes, threads and various Scheduling policies.
3. To understand process concurrency, synchronization and Deadlocks
4. To understand various memory management schemes & Disk management.
5. To understand I/O management and File systems.

Course Outcomes:

- a. Learn various types of OS and also understand various functions of OS.
- b. Understand how the operating system shares hardware resources between processes, tasks, threads, and users
- c. Learn the process management and its storage in memory and disk.
- d. Implement various memory management schemes, file system and I/O schemes.

Syllabus:

Unit-I OPERATING SYSTEM INTRODUCTION: Need of OS, Evolution of OS, Functions, Types Of OS - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Mobile OS. Operating System services, System Calls and System program.

Unit-II PROCESS AND CPU SCHEDULING: Process concepts, Process Lifecycle, Operation on processes, Cooperating Processes, Interprocess Communication, Scheduling Criteria, Scheduling Algorithm, Introduction to threads.

Unit-III PROCESS SYNCHRONIZATION: The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problem of Synchronization, Monitors.

Deadlocks: System Model, Dead locks Characterization, Methods for Handling Deadlocks: Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery.

Unit-IV MEMORY MANAGEMENT: Logical versus Physical Address Space, Swapping, Relocation, fixed & variable partitioning, Contiguous Allocation, Paging, and Segmentation with Paging.

Virtual Memory Management: principal of locality, Demand Paging, Performance of Demanding Paging, Page Replacement Algorithm, Allocation of Frames, Thrashing.

Unit-V FILE SYSTEM INTERFACE: Types of files, Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Disk management: need of disk scheduling, disk scheduling criteria, disk scheduling algorithm.

Unit-VI I/O MANAGEMENT: I/O Systems: I/O Hardware, I/O software, types of I/O, kernel I/O subsystems.

Text/Reference Books:

1. Silberschatz&Galvin : Operating System Concept, Wiley, Latest Edition.
2. Milan Milenkovic : Operating Systems, Tata McGraw – Hill Latest, Edition.
3. Principles of operating system: Dr.NareshChauhn, Oxford University press.
4. William Stallings: Operating Systems, PHI, Latest Edition.
5. A.S. Tanenbaum: Modern Operating Systems, Latest edition Pearson/PHI.

MASTER OF COMPUTER APPLICATION

CODE: AUD -01

SUBJECT NAME: GERMAN- I

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY EXAM: 75

2 0

TOTAL: 100

Duration of Exam: 3 hrs.

Course Objectives:

1. To introduce the script of German Language
2. To make students familiar with the pronunciation of basic German words
3. To learn basic vocabulary of German.
4. To make student familiar with grammar of German

Course Outcomes:

Upon successful completion of the course, the student :

- a. Learned the script of German Language
- b. Will be aware of pronunciation of basic German words.
- c. Learned vocabulary of German language.
- d. Will be able to apply the grammar rules in sentences and paragraph writing.

Unit-I Introduction

Basic Greetings in German

Unit-II Counting 1-100

Basic questions in German

Introduce yourself

Unit-III Personal Pronouns

Verb conjugations (regular verbs)

Unit-IV Articles- der, die, das

Vocabulary (classroom objects with articles)

Unit-V Days, months, seasons + im/am

Time (formal & informal)

Counting 1000+

Unit-VI Verb Conjugations (Irregular verbs)

Separable Verbs

Reference Books:

1. Netzwerk A1 by Paul Rusch
2. Studio d A1 by Funk, Kuhn, Demm

**MASTER OF COMPUTER APPLICATION
CODE: AUD -02**

SUBJECT NAME: GERMAN- II

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY

EXAM: 75

2 0

TOTAL: 100

Duration of Exam: 3 hrs

Course Objectives:

1. To introduce the advance Grammar of German Language
2. To develop good writing skills in German language through paragraphs and emails
3. To make student converse in German Language through group discussions

Course Outcomes:

Upon successful completion of the course, the student :

- a. Will be able to apply the grammar rules in sentences and paragraph writing
- b. Will be able to write emails and paragraphs in German
- c. Will be able to communicate in German language.

Unit-I Hobbies

Professions

Unit-II Family

Possesive pronouns and articles

Unit-III Nominative and Accusative case

Definite and indefinite articles in German

Unit-IV Articles- der, die, das

Vocabulary (classroom objects with articles)

Unit-V Modal Verbs

Imperative

Unit-VI W-questions

Introduction

Reference Books:

1. Netzwerk A1 by Paul Rusch
2. Studio d A1 by Funk, Kuhn, Demme

MASTER OF COMPUTER APPLICATION

CODE: AUD -03

SUBJECT NAME: FRENCH I

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY EXAM: 75

2 0

TOTAL: 100

Duration of Exam: 3 hrs.

Each lesson is divided into three parts which consist of Dialogue, Vocabulary and Grammar.

Description du materiel

1. To introduce the script of French Language
2. To make students familiar with the pronunciation of basic French words
3. To learn basic vocabulary of French.
4. To make student familiar with grammar of French

Course Outcomes:

Upon successful completion of the course, the student :

- a. Learned the script of French Language
- b. Will be aware of pronunciation of basic French words.
- c. Learned vocabulary of French language.
- d. Will be able to apply the grammar rules in sentences and paragraph writing.

Unit I: OBJECTIFS COMMUNICATIFS

- S'initiera' laculturefrançaise
- De' crielinepersonne
- Direlanationalite'
- Parlerdessaisons
- Localizerdesobjects
- Demanderldonnerdesgoûtsetdespréférences

UnitII: GRAMMAIRE/VOCABULAIRE

- Lesverbesen(er)
- Lespronomssujels
- Lesarticlesdefinis
- Lecorpshumain
- Lesverbesen(ir)
- Lesarticlesinde' finis

- Lanegation
- Lesverbesen(ger)
- Lefe'minimetepluriel
- Lesexpressionsavecfaire
- Les(nombres)(1-100)
- Lesprepositions
- L'interrogations
- Lesverbsen(re)etirreguliers
- Lesrepasfrancais
- Lesadjectifspossessifs
- De'criteuneville

References:

1. APPRENONS LE FRANCAIS Methode de Francais by MahithaRanjit , Monica Singh
2. LE NOUVEAU SANS FRONTIERES Methode de Francais byPhilippe Domonique, Jacky Girardet
3. Took reference from Bhartia Vidya Bhawan institute of foreign languages.

MASTER OF COMPUTER APPLICATION

CODE: AUD -04

SUBJECT NAME: FRENCH II

MCA SEMESTER II

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY EXAM: 75

2 0 0

TOTAL: 100

Duration of Exam: 3 hrs.

Each lesson is divided into three parts which consist of Dialogue, Vocabulary and Grammar.

Course Objectives:

1. To introduce the advance Grammar of French Language
2. To develop good writing skills in French language through paragraphs and emails
3. To make student converse in French Language through group discussions

Course Outcomes:

Upon successful completion of the course, the student :

- a. Will be able to apply the grammar rules in sentences and paragraph writing
- b. Will be able to write emails and paragraphs in French
- c. Will be able to communicate in French language.

Description du materiel

Unit-I: OBJECTIFS COMMUNICATIFS

- S'initiera' laculturefrancaise
- Salut
- Parlerdelaquantite
- Decrireunepersonne
- Parlerdelafamille
- Decrireunjournee
- Direl'heure
- Parlerdessaisons
- Interrogersur/ParlerdelaSante

Unit-II: GRAMMAIRE/ VOCABULAIRE

- Lesverbesen(er,ir,re)
- Lanegation
- Lesarticles
- Lesadverbesdequantite
- Lefemininleplurieldesnomsetdesadjectifs
- Lapositiondesadjectifs
- L'infinitifapresunautreverbe
- Lesmembresdelafamille
- Lesverbespronominaux
- Lesnombrecardinauxetordinaux
- Lessaisons,lesjoursdelasemaineetlesmoisdel'annee

- Trois formes d'interrogation
- L'interrogation négative et (si)
- Les expressions avec (avoir)
- Les animaux
- Les couleurs

References:

1. a) APPRENONS LE FRANÇAIS Méthode de Français by Mahitha Ranjit , Monica Singh
b) LE NOUVEAU SANS FRONTIÈRES Méthode de Français by Philippe Domonique, Jacky Girardet
2. Took reference from Bhartiya Vidya Bhawan institute of foreign languages.

MASTER OF COMPUTER APPLICATION

CODE: AUD -05

SUBJECT NAME: SANSKRIT - I

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY EXAM: 75

2 0 0

TOTAL: 100

Duration of Exam: 3 hrs.

1. To introduce the script of Sanskrit Language
2. To make students familiar with the pronunciation of basic Sanskrit words
3. To learn basic vocabulary of Sanskrit.
4. To make student familiar with grammar of Sanskrit

Course Outcomes:

Upon successful completion of the course, the student :

- a. Learned the script of Sanskrit Language
- b. Will be aware of pronunciation of basic Sanskrit words.
- c. Learned vocabulary of Sanskrit language.
- d. Will be able to apply the grammar rules in sentences and paragraph writing.

ईकाई-1: सस्कतवर्भारा,वर्-ववच्छद,सााशब्द-नलूग,स्रीलरग,ननसकलरग,सवनाभ,क्रिमा-नद.

ईकाई-2: सख्मा-१स५०,धातरून-रट्टकायएवरट्टकाय(अस,नठ्,गभ),अवमनरयचम.

ईकाई-3: धातरून-
रडूकाय(अस,नठ्,क),परोकनाभ,सलब्जमोकनाभ,नक्षमोकनाभ,ईशवन्दना(कवरअर्).

ईकाई-4: कायकएवउन्नदववबलततनरयचम,प्रत्मम-तभन,तत्वा.

ईकाई-5: शब्दरून-फारक,का,नदी,सववता,पर,वं,धातरून-रोट्टकाय(अस,नठ्,गभ),सभमरखन.

ईकाई-6: सभास-तलरूष,अनठितगदमाश,अशदधध-शोधन,वातम-यचना.

क्रकताफ:

- 1.दीनभणर्का,न्मसयस्वतीहाउसप्रा.लर.,इडिमा.
- 2.भणर्कासस्कतव्माकयर्,सयस्वतीहाउसप्रा.लर.,इडिमा

MASTER OF COMPUTER APPLICATION

CODE: AUD -06

SUBJECT NAME: SANSKRIT- II

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY EXAM: 75

2 0 0

TOTAL: 100

Duration of Exam: 3 hrs.

Duration of Exam: 3 hrs.

Course Objectives:

1. To introduce the advance Grammar of French Language
2. To develop good writing skills in French language through paragraphs and emails
3. To make student converse in French Language through group discussions

Course Outcomes:

Upon successful completion of the course, the student :

- a. Will be able to apply the grammar rules in sentences and paragraph writing
- b. Will be able to write emails and paragraphs in French
- c. Will be able to communicate in French language.

ईकाई-1: सस्कृतवर्भासा, वर्-ववन्मासएवसमोजन, एक-दवव-
अनक, स्वयसलन्ध(दीघसलन्ध, गर्सलन्ध, वदधधसलन्ध, मर्सलन्ध, नवरूनसलन्ध).

ईकाई-2: समततांयान, सख्मा-१स४(तीनोंलरगो), शब्दरूनप्रकयर्-
अकायान्तनलूग, अकायान्तस्त्रीलरग, अकायान्तननसकलरग.

ईकाई-3: नमामाःएवभवन्नममाः, साप्ताठहकठदनोंकनाभ, सख्मा-५०स१००, ईशवन्दना(कवरअर्).

ईकाई-4: प्रत्मम-म्न, तव्मत, सभमरखन, सभास-कभधायम.

ईकाई-5: धातरूनप्रकयर्, व्मजनसधध-
भोऽनस्वायसधध, अनस्वायसधध, छत्वभसधध, जशत्वभसधध, शतत्वभसधध, षत्वभसधध.

ईकाई-6: अन्नठितगदमाश, अशदधध-शोधन, वातारान्न, वातम-यचना, वाचमन्नरयवतन.

क्रकताफः

1.दीनभणर्का, न्मसयस्वतीहाउसप्रा.लर.,इडिमा.

2.भणर्कासस्कतव्माकयर्, सयस्वतीहाउसप्रा.लर.,इडिमा.

MASTER OF COMPUTER APPLICATION

CODE: AUD - 07

SUBJECT NAME: PERSONALITY DEVELOPMENT

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY EXAM: 75

2 0 0

TOTAL: 100

Duration of Exam: 3 hrs.

Course Objective:

1. To learn to achieve the highest goal happily
2. To become a person with stable mind, pleasing personality and determination
3. To awaken wisdom in students

Course Outcomes:

Upon successful completion of the course, the student :

- a. Will be able to achieve the goal.
- b. Will be able to achieve the balance in all situations of life.
- c. Will be able to take their decisions in all spheres of life

Syllabus:

Unit-I: Neetisatakam-Holistic development of personality Verses- 19,20,21,22 (wisdom)
Verses- 29,31,32 (pride& heroism)
Verses- 26,28,63,65 (virtue)
Verses- 52,53,59 (dont's)
Verses- 71,73,75,78 (do's)

Unit-II: Approach to day to day work and duties.

Shrimad BhagwadGeeta : Chapter 2-Verses 41, 47,48,
Chapter 3-Verses 13, 21, 27, 35,
Chapter 6-Verses 5,13,17, 23, 35,
Chapter 18-Verses 45, 46, 48.

Unit-III:Statements of basic knowledge.

Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68

Chapter 12 -Verses 13, 14, 15, 16,17, 18

Personality of Role model. Shrimad Bhagwad Geeta:

Chapter2-Verses 17, Chapter 3-Verses 36,37,42,

Chapter 4-Verses 18, 38,39 Chapter18 – Verses
37,38,63

References:

1. “Srimad Bhagavad Gita” by Swami SwarupanandaAdvaita Ashram (PublicationDepartment), Kolkata
2. Bhartrihari’s Three Satakam (Niti-sringar-vairagya) by P.Gopinath,
3. Rashtriya Sanskrit Sansthanam, New Delhi.

MASTER OF COMPUTER APPLICATION

CODE: AUD - 08

SUBJECT NAME: INTERVIEW AND GROUP DISCUSSION SKILLS

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY EXAM: 75

2 0 0

TOTAL: 100

Duration of Exam: 3 hrs.

Course Objective:

1. To enhance the Analytical and reasoning skills of students through case studies
2. To enhance communication skills of students through group discussions in interviews
3. To make students learn how to improve confidence level in unfavorable situations.
4. To make student understand the importance of body gestures, eye contact, self control during Group discussions and interviews.

Course Outcome:

Upon successful completion of the course, the student :

- a. Will be able to analyze the situation in a better way and correspondingly take decisions and reasoning skills of students through case studies
- b. Will be able to communicate better in a team.
- c. Will be able to develop confidence in all situations.
- d. Will be able to present themselves in better way in interviews.

Syllabus:

Quality of Content

- Comprehension of core idea
- Real life examples
- Data generation
- Reasoning

Vision /Goal Orientation

- Driving towards issue resolution
- Intelligent use of others' content

Personality

- Attitude
- Leadership

- Influencing ability
- Rapport building
- Participation
- Team

Confidence

- Motivation
- Activeness
- Energy
- Sense of humour

Communication

- Articulation
- Fluency
- Listening
- Body language
- Eye Contact

Types of G.D

- Factual Topics
- Controversial Topics
- Abstract Topics

Interview Skills

- Common Interview Questions
- What Employers Want
- Attitude and Effort
- Body Language
- Research
- The Mock Interview
- Phone Interviews
- Behavioral Interviews
- Closing the Interview
- Thank You Notes

MASTER OF COMPUTER APPLICATION
CODE: AUD - 09
SUBJECT NAME: YOGA AND MEDITATION

NO OF CREDITS: 0

L T P

2 0 0

SESSIONAL: 25

THEORY EXAM: 75

TOTAL: 100

Duration of Exam: 3 hrs.

Course Objective:

1. To make students learn about basics of yoga and its different levels.
2. To make students learn about meditation and its relation with yoga.
3. To make students learn about benefits of pranayama.
4. To make students learn about various asans.

Course Outcomes:

1. Students will be able to adapt yoga and good food habits in their daily life.
2. Students will be able to relax their soul by meditation.
3. Students will be able to live a healthy life by performing pranayama.
4. Students will be able to perform different asans.

Unit-I: Introduction to yoga and its different levels, food habits, Sanskar of a yogi, Patanjali Yogsutra, its importance in life, benefits and history of yoga.

Unit-II: Meditation and its relation with yoga, mind relaxation, development of morality and ethics, prayer and its meaning, its importance in life, benefits and history of meditation.

Unit-III: Pranayam and its introduction, types of pranayam, breathing exercises, preliminary preparation before pranayam, its importance and benefits in life.

Unit-IV: Practice of different types of Pranayam: Anulom-Vilom, Kapalbhathi, Nadi Shodhan, Agni Sar, Bhastrika, Bharamari etc.

Unit-V: Mantra and their importance, introduction to some chanting mantras, practicing some of mantras Gayatri Mantra, Namokar Jaap etc.

Unit-VI: Aasan and their types, benefits of different asans, practicing of different asans: Padamaasan, surya-namaskar, tadaasan, navaasan, gomukh aasan, bhujang aasan etc.

Reference Books:

1. Patanjali Yogsutra

2. Yog Manjari

MASTER OF COMPUTER APPLICATION
CODE: AUD - 10
SUBJECT NAME: ART OF LIVING

NO OF CREDITS: 0

L T P

2 0 0

Duration of Exam: 3 hrs.

SESSIONAL: 25

THEORY EXAM: 75

TOTAL: 100

Pre-requisites:

1. Getting up early in the morning, bathing, and meditation before sunrise
2. Following of five **Yamas** and five **Niyamas**
3. Avoiding 7 great sins
4. Some control over food (avoiding wine etc.)
5. Knowledge of Sanskritam

Course Objective:

1. To make student learn about basics of Yoga.
2. To make students learn about Vedas.
3. To make students learn about Vedic routine.
4. To make students learn about Vedic science and technology.

Course Outcome:

1. Students will be able to apply vedic science.
2. Students will be able to adapt general manners in their life.
3. Students will be able to adapt

vedic routine in their life.

4. Students will be able to apply yogas for self realization.

Syllabus:

- Unit-I:** **IMPORTANCE** Solution to present day problems: terrorism, pollution, personal, family, social, health, mental etc.; attainment of physical comforts, security, good governance, healthy environment etc.; bliss (ananda) of Yoga, getting rid of all miseries forever (Moksha); Why Vedic way? Vedas the oldest scriptures, word of the creator, fountain head of all religions; virtuous actions/Dharma, Pure (“Shudha”) Manusmriti; practical example – Valmiki Ramayanam (pure); evidences from Veda, Manusmriti (pure), Valmiki Ramayanam (pure), NASA findings etc.
- Unit-II:** **VEDIC ROUTINE DAILY** Brahma yajnya : Sandhyā- vandanam - Place, time, duration, dress, posture, achamanam, pranayama, japa, benefit, evidences, reading of veda/sāstra; Deva-yajnya: place, time, material; Balivaisvadeva yajnya; daily livelihood / or as per āshrama requirement; “Yamas” – Ahinsa, satya, asteya, brahmacharya, aparigraha; “Niyamas” – shaucha, santosha, tapah, swadhyaya, ishvara pranidhanam; significance and impact on personal and social life.
- Unit-III:** **GENERAL MANNERS** Respecting the elders (specially the parents and the teacher), not to throw excreta or other impure things into water or fire, avoiding anger with an angry person etc.
- Unit-IV:** **VEDIC LIFE ROTINE** Four ashramas – brahmacharya, grihastha, vanaprastha, sanyāsa, duties in each.
- Unit-V:** **SANSKARAS:**16 sanskāras (from conception till death) for the betterment of physical (sthūla sariram)and mental health (Sūkshma Sariram), institution of marriage – virginity, age difference, sincerity towards each other etc.
- Unit-VI:** **Great sins (“Mahā Pātaka”) and “Prāyaschittam”:**Seven great sins – abortion, adultery, drinking wine, livelihood on interest, speaking lie after lie in the court of virtuous men, stealing gold, killing a scholarly person.
- Unit-VII:** **Self Realization:** The greatest achievement, becoming immortal (Moksha), ashtanga yoga.

Unit-VIII: Vedic Science and Technology: Proper town planning as per the Vedic texts to meet the above objectives (good governance), some fundamentals from Vedic science to understand the Vedic art of living.

Unit-IX: Tips from Ayurveda for good health: Drinking water after getting up from bed, very light dinner, fresh warm food, cow's products etc.

Reference books:

1. Rigveda- Sakal sakha, Yajurveda- Madhyandin Sakha
2. Satapatha Brahmanam
3. Manusmriti ("Shudha")
4. Valmiki Ramayanam ("Shudha")
5. Samarangana Sutra Dhara
6. Vaisesika Darsanam, Yoga Darsanam
7. Susrut Sanhita

MASTER OF COMPUTER APPLICATION
CODE: AUD - 11
SUBJECT NAME: ROLE OF NSS IN NATION BUILDING

NO OF CREDITS: 0

L T P

2 0 0

Duration of Exam: 3 hrs.

SESSIONAL: 25

THEORY EXAM: 75

TOTAL: 100

Course Objectives:

1. To make student learn about youth leadership.
2. To make students learn about the importance and role of youth leadership.
3. To aware students about life competencies and help in decision making.
4. To motivate student for social harmony and national integration.

Course Outcomes:

1. Students will be able to serve their nation by making change in society.
2. Students will be able to build leadership qualities.
3. Students will be able to play their active role in national building.
4. Students will be able to make their own decisions and solve their problems.

Unit-I: Understanding youth

- Definition, profile of youth, categories of youth
- Issues, challenges and opportunities for youth
- Youth as an agent of social change
- National youth Policy

Unit-II: Importance and Role of Youth Leadership

- Meaning and types of leadership
- Qualities of good leaders; traits of leadership
- Importance and role of youth leadership
- Youth-focused and Youth-led organizations

Unit-III: Life Competencies

- Definition and Importance of life competencies
- Communication –process, types & barriers
- Motivation – Concept & Cycle
- Problem Solving and Decision Making

Unit-IV: Social Harmony and National Integration

- Indian history and culture
- Role of youth in peace-building and conflict resolution

- Role of youth in Nation building
- Youth development programmes at the National Level, State Level and voluntary sector

MASTER OF COMPUTER APPLICATION

CODE: AUD - 12

SUBJECT NAME: PHYSICAL EDUCATION

NO OF CREDITS: 0

SESSIONAL: 25

L T P

THEORY EXAM: 75

2 0 0

TOTAL: 100

Duration of Exam: 3 hrs.

Course Objectives:

1. To make student learn the basic concept of physical education.
2. To make student learn about physiological aspect of physical education.
3. To make student learn about psychological aspect of physical education.
4. To make student learn about health concepts of physical education.

Course Outcomes:

1. Learned the basic concepts of physical education.
2. Will be able to build their career in physical education.
3. Will be aware about health-related issues.
4. Learn about various sports/games.

Syllabus:

Unit-I: **Concept of Physical Education:** Meaning and definition of Physical Education, its aim and objectives Need and importance of Physical Education, Misconceptions about Physical Education & its relevance in Inter Disciplinary Context

Unit-II: **Career Aspects in Physical Education:** Career Options in Physical Education, Avenues for Career Preparation, Motivation & Self Assessment for career choices

Unit-III: **Physiological Aspects of Physical Education:** Warming up - General & Specific & its Physiological basis, Effects of Exercise on Muscular & Digestive systems, Effects of Exercise on Respiratory & Circulatory systems

Unit-IV: **Psychological Aspects of Physical Education:** Definition & role of Sports Psychology, Motivation and Achievements in Sports, Adolescent Problems & its Management.

Unit-V: **Health Concepts of Physical Education:** Role of Physical Education Programme on Community Health Promotion (Individual, Family & Society),

Effects of Alcohol, Tobacco and Drugs on Sports Performance, Obesity, Causes & Preventive Measures and Role of diet on Performance

Unit-VI: **About Games:** History of the Game/Sport, Latest General Rules of the Game/Sport, Measurement of Play Fields and Specifications of Related Sports Equipments, Important Tournaments and Venues, Sports Personalities

Unit VII: **Skill Development:** Fundamental Skills of the Game/Sport, Specific Exercises of Warm-up and Conditioning, Related Sports Terminologies, Sports Awards, Common Sports Injuries & its Prevention

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-201

SUBJECT NAME: ANALYSIS & DESIGN OF ALGORITHMS

NO OF CREDITS: 4

MCA SEMESTER III

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre- Requisite: DS

Successive: None

Course Objectives:

1. Introducing students with mathematical preliminaries required to analyze and design computer algorithms and study advanced data structures required to design efficient computer algorithms.
2. To understand students with specific algorithms for a number of important computational problems like sorting, searching, and graphs, etc.
3. Use various techniques for efficient algorithm design (divide-and-conquer, greedy, dynamic programming, backtracking and branch and bound algorithms) and are able to apply them while designing algorithms.
4. Introducing the concept of NP-complete problems and different techniques to deal with them. Know the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

Course Outcomes:

- a. To analyze and compare complexity for different types of algorithms for different types of problems and apply mathematical preliminaries to the analyses and design stages of different types of algorithms.
- b. To apply different types of data structures, analyze the best one for different types of problems and recognize the general principles and good algorithm design techniques for developing efficient computer algorithms. Introducing students with specific algorithms for a number of important computational problems like sorting, searching, and graphs, etc.
- c. Analyze on the suitability of a specific algorithm design technique for a given problem.
- d. Design efficient algorithms for new situations, using as building blocks the techniques learned and apply algorithm design techniques to solve certain NP-complete problems.

Syllabus:

- Unit-I INTRODUCTION:** Brief Review of stacks, queues, graphs, binary search tree, set and disjoint set union, general sorting algorithms, Analysis of algorithms in terms of space and time complexity.
- Unit-II DIVIDE AND CONQUER:** General method, binary search, ternary search algorithm, merge sort, quick sort, selection, Strassen's matrix multiplication, analysis of algorithms for these problems.
- Unit-III GREEDY METHOD:** General method, knapsack problem, job sequencing with deadlines, minimum spanning trees, single source paths, optimal storage on tapes, optimal merge patterns and analysis of these problems.
- Unit-IV DYNAMIC PROGRAMMING:** General method, single source shortest path, all pair shortest path, optimal binary search trees, 0/1 knapsack, the traveling salesman problem.
- Unit-V BACK TRACKING:** General method, 8 queen's problem, graph coloring, sum of subsets, Hamiltonian cycles, analysis of these problems.
- Unit-VI BRANCH AND BOUND:** General Method, 0/1 knapsack and traveling salesman problem.
- Unit-VII NP-HARD AND NP-COMPLETENESS:** P, NP, NP-Hard, NP-Complete, Cook's Theorem and Problem Solving.

Text / Reference Books:

1. Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni, 1978, Galgotia Publ.,
2. Introduction to Algorithms, Thomas H Cormen, Charles E Leiserson and Ronald L Rivest: 1990, TMH.
3. The Design and Analysis of Computer Algorithm, Aho A.V. Hopcroft J.E., 1974, Addison Wesley.

4. Algorithms-The Construction, Proof and Analysis of Programs, Berlion, P.Bizard, P., 1986.
5. Johan Wiley & Sons,
6. Writing Efficient Programs, Bentley, J.L., PHI
7. Introduction to Design and Analysis of Algorithm, Goodman, S.E. &Hedetnieni, 1997, MGH.

**MASTER OF COMPUTER APPLICATION
CODE: MCA-17-203**

**SUBJECT NAME: PRINCIPALS OF SYSTEM PROGRAMMING & COMPILER
DESIGN**

NO OF CREDITS: 4

MCA SEMESTER III

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre- Requisite: CFPC, MFOC

Successive: None

Course Objectives:

1. To understand system software components and different software tools used in programming environment and to make them learn functionality of different system software and utilities.
2. To study Lexical Analysis of program and various methods used to develop Lexical analyzer
3. To learn Parsers and its various techniques like top down and bottom up parsers and their implementation.
4. To understand various systems directed translation schemes, generation of intermediate code and explain principle source of optimization, issues and their solutions.

Course Outcomes:

- a. Acquired knowledge about various system software and role in programming environment.
- b. Implement lexical analyzer using NFA and DFA.
- c. Implement various parsing techniques.
- d. Understand the basic issues of code optimization, register allocation and assignment methods their limitations and benefits.

Syllabus:

Unit-I EVOLUTION OF THE COMPONENTS OF SYSTEMS PROGRAMMING:
Assemblers, Loaders, Linkers, Macros, Compilers. Software Tools: Variety of Software tools, Text editors, Interpreters and program generators, Debug Monitor, Programming environment. Loader Schemes compile and go loader, general loader

schemes, absolute loader, Subroutine linkage, reallocating loader, Direct Linkage Loader, Binders, Linkage loader, overlays.

Unit-II COMPILER: Phases of Compiler, Compiler writing tools, Lexical Analysis, Finite Automata, Regular Expression, From a Regular expression to an NFA, NFA to DFA, Design of Lexical Analyzer. Syntax Analyzer, CFG, Role of the Parser, CFG, Top Down Parsing, Recursive descent parsing, predictive parsers, Bottom up Parsing, Shift reduce, operator precedence parsers, LR Parsers.

Unit-III SYNTAX DIRECTED DEFINITION: Construction of Syntax trees, Intermediate code generation, Intermediate Languages, Syntax trees, post fix form. Symbol table: contents of Symbol table, Data Structures for Symbol table; Runtime storage Administration.

Unit-IV CODE OPTIMIZATION AND CODE GENERATION: Principles sources of optimization, loop optimization, DAG Representation of Basic blocks, Code generation – problems in code generation, a simple code generator, Register allocation and Assignment, Peephole optimization.

Text / Reference Books:

1. Donovan: Systems Programming, Tata McGraw Hill.
2. Dhamdhare: System Software, Tata McGraw Hill.
3. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: Compilers Principles, Techniques and Tools, Addison Wesley.
4. Alfred V. Aho and Jeffrey D. Ullman: Principles of Compiler Design, Addison Wesley.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-205

SUBJECT NAME: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

NO OF CREDITS: 4

MCA SEMESTER III

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre- Requisite: None

Successive: Neural Network

Course objectives:

1. To understand achievements of AI and the theory underlying those achievements.
2. To review "conventional" searching methods including breadth-first, depth-first, best-first search any many more heuristic techniques. Heuristic functions and their effect on performance of search algorithms.
3. To represent the knowledge in different forms as well as an understanding of other topics such as minimax, resolution, etc.
4. To understand the use of fuzzy logic and temporal reasoning.
5. To learn the different methods of Planning and learning.
6. To study genetic algorithms.
7. To learn NLP along with Rule based and Non Rule based expert system

Course outcomes:

After undergoing the course, Students will be able to:

- a. Understand the importance, the basic concepts and the Applications of AI.
- b. Apply various search techniques used for Intelligent systems
- c. Efficiently represent the various knowledge representation schemes used for intelligent systems.
- d. Apply some statistical like Bayes Theorem and Soft computing techniques (like ANN and GA) to solve the AI problem.
- e. Understand the phases and the architecture of various advanced system like NLP based system and Expert System.

Syllabus:

Unit-I **FUNDAMENTAL ISSUES IN IS:** Definition of AI, History, Domains AI, AI problems & State space, Some examples problems representations like Travelling Salespersons, Syntax analysis Problem, Basic issues to solve AI problems, Underlying assumptions, AI techniques, Level of model, Criteria for success, Control strategies, DFS,BFS

Unit-II **HEURISTIC SEARCH TECHNIQUES:** Generate & Test: Hill Climbing(simple & steepest), Best first search/A*, Problem Reduction/AO*, Constraint satisfaction, MEA.

Unit-III **KNOWLEDGE REPRESENTATION ISSUES:** Syntax & Semantic for Propositional logic, Syntax & Semantic for FOPL, Properties for WFF's, Resolution: Resolution Basics, conversion to clausal form, Resolution of proposition logic, Unification of predicates, Resolution algorithms for predicates, Problems with FOPL, Semantic nets, Frames, Scripts

Unit-IV **REASONING UNDER UNCERTAINTY:** An introduction, Default reasoning & Closed world assumptions, Model & Temporal logic, Fuzzy logic, Bayesian Probabilistic inference, Dempster Shafer theory, Heuristic reasoning methods

Unit-V **PLANNING & LEARNING:** Planning, Planning in Situational calculus, Representation for planning, Partial order planning, Partial order planning algorithm, Learning by Examples, Learning by Analogy, Explanation based learning, Neural nets, Genetics algorithms

Unit-VI **NATURAL LANGUAGE AND EXPERT SYSTEM DEVELOPMENT LIFE CYCLE:** Introduction to Natural Language Processing, Expert system: Definition, Role of knowledge in expert system, Architecture of expert system(Rule Based and Non-Rule Based), Problem selection, Prototype construction, Formalization, Implementation, Evaluation, Knowledge acquisition: Knowledge Engineering, Cognitive behavior, Acquisition techniques.

Text / Reference Books:

1. David W. Rolston: Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
2. Artificial Intelligence by Elaine Rich & Kevin Knight, TMH
3. Principals of AI(Nills .J.Nilsson)
4. DAN. W.Petterson
5. AI by Russel and Norvig, Pearson education
6. Petrick Henry Winston(AI)

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-207

SUBJECT NAME: SOFTWARE ENGINEERING

NO OF CREDITS: 4

MCA SEMESTER III

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre- Requisite: CFPC

Successive: STQA, CBMS

Course Objectives:

1. To enable the students to apply a systematic application of scientific knowledge in creating and building cost effective software solutions to business and other types of problems. Students can understand different phases to make software & study them in detail.
2. To make the students understand project management concepts & their metrics. They are also familiar with the calculation of staffing for a particular project, its cost & schedule.
3. To make the students understand requirement engineering and its models (Information, functional, behavioural). Students are also aware about the design models & its principles (data design, component design, interface design & architectural design).
4. To make the students understand different testing techniques for different projects and to develop quality software, its maintenance & introduce about software reliability.

Course Outcomes:

- a. Students will be able to understand basic concepts of software engineering, Software life cycle models.
- b. Students will be able to calculate the cost & staff for a particular project at the start.
- c. Students will be able to make an unambiguous SRS (software requirement specification) after collecting requirements of any client.
- d. Apply various testing techniques to ensure the quality of software.

Unit-I INTRODUCTION: Evolving role of software, Software Characteristics, Software crisis, Silver bullet, Software myths, Software process, Personal Software Process (PSP), Team Software Process (TSP), emergence of software engineering, Software process, project and product, Software Process Models: Waterfall Model, Prototype

Model, Spiral, Model ,RAD Model, Iterative Model, Incremental Model, Aspect-oriented Model, Agile Model.

Unit-II SOFTWARE PROJECT MANAGEMENT: Project management concepts, Planning the software project, Estimation—LOC based, FP based, Use-case based, empirical estimation COCOMO- A Heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management.

Unit-III REQUIREMENTS, ANALYSIS AND SPECIFICATION: Software Requirements engineering, Requirement engineering process, Requirement Engineering Tasks, Types of requirements, SRS.

Unit-IV SYSTEM MODELING: Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling, The mechanics of structured analysis: Creating entity/ relationship diagram, data flow model, control flow model, the data dictionary.

Unit-V SYSTEM DESIGN: Design principles, the design process; Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling; Design Heuristics for effective modularity, Data Design, Architecture Design, Interface Design

Unit-VI SOFTWARE TESTING AND MAINTENANCE: Testing terminology—error, bug/defect/fault, failure, Verification and validation, Test case design, Static testing ,Dynamic testing--- Black box testing—Boundary value analysis, White box testing- - basis path testing, Unit testing, Integration testing, Acceptance Testing, debugging, debugging process debugging approaches. Software maintenance categories, Models

Unit-VII SOFTWARE QUALITY MODELS AND STANDARDS: Quality concepts, Software quality assurance, SQA activities, Formal approaches to SQA; Statistical software quality assurance; CMM, The ISO 9126 Standard

Unit-VIII ADVANCED TOPICS IN SOFTWARE ENGINEERING: Configuration Management, Software re-engineering, reverse engineering, restructuring, forward engineering, and Clean Room software engineering.

Case Study: To develop SRS and SDD for a Software Project.

Text / Reference Books:

1. Software Engineering – A Practitioner’s Approach, Roger S. Pressman, 1996, MGH.
2. Fundamentals of software Engineering, Rajib Mall, PHI
3. Software Engineering by Ian Sommerville, Pearson Edu, 5th edition, 1999, AW,
4. Software Engineering – David Gustafson, 2002, T.M.H
5. Software Engineering Fundamentals Oxford University, Ali Behforooz and Frederick J. Hudson 1995
6. JW&S,
7. An Integrated Approach to software engineering by Pankaj Jalote , 1991 Narosa,
8. Software Testing : Principles and Practices, Dr. Naresh Chauhan.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-209

SUBJECT NAME: JAVA PROGRAMMING

NO OF CREDITS: 4

MCA SEMESTER III

SESSIONAL: 25

L P

THEORY EXAM: 75

4 0

TOTAL: 100

Pre- Requisite: IFWD,C++

Successive: AJP

Course Objectives:

1. To Study the software and hardware requirement and installing the java.
2. To understand Java programming constructs like variable, primitive data types, operators, type conversion, type casting etc.
3. To develop program by using classes, object, nested classes, constructors etc.
4. To create package, use of packages, adding a class to a package.
5. To understand conversion of numbers and Strings, manipulations of strings, Unboxing and autoboxing.
6. To implement inheritance of classes, polymorphism, abstract class.
7. To create file, deleting file, copying the content in files, reading and Writing in files, managing Metadata etc.
8. To handle the checked and unchecked exception , Basics of AWT, components and containers.

Course Outcomes:

After the course completion the students will be:

1. Understand the fundamentals of object oriented programming using java, JDK, architecture of JVM and able to understand the difference between the C++ and Java
2. Able to create objects, classes, packages and class libraries.
3. Implement abstract classes , polymorphism and File handling to solve the complex problem
4. Implement multithreading, applet, GUI based programmers and handle the exceptions

Syllabus:

Unit-I FUNDAMENTALS OF OOP AND JAVA: Need of OOP, Principles of Object Oriented languages, Procedural Language vs. OOPS, Applications of OOPS, Origin of JAVA, features of JAVA, JAVA Environment, Hardware and Software Requirements, Byte Code , Installing JDK, Difference between C++ and JAVA, Command-Line Arguments, Environment Variables, System Utilities, Command-Line I/O Objects, PATH and CLASSPATH

Unit-II JAVA PROGRAMMING CONSTRUCTS: JAVA program structure ,Variables, Primitive Data Types, Identifiers, Literals, Operators, Expressions, Precedence Rules and Associativity, Primitive type Conversion and Casting, Flow of Control(Conditional Statements, Loops, Branching Mechanism) Command Line Arguments.

Unit- III CLASSES AND OBJECTS: Defining a class, creating objects, methods(declaration, invocation, overloading), constructors ,garbage collection, static keyword, this keyword, arrays, inheritance and its types, method overriding, super keyword, final keyword, abstract class.

Unit-IV INTERFACES AND PACKAGES: Defining Interface, Extending and implementing interface, interface vs. abstract classes. JAVA API packages, using system packages, naming conventions, creating packages, accessing a package, using package, adding class to a package.

Unit-V EXCEPTIONS, MULTITHREADING & I/O: Types of errors, exception handling techniques, user defined exceptions, multiple catch statement, finally statement. Multithreading, life cycle of a thread, creating new threads in 2 ways, thread priority. Streams and File I/O.

Unit-IV APPLETS AND AWT: Difference between applets and applications, life cycle of an applet, common methods used in displaying the output, applet tag, adding applet to HTML file, executing the applet, passing parameters to applets. Basics of AWT, Components and Containers, Layouts.

Text / Reference Books:

1. Sachin Malhotra and Saurabh Chaudhary , “Programming in JAVA”, Oxford University Press, ISBN : 0-19-806358
2. E-Balagurusamy, “Programming with JAVA- A Primer” Tata McGraw-Hill Publishers, ISBN 0-07-463542-5

3. Dietel and Dietel "CORE JAVA"
4. Herbert Shield " The complete reference-JAVA2" , TMH

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-202

SUBJECT NAME: ADVANCED JAVA PROGRAMMING

NO OF CREDITS: 4

MCA SEMESTER IV

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: JAVA

Successive: Open Source Technology

Course Objectives

1. To understand the various concepts of advanced java programming and to familiarize the student with the AWT hierarchy and to acquaint the student the concepts of event handling of JAVA
2. To understand the concepts of Swing package and learn the basics of data access using JDBC
3. To implement the server side programming using Servlets and to familiarize the students with the concepts of reusable classes using JAVA Beans and Struts Framework
4. To understand the concept of Scripting language like JavaScript and master JSP

Course Outcomes

At the end of the course, the student would have

1. Understand various concepts of advanced java programming and to familiarize the student with the AWT hierarchy and to acquaint the student the concepts of event handling of JAVA
2. Acquired with concepts of Swing package and learn the basics of data access using JDBC
3. Implement server side programming using Servlets and to familiarize the students with the concepts of reusable classes using JAVA Beans and Struts Framework
4. Learn Scripting language like JavaScript and master JSP

Syllabus:

Unit-I NUMBERS, STRINGS & COLLECTIONS: The Numbers Classes, Formatting Numeric Print Output, Strings, Converting Between Numbers and Strings, Manipulating Characters in a String, The String Builder Class, Autoboxing and Unboxing, The Collection Interface, The Set Interface, The List Interface, Map interface. Generics and Annotation.

Unit-II I/O IN JAVA: I/O Streams, Byte Streams, Character Streams, Buffered Streams, Scanning, Formatting, I/O from the Command Line, Data Streams, Object Streams, File I/O, The Path Class, Path Operations, File Operations, Checking a File or Directory, Deleting a File or Directory, Copying a File or Directory, Moving a File or Directory,, Managing Metadata (File and File Store Attributes), Reading, Writing, and Creating Files, Random Access Files

Unit-III AWT & SWINGS: AWT Class Hierarchy, Creating Containers and adding Components, Layout, Panels, event Handling, Adapter Classes, Dialog Boxes, Scrollbar, Menus

Difference between AWT and Swings, Containment Hierarchy of Swings, Adding Components, JTextField, JPasswordField,JTable, JComboBox,JProgressBar, JList,JTree, JColorChooser, Dialogs

Unit-IV SERVLET & JDBC: Advantages over applets, Servlet alternatives and features, Servlet Architecture, Servlet Lifecycle,GenericServlet, HttpServlet,Passing and Retrieving parameters to servlets, Server Side Include, Cookies, filters, Security Issues.Introduction to JDBC, JDBC vs. ODBC, JDBC Drivers, JDBC Architecture, JDBC Classes and Interfaces

Unit-V JAVA BEANS and JAVASCRIPT: Introduction and Advantages of JavaBeans, BDK Introspection, Properties, JavaBeans API,EJB, Introduction to Struts Framework.Need of JavaScript, Features and Basic Programming constructs of JavaScript(variables, arrays, and functions), Objects, Dialog Boxes, and Event Handling

Text / Reference Books:

1. Uttam K. Roy, “ Advanced Java Programming”, Oxford University Press, ISBN : 0-19-945550-3
2. Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication.
3. Internet & Web Technologies – Raj Kamal, TMH
4. Herbert Shield “ The complete reference-JAVA2” , TMH

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-204

SUBJECT NAME: DESIGN OF UNIX OS & SHELL PROGRAMMING

NO OF CREDITS: 4

MCA SEMESTER IV

SESSIONAL: 25

L P

THEORY EXAM: 75

4 0

TOTAL: 100

Pre- Requisite: OS

Successive: None

Course Objectives:

1. To understand the basic concepts of single & multiuser Operating System, basic structure of UNIX kernel and its subsystems,
2. To study the concept of file subsystem, inodes and how files are managed by inodes.
3. To study process control subsystem, process scheduling paradigms and different types of scheduling employed in UNIX,
4. To understand memory management subsystems viz. swapping and demand paging.
5. To learn command structure of UNIX, various types of shells and types of commands and familiarize students with some general commands, directory and file related commands, process related and user communication related commands in UNIX. filters and piping, system administration and some system administration related commands.
6. To learn editors available in UNIX and the detailed working on the most Vi editor
7. To implement shell programming, wild cards and how to write simple shell programs, introduce concepts of decision control, looping, nested looping and control flow clauses in shell programming. Also make them write the related shell programs.

Course Outcomes:

- a. Acquired concepts of UNIX Operating System, its kernel and different subsystems of kernel, types of shells.
- b. Understand Process Control subsystem, its State diagram, types of scheduling and memory management policies.
- c. Execute various types of commands on the standard shell viz. basic commands, directory and file related, pipe and filter related, process related, user communication related and the system administration related commands.
- d. Implement shell scripts using this editor involving decision control, looping and control flow statements.

Syllabus:

Unit-I **THEORETICAL CONCEPTS AND FILE SYSTEM OF UNIX:** Evolution of UNIX, Basic features of UNIX, Architecture of UNIX kernel: File subsystem and process control subsystem, UNIX Vs LINUX, Various flavors of UNIX and LINUX. Hierarchical structure of UNIX File system, Types of files, data structures of the file subsystem; File system layout, internal representation of files: inodes, accessing and releasing inodes, structure of regular files and directories, superblocks, inode and disk block assignment to a new file.

Unit-II **PROCESS CONTROL SYSTEM AND MEMORY MANAGEMENT:** Concept of a process, state transitions, data structures, Context of a process, Layout of the system memory, process scheduler, scheduling parameters, Fair share scheduler. Swapping: Data structures, implementation of swapping processes in and swapping out; Demand Paging: Data structures, page stealer process, fault handler.

Unit-III **UNIX COMMANDS:** Structure of UNIX command, Internal and external commands, Basic utilities, logging in and out, changing passwords, File and directory related Commands: Absolute and relative path names, Creation and deletion of files and directories, Compression of files, file permissions, basic operations on files, simple filters and advanced filters, printer commands, Process related commands, Communication related commands, I/O redirection: standard input, output and error, piping; Vi editor and related commands, TCP/IP networking commands.

Unit-IV **SHELL PROGRAMMING AND SYSTEM ADMINISTRATION:** Types of shells and their features, shell's interpretive cycle, Shell wild cards, Shell variables, interactive shell scripts, shell keywords, positional parameters, using shift on positional parameters, passing command line arguments, arithmetic operations, taking decisions, loop control structures. The administrator privileges, maintaining security, user and group management, startup and shut down, Disk related commands, Backup and recovery, password aging, advanced administration commands.

Text / Reference Books:

1. The Design of the UNIX Operating System: Maurice J Bach, PHI
2. UNIX: Concepts and Applications: Sumitabha Das, Tata McGraw Hill.
3. UNIX Shell Programming: YashwantKanetkar, BPB publications.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-206

SUBJECT NAME: SOFTWARE TESTING AND QUALITY ASSURANCE

NO OF CREDITS: 4

MCA SEMESTER IV

SESSIONAL: 25

L T P

THEORY EXAM: 75

3 1 0

TOTAL: 100

Pre- Requisite: SE

Successive: OOSD

Course Objectives:

1. To get familiar the students about basic concepts of software testing and its techniques.
2. To study the concepts of Verification and validation activities.
3. To study in detail the process of performing the black box and white box testing approaches with examples.
4. To learn regression testing.
5. To study about the various testing automation and debugging tools and case studies.
6. To study the basic and advanced concepts of object oriented testing.

Course Outcomes:

- a. Design and develop the bug free software systems using basic concepts of software testing.
- b. Identify, formulate, review, estimate and analyze complex engineering problems of software testing using principles of mathematics.
- c. Create, select and apply appropriate techniques, modern engineering concepts and IT tools for software testing.
- d. Apply verification, validation activities, static, dynamic testing, debugging tools and techniques and importance of working in teams.
- e. Implement concepts of object oriented testing, web testing and regression testing.

Unit-I TESTING TERMINOLOGY AND METHODOLOGY: Definition of testing, goals, psychology, model for testing, effective testing, limitations of testing, Importance of Testing, Definition of Failure, faults or bug, error, incident, test case, test ware, life cycle of bug, bug effects, bug classification, test case design, testing methodology, development of test strategy, verification, validation, Static testing:

Inspection ,Review and Walkthrough, dynamic testing, testing life cycle model, testing techniques, testing principles, Testing Metrics.

Unit-II VERIFICATION AND VALIDATION: Verification activities, verification of requirements, verification of HL design, verification of data design, verification of architectural design, verification of UI design, verification of LL design, introduction to validation activities

Unit-III DYNAMIC TESTING: White Box testing: Boundary value analysis, equivalence class partitioning, state table based testing, decision table based, error guessing.Black Box Testing: Logic coverage criteria, basic path testing, graph matrices.

Unit-IV VALIDATION TESTING: Unit testing, drivers, stubs, integration testing, methods, functional testing, system testing, recovery testing, security testing, stress testing, performance testing, usability testing

Unit-V REGRESSION TESTING: Objective of regression testing, Regression test process, Regression testing techniques.

Unit-VI TEST AUTOMATION AND DEBUGGING: S/w measurement and testing, testing metrics and tools

Case Study: Testing for Object-oriented and web-based systems

Unit-VII OBJECT-ORIENTED TESTING: Use-case based testing; Class testing, Testing Exception handling

Text / Reference Books:

1. G.J Myers, The Art of Software Testing, John Wiley & Sons, 1979
2. Naresh Chauhan, Software Testing Principles and Practices, OXFORD University Press.

CODE: MCA-17-208

**SUBJECT NAME: COMPUTER BASED MANAGEMENT SYSTEM AND E
COMMERCE**

NO OF CREDITS: 4

MCA SEMESTER IV

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: SE

Successive: None

Course Objectives:

1. To understand basic concepts of Management and its functions.
2. To introduce the concept of modern management in 21st century.
3. To study the applications of information technology in management.
4. To study about the electronic commerce, various business models and security issues while performing electronic transactions.

Course outcomes:

- a. The students are able to understand the concept of management and about its functions.
- b. Acquired Knowledge about the various functional areas of management.
- c. Study of modern management concepts in 21st century and total quality management, electronic data interchange and just in time approach.
- d. Study of applications of information technology in the area of management information systems and their applications..
- e. Study of various types of management Study about the electronic commerce and electronic transactions and impact of electronic commerce on organizations and society and security issues while doing electronic transactions.

Syllabus:

Unit-I INTRODUCTION TO MANAGEMENT: THE MANAGEMENT PROCESSES: Planning, Organizing, Leading and Controlling, Management Levels: Top, Middle and Bottom, Management as an art, Management as a science, Management as a profession, Functional area of Management. The Management School: Scientific Management, Classical Management, Behavioral Management, Management Science, Systems Approach, Contingency Approach.

Unit-II MANAGEMENT IN 21ST CENTURY: Seven-S Model, Organization Structure, Communication Process, Strategy: Institutional, Operational, Total Quality Control (TQC). Total Quality Management (TQM), Electronic Data Interchange (EDI), Just-in-Time (JIT) Approach.

Unit-III APPLICATIONS OF MANAGEMENT INFORMATION SYSTEM: Types of information system in organizations : Transaction Processing System (TPS), Office System, Knowledge Work System (KWS), Decision Support System (DSS), Management Information System (MIS), Executive Support System (ESS).

Unit-IV E-COMMERCE: Overview of E-Commerce, Benefits of E-Commerce, Impact of E-Commerce, Applications of E-Commerce, Business Models of E-Commerce, Electronic Payment System : Introduction to Payment System : Online Payment System, Pre-paid and postpaid Payment System. Security in E-Commerce: Transaction Security, Cryptology, Authentication Protocol, Digital Signature, Knowledge Management, Business intelligence, Impact of E-commerce on individual, society and organizations.

Text / Reference Books:

1. Stoner, Freeman, Gilbert: Management, Latest, PHI Publication.
2. Kenneth, C. Laudon, Jane P. Laudon: Management Information System, Latest Edition, Pearson Education Publication.
3. P.T. Joseph: E-Commerce - A Managerial Perspective, PHI Publication.
4. Management Theory and Practice. C.B. Gupta
5. Information Technology for Management. Turban, Mclean, Wetherbe

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-210

SUBJECT NAME: VISUAL LANGUAGES PROGRAMMING

NO OF CREDITS: 4

MCA SEMESTER IV

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: CFPC, DBMS

Successive: None

Course Objectives

1. To explore Visual Basic's Integrated Development Environment (IDE) and how to load, modify, and save changes made to forms and projects in the Visual Basic environment.
2. To design, create, build, and debug Visual Basic applications, also explain variables, operators and data types used in program development.
3. To define and implement form objects including data arrays, control arrays, text boxes, message boxes, dialog boxes, labels, controls, menus, frames, picture boxes, pull-down menus, and combo boxes, MDI, Image List, List View, DAO, RDO, ODBC etc.
4. To use different type of arrays, loop structures, different type of procedures and functions
5. To use the debugger in the Visual Basic environment to set breakpoints, program step, procedure step, and error handling
6. To implementation of COM, DCOM, ActiveX, ActiveX-DLL.
7. To generate various types of crystal reports and how to perform packaging and deployment.
8. To study usage of VB script.

Course Outcomes

At the end of the course, the student would have

- a. Learn different type of client server architectures and introduction to VB6 tool and its related objects.
- b. Learn the various programming constructs, syntax of various controls used in VB.
- c. Learn various ways to access data (like data control, DAO) in VB, how to deal with errors and exceptions in VB, and some other interfaces like MDI.
- d. Learn the concepts of COM, ActiveX Controls, how to make Data Reports and Crystal Reports and usage of VB script.

Syllabus:

- Unit-I CLIENT SERVER BASICS:** Discover Client-Server and Other Computing Architectures, Understand File Server versus Client -Server Database Deployment, Learn About the Two Tier Versus Three Tire Client-Server Model.
Visual basic building blocks and default controls: Forms, Using Controls, Exploring Properties, Methods and Events, Introduction to Intrinsic Controls, Working With Text, Working With Choices, Special Purpose Controls.
VB advance controls: Events, Menu bar, Popup Menus, Tool bar, Message Box, Input Box, Built-in Dialog Boxes, Creating MDI, Working with Menus.
- Unit-II VB PROGRAMMING FUNDAMENTALS AND VARIABLES:** Introduction to Variables, Variable Declaration. Arrays, Introduction to Constants and Option Explicit Statement, Assignment Statements, Working With Math Operations, Strings, Formatting Functions. **Controlling And Managing Program:** All Control Statement, Loops, Error Trapping, Working with Procedures, Functions, Windows Common controls, control arrays.
- Unit-III VISUAL BASIC AND DATABASES:** Understanding the Data Controls, Introduction to DAO, Working with Record sets, Record Pointer, Filter, Sorts and Manipulation of Records.
Remote And ActiveX data Objects: Working with ODBC, Remote Data Objects and Remote data Control, Introducing ADO, ADO Data Control, Using Data Grid Control and ActiveX Data Objects.
- Unit-IV COM AND ACTIVEX COMPONENTS:** COM, Creating, Testing, Compiling, Enhancing and User Drawn ActiveXControls, Building Class Modules, ActiveX DLL.
Client-Server Development Tools: Data Reports And Crystal Reports, Packaging A Standard EXE Project.

Text / Reference Books:

1. McBride, P.K. : Programming in Visual Basic, BPB Publ.
2. HolznerSteven : Visual Basic Programming, IDG Books India Ltd.
3. Artiken : Visual Basic for Programming Explorer, Comdex.
4. 4.Any other book(s) covering the content of the paper in more depth.

MASTER OF COMPUTER APPLICATION

CODE-GEC-1

SUBJECT NAME: INTELLIGENT SYSTEMS

NO OF CREDITS: 3

MCA SEMESTER IV

L P

3 0

SESSIONAL: 25

THEORY EXAM: 75

TOTAL: 100

Course objectives:

Students undergoing this course are expected to:

1. To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements.
2. Searching as a problem-solving technique: a review of "conventional" searching methods including breadth-first, depth-first, best-first search any many more heuristic techniques. Heuristic functions and their effect on performance of search algorithms..
3. Represent the knowledge in different forms as well as an understanding of other topics such as minimax, resolution, etc.
4. Know the different ways of planning and natural language understanding.
5. Realize the different methods of learning.
6. Introduction to genetic algorithms.

Unit 1 **FUNDAMENTAL ISSUES IN IS** : Defi of AI , History ,Domains AI ,AI problems & State space ,Some examples problems representations like Travelling Salespersons ,Syntax analysis Problem, Basic issues to solve AI problems ,Underlying assumptions ,AI techniques ,Level of model ,Criteria for success ,Control strategies ,DFS,BFS

Unit 2 **HEURISTIC SEARCH TECHNIQUES:** Generate & Test, Hill Climbing(simple & stipest),Best first search ,A* , AO* , Constraint satisfaction.

Unit 3 **KNOWLEDGE REPRESENTATION ISSUES:** Syntax & Semantic for Propositional logic, Syntax & Semantic for FOPL, Properties for WFF's, Resolution Basics :conversion to clausal form ,Resolution of proposition logic

,Resolution algorithms for predicates ,Problems with FOPL ,Semantic nets ,Frames ,Scripts

Unit 4 **REASONING UNDER UNCERTAINTY :** An introduction ,Default reasoning & Closed world assumptions ,Model & Temporal logic ,Fuzzy logic ,Bayesian Probabilistic inference, Dempster Shafer theory ,Heuristic reasoning methods

Unit 5 **PLANNING & LEARNING:** Planning ,Planning in Situational calculus ,Representation for planning ,Partial order planning, Partial order planning algorithm ,Learning by Examples ,Learning by Analogy ,Explanation based learning ,Neural networks ,Genetic algorithms

Unit 6 MINIMAX Game playing strategy ,Natural language processing ,Overview of linguistics ,Grammar & Language ,Transformation Grammar ,Basic Parsing Techniques, Expert System ,Architecture of Rule based Expert system ,Non Rule based Expert system.

Course outcomes:

After undergoing the course, Students will be able to:

1. Learn the use of AI in different real life problems and heuristic search techniques for AI related problems.
2. Develop an ability to analyze and formalize the problem (as a state space, graph, etc.) and select the appropriate search method.
3. Apply the natural language processing techniques to computer.
4. Can apply genetic algorithm to solve the complex problems.

REFERENCES

1. Artificial Intelligence by Elaine Rich & Kevin Knight, Tata McGraw Hills Pub.
2. Principles of AI by Nils J. Nilsson, Pearson Education Pub.
3. Artificial Intelligence by DAN. W. Peterson. Printice Hall of India
4. Artificial Intelligence by Petrick Henry Winston,
5. Artificial Intelligence by Russel and Norvig, Pearson Education Pub.

MASTER OF COMPUTER APPLICATION

CODE: GWC-2

SUBJECT NAME: CYBER LAWS AND SECURITY

NO OF CREDITS: 3

MCA SEMESTER IV	SESSIONAL:	25
L P	THEORY EXAM:	75
3 0	TOTAL:	100

Course Objectives

1. The objective of the course is to make students familiar about security, its related terms like threat, attack, control etc.
2. To introduce various security challenges in different application domains
3. To introduce Security threats in the internet based applications.
4. To make students familiar with various physical security methods
5. To make students familiar about various forensic tools and various laws for cyber crime and policy designed by the government for cyber security.

Syllabus:

Unit-I History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services, Information System Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles.

Unit-II Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards. Physical Security- Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges

Unit-III Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, Policies Network Security- Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN

Unit-IV **SECURITY METRICS**- Classification and their benefits Information Security & Law, IPR, Patent Law, Copyright Law, Legal Issues in Data Mining Security, Building Security into Software Life Cycle Ethics- Ethical Issues, Issues in Data and Software Privacy Cyber Crime Types & overview of Cyber Crimes

Course Outcome

1. By the end of the course, students should be able to understand the concept of security and its differentiation with its related terms.
2. By the end of the course, students should be able to understand why security is important for internet based applications and various security threats in these areas.
3. By the end of the course, students should be able to understand various methods to provide physical security.
4. By the end of the course, students should be able to know laws, policies initiated by the government against cyber crime.

REFERENCES

1. Godbole, "Information Systems Security", Willey
2. Merkov, Breithaupt, "Information Security", Pearson Education
3. Yadav, "Foundations of Information Technology", New Age, Delhi
4. Schou, Shoemaker, "Information Assurance for the Enterprise", Tata McGraw Hill
5. Sood, "Cyber Laws Simplified", Mc Graw Hill
6. Furnell, "Computer Insecurity", Springer
6. IT Act 2000

MASTER OF COMPUTER APPLICATION

CODE:GEC-3

SUBJECT NAME: SOFT COMPUTING

NO OF CREDITS: 3

MCA SEMESTER IV	SESSIONAL:	25
L P	THEORY EXAM:	75
3 0	TOTAL:	100

Course Objectives

Students will learn about

1. Need of soft computing in the context of real life scenarios and various constituent methodologies underlying in the domain of soft computing.
2. Fundamentals of fuzzy sets and logic ,Fuzzy logic based control/ expert systems.
3. Inductive logic and need for training in the context of machine learning and Neuron models relating to supervised and unsupervised learning.
4. Training the neurons on given input/output class information.
5. Solving a problem with huge state space using genetic modeling and operators
6. Applying soft computing in common domains like IR, Drug design etc.

Unit-I **Neural Networks:** History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms- Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms- perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perception Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

Unit-II **FUZZY LOGIC:** Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

Unit-III OPERATIONS ON FUZZY SETS: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Unit-IV FUZZY ARITHMETIC: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Unit-V FUZZY LOGIC: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges. Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets. Genetic Algorithms, Scope & application areas, solution of 0-1Knapsack problem using GA

Course Outcomes

After the completion of the course the student will be able to

1. Discuss the various aspects of uncertainty in real life and inability of conventional computing to handle them and to Relate real life problem contexts to soft computing paradigms tools
2. Design and use fuzzy sets and numbers in the context of various domains and Design fuzzy rule based system for a control application like washing machine.
3. Identify the problems suitable for solution using neural networks and train a perceptron network over a given input/output pattern information.
4. Design a genetic model for a given problem with huge state space and Apply GA tools and solution to a problem to find an amicable solution for the same.

REFERENCES

1. "Fuzzy sets and Fuzzy Logic: Theory and applications", G.J. Klir, B. Yuan, PHI
2. "Introduction to Fuzzy sets and Fuzzy Logic", M. Ganesh, PHI
3. "An Introduction to Fuzzy Control", D. Driankov, H. Hellendoorn, M. Reinfrank, Narosa Publishing Company
4. "Neural Networks: A classroom approach", Satish Kumar, Tata McGraw Hill
5. Haykin S., "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
6. Anderson J.A., "An Introduction to Neural Networks", PHI, 1999

MASTER OF COMPUTER APPLICATION (GENREAL ELECTIVE)

CODE: GEC-4

SUBJECT NAME: Web Technology and Information Retrieval

NO OF CREDITS: 3

MCA SEMESTER IV	SESSIONAL:	25
L P	THEORY EXAM:	75
3 0	TOTAL:	100

Course Objectives:

1. To build an understanding of the fundamental concepts of Information Retrieval.
2. To understand the elements of Web Search Engines and Crawlers.
3. To familiarize students with the basic taxonomy and terminology of Indices and to understand Heap's Law for estimation and Zipf's law for modeling distribution of terms.
4. To understand dictionary compression and posting list compression and to introduce the scoring, tf-idf weighting and vector space model for scoring.

Syllabus:

Unit I: **WEB SERVER TECHNOLOGY:** Web's Robot global access to information, HTML, HTTP, Accessing a web server, publishing on web server, secure HTTP, Secure Sockets Layer, WWW Proxies, IIS, Case study of apache web server.

Unit II : **WEB SEARCH BASICS:** Background and history, Anatomy of WWW, Web characteristics, Spam, The web graph, The Web Search Users, search engines, architecture of search engines, search tools, DNS resolution, The URL frontier, Link analysis, PageRank,

Unit III: **WEB CRAWLERS:** Basics of Web crawling, Various crawling techniques , incremental crawler, parallel crawler, distributed crawlers, focused crawler, agent based crawler, Hidden web Crawler

Unit IV: **INTRODUCTION TO INFORMATION RETRIEVAL:** Information retrieval problem, an inverted index, Processing Boolean queries, The extended, Boolean model versus ranked retrieval, an inverted index, Bi-word indexes, Positional indexes, Combination schemes

Unit V: **INDEX CONSTRUCTION:** Hardware basics, Blocked sort-based indexing, Single-pass in-memory indexing, Distributed indexing, Dynamic indexing, Other types of indexes Index compression: Statistical properties of terms in information retrieval, Heaps' law: Estimating the number of terms, Zipf's law: Modeling the distribution of terms, Dictionary compression, Dictionary as a string, Blocked storage, Postings file compression.

Course Outcome:

After completion of the course, students will be able to:

1. Understand basic Information Retrieval Systems and learn how Boolean queries are processed.
2. Understand the basic concept of Search Engines their architecture and its various functional components and understand the basic concept of Web crawlers and their architecture.
3. Identify the different types of indices: inverted index, positional index, bi-word index and be able make estimations and model distribution of terms and compressions.
4. Enumerate various types of indices and also understand the concept of efficient storage of indices and learn tf-idf scoring and vector space model scoring for ranking.

Code: GEC-5

SUBJECT NAME: Intellectual Property Rights (IPR)

NO OF CREDITS: 3

MCA SEMESTER IV	SESSIONAL:	25
L P	THEORY EXAM:	75
3 0	TOTAL:	100

Course Outcome:

1. To make the student aware about Intellectual Property and why it is important.
2. To study the concept of Patents, history of patent and its categorization.
3. To learn the procedure of obtaining Patents.
4. To make the student learn Assignment and Revocation of Patent.
5. To study the concept of infringement and its defence.

Syllabus:

Unit I: INTRODUCTION TO INTELLECTUAL PROPERTY: Concept of Intellectual Property, Kinds of Intellectual Property, Economic Importance of Intellectual Property,

Indian Theory on Private Property: Constitutional Aspects of Property, Constitutional Protection of Property and Intellectual Property, Economic Development and Intellectual Property, Rights Protection

Unit II: INTRODUCTION TO PATENTS: Overview, Historical Development, Concepts: Novelty, Utility, Patentable Subject-matter: Patent Act, 1970-Amendments of 1999, 2000, 2002 and 2005, Pharmaceutical Products and Process and Patent , Protection, Software Patents, Business Method, Protection of Plant Varieties and Farmers' Rights Act, 2001, Patenting of Micro-organism

Unit III: PROCEDURE OF OBTAINING OF PATENTS: Concepts of a Patent Application,, Specification: Provisional, Complete, Disclosure Aspects, Claims: Principal, Dependant, Omnibus, Examination of Application, Opposition of Application, Sealing of Patents

Unit IV: WORKING OF PATENTS– COMPULSORY LICENSE: Commercialization of Inventions: License- Terms of License Agreement, Assignments of Patents, Revocation of Patents

Unit V: INFRINGEMENT: What is Infringement?, How is Infringement determined? Who is an Infringer?, Direct, Contributory and Induced, Defences of Infringement:5.2.1 Research Exemption, Invalidity, Misuse, Failure to mark, Laches and Estoppel and first sale doctrine

Course Outcome:

After completion of the course student will be able to:

1. Understand the concept of Intellectual Property and its importance.
2. Understand Patents, categorization and procedure for obtaining patents.
3. Understand the commercialization of invention
4. Understand the concept of infringement and its defence.

References Books:

1. W.R. Cornish, Intellectual Property, Sweet & Maxwell, London (2000)
2. P. Narayana, Patent Law, Wadhwa Publication
3. Merges, Patent Law and Policy: Cases and Materials, 1996
4. Brian C. Reid, A Practical Guide to Patent Law, 2nd Edition, 1993
5. Brinkhof (Edited), Patent Cases, Wolters Kluwer.
6. Prof. Willem Hoyng & Frank Eijsvogels, Global Patent Litigation, Strategy and Practice, Wolters Kluwer.
7. Gregory Stobbs, Software Patents Worldwide, Wolters Kluwer.
8. Feroz Ali Khader, The Law of Patents- With a special focus on Pharmaceuticals in India, Lexis Nexis Butterworths Wadhwa, Nagpur.
9. Sookman, Computer Law, 1996
10. N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property (2009). Eastern Book Company, Lucknow.

SUBJECT NAME: .NET TECHNOLOGY

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: CFPC,DBMS, ADMS

Successive: None

Course Objectives:

1. To study the features of .Net Technologies & to understand Visual Studio .Net Environment
2. To learn of C# programming fundamentals
3. To learn VB.Net programming constructs
4. To learn ADO.Net Object Model.
5. To learn ASP.Net of ASP.Net Web Programming

Course Outcomes:

- a. Understand .net framework , its runtime environment and application development using IDE of Visual Studio 2010 and higher versions.
- b. Implement C# and VB.Net language constructs in the form of stand-alone console and Window form applications .
- c. Understand Database concepts in ADO.net and apply the knowledge to implement distributed data-driven applications using VB.Net, SQL-Server and ADO.Net
- d. Design, document, debug ASP.Net web forms with server and validation controls and implement ASP.Net web services.

Syllabus:

Unit-I INTRODUCTION TO .NET FRAMEWORK: INTRODUCTION TO .NET: The origin of .NET, Basics of .Net Framework & its Key design goals, 3-tier architecture, managed code, assemblies, CLR, Execution of assemblies code, IL, JIT, .NET framework class library, common type system, common language specification, metadata; Interoperability with unmanaged code
Net Framework Base Classes: System Namespaces; the System Types; System.object class; System. Exception Class; System. Collections;

Unit-II UNDERSTANDING THE DEVELOPMENT ENVIRONMENT: .NET INTEGRATED DEVELOPMENT ENVIRONMENT : Projects & Solutions, User Interface Elements, The Visual Studio Start Page; Visual Studio.Net work area; Navigational Features, Understanding Window Forms; Viewing and changing properties; Adding controls to the form.
Designing Visual Components: Using the task list

Unit-III INTRODUCTION TO VB .NET AND C# : DATA TYPES C#: Data Types, Operators, Methods, Handling Strings, Jagged Array, Array list, Indexer (one Dimension) and property, Interfaces, Delegates and events.
User Interface: Procedures in VB.NET, Garbage Collection, Message boxes; Dialog boxes; Menus and Toolbars; creating menu; adding Toolbars and buttons; defining an icon for a toolbar button; Adding Functionality to the Toolbar; Exception Handling.

Unit-IV ADO.NET: Architecture of ADO.Net, Comparison with ADO, ADO.Net Object Model, Net Data provider, Data Adapter, Data Set, Data Row, Data Column, Data Relation, command, Data Reader, Connecting to Database, Accessing & Manipulating Data and Performing Data Updates.

Unit-V ASP. NET: Anatomy of ASP .NET Page,ASP.Net Features, Introduction to Web Forms Server Controls : label, dropdown list box, Button, AdRotator , Textbox, Checkbox etc. , Validation controls, ASP.NET Web Services, State Management ,Caching, Authentication (window,.Net Passport, Forms Based), Securing ASP.NET Applications

Text / Reference Books:

1. Jeffrey Richter, Francesco Balena : Applied .Net Framework
2. Prog. In MS VB. Net, TMH Publications.
3. Herbert Schildt : Complete Reference C#, TMH Publication.
4. Michael Halvorsan : Microsoft Visual Basic.NET step by step,PHI Publication.
5. Balaguruswamy: Programming in C# , TMH Publications
6. Rebecca M.Riordan: Microsoft ADO.NET Step By Step , PHI Publication

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-303

SUBJECT NAME: OBJECT ORIENTED SYSTEM ENGINEERING

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: OOPs, SE

Successive: None

Course Objective

1. To review of the concepts of Object Oriented Programming and understand the Importance of Architecture in the Software Development lifecycle.
2. To study the importance of object-oriented analysis and design and its limitations.
3. To understand the importance of modeling and introduction to Unified modeling Language and Objectory.
4. To study function of each UML Model throughout the process of Object Oriented Analysis and Design and explaining the notation of various elements in these models.
5. To learn Iteration and planning in SDLC especially in UML.

Course Outcomes

After completing this course the student must demonstrate the knowledge and ability to:

- a. Show the importance of systems analysis and design in solving complex problems and how the object-oriented approach differs from the traditional approach to systems analysis and design.
- b. Explain the importance of modeling and how the Unified Modeling Language (UML) represents an object-oriented system using a number of modeling views and understand of the various phases of the Objectory software Development Process.
- c. Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state-chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation.
- d. Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships.
- e. Show the role and function of each UML model in developing object-oriented software and understanding of the Iterative and Iterational approach to be followed in UML

Syllabus:

- Unit-I INTRODUCTION TO OBJECT ORIENTED METHODOLOGY:** Review of the Traditional Methodologies, Classes, Objects, Encapsulation, Association, Aggregation, Inheritance, Polymorphism, States and Transitions.
Object Oriented Modeling: visual modeling and its importance, – UML Approach, Conceptual model of the UML, Architecture, Software Development Life Cycle.
Object Oriented Design: Trends in software design, Design principles, Responsibility driven design, Separation of Responsibilities, Design phases and tools
- Unit-II INTRODUCTION TO OBJECTORY SOFTWARE DEVELOPMENT PROCESS:** Introduction, Benefits, Phases and Iterations, Elaboration Stage, Construction Stage, Transition Stage.
- Unit-III STRUCTURAL MODELING:** Objects, classes: Names, attributes, operations, responsibilities; Stereotypes and Classes Relationships: Dependencies, Generalization, Association, Structural Diagrams: Class diagram, object diagrams.
- Unit-IV BEHAVIORAL MODELING:** Interaction diagrams, types of Interaction diagrams ,Activity Diagrams Activities, Transitions, Decision Points, Swimlanes Actors & Use cases, use case diagram, Use Case Relationships, Types of Relationships,
- Unit-V ARCHITECTURAL MODELING:** Designing the System Architecture : The need for Architecture, The “4+1” view of Architecture, The Logical view, The Component View, The Process View, The Deployment View, The Use Case view. Checking the Model: Making the Model Homogeneous, Combining Classes, Splitting Classes, Eliminating Classes, Consistency Checking, Scenario Walk-through, Event Tracing, Documentation Review
- Unit-VI THE ITERATION PLANNING PROCESS:** Benefits, Goals, Design the User Interface, Adding Design Classes, The Emergence of Patterns, Designing Relationships, Designing Attributes and Operations, Designing for Inheritance, Coding, Testing, and Documenting the Iteration.

Text / Reference Books:

1. “UML User Guide”, Grady Booch, James Rumbaugh, Ivar Jacobson, 2000, Addison Wesley.
2. Visual Modelling with Rational Rose 2000 and UMLBy Terry Quatrani Foreword by Grady Booch, 2000.
3. “UML Reference Guide”, James Rumbaugh, Ivar Jacobson, Grady Booch, 2000, Addison Wesley.
4. “The Objectory Software Development Process”, Ivar Jacobson, Grady Booch, James Rumbaugh, 1999, Addison Wesley.
5. UML Distilled by Maxtin Fowler with Kendall Scott,2000 ,Second Edition

6. Sams Teach Yourself “UML” In 24 Hours By Joseph Schmuller ,2000

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-305

SUBJECT NAME: ADVANCED DATA BASE SYSTEMS

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T
4 0 0

THEORY EXAM: 75

TOTAL: 100

Pre- Requisite: CFPC, DMMS

Successive: .NET

Course Objective

1. To understand Enhanced Entity Relationship Model, Object Model
2. To study about Object Oriented database with their advantages and storage and access methods.
3. To understand large data repositories i.e. Data Warehouse and various Data Mining techniques for extracting and analysis of useful information.
4. To study Parallel and Distributed Databases: Distributed database concepts, Architectures for distributed databases,
5. To understand Databases on Web and Semi Structured Data:
6. To understand Enhanced Data Models for Advanced Applications.

Course outcome

- a. Understand the concepts of different type of databases (Relational, Object Oriented and Object Relational Database) and can create these types of databases through various methodology available.
- b. Understand the concept of large database repositories, Data warehouse and data mining. Student will be able to differentiate between data warehouse and any other database system and can retrieve or mine the data for various purposes (like prediction, analysis etc.) from large data repositories.
- c. Understand the concept of Parallel and distributed databases and different ways in which data can be stored, processed or recover on such databases.
- d. Understand the concept of latest types of databases (like mobile database, GIS based, XML etc) and how they are different from the traditional database approach and will be able to identify the areas in which these types of databases are helpful.

Syllabus:

Unit-I THE ENHANCED ENTITY RELATIONSHIP MODEL AND OBJECT MODEL: ER-model, EER-model: Subclasses, superclasses, Inheritance, Specialization, Generalization, Motivation for complex data types, User defined abstract data types and structured types.
Object-Oriented Databases: Overview of Object-Oriented concepts, Object identity, Object structure, and type constructors, Encapsulation of operations, Methods, and

Persistence, Type hierarchies and Inheritance, Type extents and queries, Database schema design for OODBMS,OQL.

Object Relational Databases: Database design for an ORDBMS - Nested relations and collections, Storage and access methods.

Unit-II DATA WAREHOUSE: Difference between Operational database and data warehouse, Multidimensional Model, Schemas for Multi dimensional Model, Concept Hierarchies, OLAP Operations, Data warehouse architecture.

Data Mining: Introduction to data mining, Knowledge Discovery in Databases, Association Analysis, Association Rule Mining, Classification and Prediction, Cluster Analysis.

Unit-III PARALLEL AND DISTRIBUTED DATABASES: Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins; Distributed database concepts, Architectures for distributed databases, Data fragmentation, Replication, and catalog management techniques, Query processing in distributed database; Joins, Concurrency control and Recovery in distributed databases.

Unit-IV DATABASES ON WEB AND SEMI STRUCTURED DATA: Overview of XML; XML Applications; The semi structured data model, Implementation issues, Enhanced Data Models for Advanced Applications; Active database concepts. Temporal database concepts; Geographic information systems, spatial databases, Deductive databases and query processing; Mobile databases, Multimedia databases.

Text / Reference Books:

1. Elmasri and Navathe, Fundamentals of Database Systems, Pearson Education.
2. Korth, Silberchatz, Sudarshan, Database System Concepts, McGraw-Hill.
3. C.J.Date, Longman, Introduction to Database Systems, Pearson Edu

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-307 (1)

SUBJECT NAME: THEORY OF COMPUTATION (ELECTIVE-1)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: MFCS

Successive: None

Course Objectives

1. To understand the fundamental concepts of Finite state Systems and Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA), Chomsky hierarchy of grammars.
2. To acquire knowledge about Regular Grammar and Regular Sets, Context Free and Context Sensitive Grammars: Definition, Context free and Context sensitive grammar.
3. To implement push down automata and Turing machines.
4. To understand the concept of Undecidability and Computability.

Course Outcomes

- a. Understand Finite State Systems, Properties and limitations of Finite State machines, Basic Definitions, Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA) and be able to explain Chomsky hierarchy of grammars.
- b. Acquired knowledge about Regular Expressions, Identities, Regular languages and finite automata, Arden theorem: Equivalence of finite automata and Regular Expressions and able to understand Context free and Context sensitive grammar, Parse trees, Ambiguity in CFG.
- c. Analyze, Design of PDA and will become familiar with Deterministic and Non-Deterministic Turing Machines, Design of TM, Universal TM, Halting problem of TM. Permutations and Combinations.
- d. The students will be able to find the various solutions of Recursive and non-recursive languages.

Syllabus:

Unit-I FINITE AUTOMATA AND REGULAR EXPRESSIONS: Finite State Systems, Basic Definitions Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA), Equivalence of DFA and NFA Finite automata with ϵ -moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa.

Unit-II INTRODUCTION TO MACHINES: Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines, Conversion of NFA to DFA by Arden's Method.

Unit-III PROPERTIES OF REGULAR SETS: The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of finite Automata, Minimization Algorithm.

Unit-IV GRAMMARS: Definition, Context free and Context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

Unit-V PUSHDOWN AUTOMATA: Introduction to Pushdown Machines, Application of Pushdown Machines

Unit-VI TURING MACHINES: Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., PCP Problem.

Unit-VII CHOMSKY HIERARCHIES: Chomsky hierarchies of grammars, unrestricted grammars, Context sensitive languages, Relation between languages of classes.

Unit-VIII COMPUTABILITY: Basic concepts, Primitive Recursive Functions.

Text / Reference Books:

1. Introduction to automata theory, language & computations- Hopcroft&O.D.Ullman, R Motwani, 2001, AW
2. Theory of Computer Sc. (Automata, Languages and computation):K.L.P.Mishra&N.Chandrasekaran, 2000, PHI.
3. Introduction to formal Languages & Automata-Peter Linz, 2001, NarosaPubl.
4. Fundamentals of the Theory of Computation- Principles and Practice by RamondGreenlaw and H. James Hoover, 1998, Harcourt India Pvt. Ltd..
5. Elements of theory of Computation by H.R. Lewis & C.H. Papaditriou, 1998, PHI.
6. Introduction to languages and the Theory of Computation by John C. Martin 2003, T.M.H.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-307 (2)

SUBJECT NAME: ADVANCE COMPUTER NETWORKS (ELECTIVE-1)

NO OF CREDITS: 4

MCA SEMESTER V

L P T

SESSIONAL: 25

THEORY EXAM: 75

Pre- Requisite: CN

Successive: None

Course Objectives

1. To understand Data Communication, Line Encoding Schemes, Multiplexing techniques, Modulation methods and introduce B-ISDN and ATM, Optical Transmission, Network techniques, Signaling principles.
2. To learn the concept of broadband network performance, traffic management aspects.
3. To study ATM traffic parameters and transfer capabilities, Quality of service and ATM switching: matrix type, central memory, ring type switching element.
4. To learn about Switching networks and ATM transmission.
5. To understand concept of Multi-Protocol Label Switching (MPLS) and Ad-hoc Network Concepts.

Course Outcomes

The students will be able to:

- a. Understand concepts of Data Communication, Line Encoding Schemes, Multiplexing techniques, Modulation methods and introduce B-ISDN and ATM, Optical Transmission, Network techniques, Signaling principles.
- b. Acquired concept of broadband network performance, traffic management aspects.
- c. Acquired ATM traffic parameters and transfer capabilities, Quality of service and ATM switching: matrix type, central memory, ring type switching element.
- d. Get familiar with Switching networks and ATM transmission.
- e. Understand the concept of Multi-Protocol Label Switching (MPLS) and Ad-hoc Network Concepts.

Syllabus:

Unit-I DATA COMMUNICATION: Data transmission, Parallel Transmission, Serial Transmission, Line Encoding Schemes: Unipolar, Polar, Bipolar, Multiplexing techniques: TDM, FDM, Modulation methods: AM, FM, PM, Pulse Code Modulation.

Unit-II INTRODUCTION TO B-ISDN AND ATM: B-ISDN principles, Asynchronous transfer mode, Optical Transmission, Network techniques: Networking layering,

Switching of virtual channels and virtual paths, applications of virtual channel/path connections, Signaling principles: capabilities required for B-ISDN signaling, signaling virtual channels, broadband network performance, traffic management aspects: overview of functions, ATM traffic parameters and transfer capabilities, Quality of service.

Unit-III B-ISDN REFERENCE MODEL: General aspects, layering architecture, relationship between B-ISDN PRM and OSI reference model, B-ISDN protocol reference model description and layer functions, User Network Interface.

Unit-IV ATM: ATM based services and applications, ATM cell structure, Cell header, ATM connections: virtual path connection, virtual channel connection. ATM switching: matrix type, central memory, ring type switching element. Switching networks: Single stage networks, Multi-stage networks, ATM transmission: cell transfer functions, transmissions systems

Unit-V MULTI-PROTOCOL LABEL SWITCHING (MPLS): How MPLS works, Installing and removing MPLS paths , Comparison of MPLS versus IP , MPLS local protection , Comparison of MPLS versus Frame Relay , Comparison of MPLS versus ATM , Comparison of MPLS VPN versus IPsec VPN , Access to MPLS networks , Benefits of MPLS.

Unit-VI AD-HOC NETWORK CONCEPTS: Routing in Ad-hoc networks, routing protocols.

Text / Reference Books:

1. Forouzan, Data Communications and Networking, TMH, 4th Edition, 2006.
2. Computer Networks (4th edition), Tanenbaum Andrew S., International edition, 2004.
3. ATM Networks, Third Edition: Concepts Protocols Applications by Rainer Handel. Ad-hoc Networks by Charles E.Perkins
4. William Stallings, Data and Computer Communications, PHI, 7th Edition, 2003 Leon-Garcia, Widjaja, Communication Networks, Fundamental Concepts and Key Architecture, TMH, 2nd Edition, 2004

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-307 (3)

SUBJECT NAME: SOFT COMPUTING (ELECTIVE-1)

NO OF CREDITS: 4

MCA SEMESTER V

L P T

4 0 0

SESSIONAL: 25

THEORY EXAM: 75

TOTAL: 100

Pre- Requisite: MFCS

Successive: None

Course Objectives

To subject aims to educate the students about

1. To acquaint the students with the need for soft computing and its associated tools.
2. To understand about the concepts relating to fuzzy sets and logic and their applications in various domains.
3. To learn the concepts relating to Neural Networks and their applications in the areas of classification and content addressable memory.
4. To acquaint the students with the need for Genetic Algorithms and their utility in solving the problems having huge state space.
5. To understand, how to use various soft computing tools in solving practical problems.

Course Outcomes

After the completion of the course, the students will be able to:

- a. The students will be able to understand and apply basic concepts related to fuzzy sets and logic.
- b. The students will be able to understand and apply basic concepts related to neural networks.
- c. The students will be able to understand and apply basic concepts related to Genetic Algorithms.
- d. The students will be able to apply concepts related to Genetic Algorithms, Neural Networks and Fuzzy Logic to practical problems.

Syllabus:

Unit-I INTRODUCTION: Introduction to soft computing; Introduction to biological and artificial neural network; Introduction to fuzzy sets and fuzzy logic systems. Introduction to Genetic Algorithm, Biological Background, Creation of Offspring, Working Principle, Genetic Operators and Parameters: Cross Over, Inversion and Deletion, Mutation, Genetic Algorithms in Problem Solving, Implementation Issues.

Unit-II ARTIFICIAL NEURAL NETWORKS AND APPLICATIONS: Early Neural Networks, McCulloch-Pitt Network, Hebb Learning, Hebb Networks and its Application, Perceptron, Problem of Linear separability, Delta Learning Rule, ADALINE Network, MADALINE Network and their applications.

Unit-III BACKPROPAGATION NETWORK: Its application, Associative Memories: Concept of Energy, Auto-associative, Iterative Auto-Associative Memory(Hopfield Net), Bidirectional Associative Memories (BAM) and their application in Pattern Recognition, Introduction to Adaptive Resonance Theory.

Unit-IV FUZZY SYSTEMS AND APPLICATIONS: Crisp Set Fuzzy sets, Relation between Fuzzy sets, Operations on Fuzzy sets, Certain numbers and Sets Associated with Fuzzy sets, alpha-cut Decomposition Theorem, Extension Principle, Fuzzy Set of Type-k and Level-k, Fuzzy Relations, Composition of Fuzzy Relations, multi-values Logic, Fuzzy Inference, Fuzzy Inference Mechanism, Application, Applications of Fuzzy logic(At least one real Life Problem). Neuro-fuzzy systems.

Text / Reference Books:

1. S. Rajasekaran and G. A VijayalakshmiPai: Neural Network, Fuzzy Logic and Genetic
2. Algorithm(Synthesis and Applications) PHI
3. M. Mitchell: An Introduction to Genetic Algorithms, Prentice-Hall India.
4. J.S.R. Jang, C.T. Sun and E.Mizutani: Neuro-Fuzzy and Soft Computing, PHI, Pearson Education.
5. M. Ganesh: introduction to Fuzzy Sets and Fuzzy Logic, PHI.
6. Timothy J. Ross: Fuzzy Logic with Engineering Applications, McGraw-Hill.
7. D.E. Goldberg : Genetic Algorithms in Search, Optimization, and Machine Learning,
8. Addison-Wesley.
9. Z. Michalewicz: Genetic Algorithms + Data Structures = Evolution Programs, Spinger-Verlag.
10. N.K. Sinha & M.M. Gupta (Eds): Soft Computing & intelligent Systems: Theory & Applications, Academic Press.

**MASTER OF COMPUTER APPLICATION
CODE: MCA-17-307 (4)**

SUBJECT NAME: MULTIMEDIA AND ITS APPLICATIONS (ELECTIVE-1)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: CG

Successive: None

Course Objective:

The Student will be able to

1. To analyze and explain various technologies involved to support multimedia application development.
2. to understand multimedia authoring and Understanding the constraints on multimedia systems and the range of technologies available to multimedia systems designers and integrators.
4. To understand how the quality of multimedia systems is perceived and how this Relate to the design of multimedia input, output and editing systems.
5. To understand different compression principles and different compression techniques and to know the mathematics involved in digital and analog conversion of components of multimedia.
6. To design and develop multimedia systems according to the requirements of multimedia application and understand the particular issues of virtual reality.

Course Outcomes

The student will be able to

- a. Design and implementation of hypermedia & multimedia systems.
- b. Achieve an in-depth understanding of the impact of multimedia on personal and distributed computer systems, the range of media types and tools to support their digital conversion and manipulation of images, audio and video and their compression
- c. Develop an interactive multimedia application to display their ability to use multimedia tools including multimedia authoring.
- d. Evaluate and Discuss Excellent and ineffective interactive multimedia design.
- e. Produce Multimedia Presentation and interactive web page design.
- f. Design and implement a number of multimedia applications and Evaluate and discuss virtual reality systems.

Syllabus:

Unit-I BASICS OF MULTIMEDIA TECHNOLOGY: Computers, communication and entertainment; multimedia an introduction; framework for multimedia systems; multimedia devices; CD- Audio, CD-ROM, CD-I, presentation devices and the user interface; multimedia presentation and authoring; professional development tools; LANs and multimedia; internet, World Wide Web & multimedia distribution network-

ATM & ADSL; multimedia servers & databases; vector graphics; 3D graphics programs; animation techniques; shading; anti aliasing; morphing; video on demand.

Unit-II: IMAGE COMPRESSION & STANDARDS: Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3D drawing and rendering; JPEG-objectives and architecture; JPEG-DCT encoding and quantization, JPEG statistical coding, JPEG predictive lossless coding; JPEG performance; overview of other image file formats as GIF, TIFF, BMP, PNG etc.

Unit-III AUDIO & VIDEO: Digital representation of sound; time domain sampled representation; method of encoding the analog signals; sub band coding; Fourier method; transmission of digital sound; digital audio signal processing; stereophonic & quadrasonic signal processing; editing sampled sound; MPEG Audio; audio compression & decompression; brief survey of speech recognition and generation; audio synthesis; musical instrument digital interface; digital video and image compression; MPEG motion video compression standard; DVI technology; time base media representation and delivery.

Unit-IV VIRTUAL REALITY: Applications of multimedia in various fields, intelligent multimedia system, desktop virtual reality, VR operating system, virtual environment displays and orientation making; visually coupled system requirements; intelligent VR software systems.

Text / Reference Books:

1. An introduction, Villamil& Molina, Multimedia Mc Milan, 1997
2. Multimedia: Sound & Video, Lozano, 1997, PHI, (Que)
3. Multimedia: Production, planning and delivery, Villamil&Molina,Que, 1997
4. Multimedia on the PC, Sinclair,BPB
5. Multimedia: Making it work, Tay Vaughan, fifth edition, 1994, TMH.
6. Multimedia in Action by James E Shuman, 1997, Wadsworth Publ.,
7. Multimedia in Practice by Jeff coate Judith, 1995,PHI.
8. Multimedia Systems by Koegel, AWL
9. Multimedia Making it Work by Vaughan, etl.
10. Multimedia Systems by John .F. Koegel, 2001, Buford.
11. Multimedia Communications by Halsall& Fred, 2001, AW.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-307 (5)

SUBJECT NAME: DISTRIBUTED OPERATING SYSTEMS (ELECTIVE-1)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: OS

Successive: None

Course Objectives:

1. To understand hardware, software and communication in distributed systems in a broader sense and also the issues in designing the distributed operating systems.
2. To understand communication, process, naming, synchronization, consistency and replication, and fault tolerance.
3. To study Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols.
4. To study the distributed resource management components.
5. To know the components and management aspects of Real time, Mobile operating Systems.
6. To implement algorithms of distributed shared memory, recovery and commit protocols and address MACH and UNIX operating system in a broader sense.

Course Outcomes:

- a. Acquired with distributed systems design and implementation. They will be exposed to various areas of research in distributed systems and mobile computing systems.
- b. Modify existing open source kernels in terms of functionality or features used. They will learn about designing and implementing fault tolerant distributed systems.
- c. Learn mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system. And identify the different features of real time and mobile operating systems.
- d. Learn the various resource management techniques like the use of distributed shared memory and other resources for distributed systems.
- e. Conduct independent research in distributed systems like MACH, UNIX etc.

Syllabus:

Unit-I INTRODUCTION: Introduction to Distributed System, Goals of Distributed system, Hardware and Software concepts, Design issues.

Unit-II COMMUNICATION IN DISTRIBUTED SYSTEM: Layered protocols, ATM, client server model, remote procedure call, and group communication.

Unit-III SYNCHRONIZATION IN DISTRIBUTED SYSTEM: Clock synchronization, Mutual Exclusion, Election algorithm: the Bully algorithm and Ring algorithm, Deadlock in Distributed Systems, Distributed Deadlock Prevention and Distributed Deadlock Detection.

Unit-IV PROCESSES AND PROCESSORS IN DISTRIBUTED SYSTEMS: Threads, System models, Processors Allocation.

Unit-V DISTRIBUTED FILE SYSTEMS & SHARED MEMORY: Distributed file system Design, Distributed file system Implementation. What is shared memory, Consistency models, Page based distributed shared memory and shared variables distributed shared memory.

Unit-VI CASE STUDY MACH: Introduction to MACH, process management in MACH, Communication in MACH, UNIX emulation in MACH.

Text / Reference Books:

1. Distributed Operating System – Andrew S. Tanenbaum, PHI.
2. P. K. Sinha – Distributed Operating System-Concepts and Design
3. William Stallings: Operating Systems, PHI, Latest Edition.
4. A.S. Tanenbaum: Modern Operating Systems, Latest edition Pearson/PHI.

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-309 (1)

SUBJECT NAME: OPEN SOURCE TECHNOLOGY (ELECTIVE 2)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: AJP

Successive: None

Course Objectives:

1. To introduce open source technology for development of web applications.
2. For Study the problems with traditional commercial software.
3. To understand open source scripting language for programming in web environment i.e. PHP.
4. To study the open source management system and connection with database.
5. To learn open source web server, software tools.

Course Outcomes

- a. Leaned the need of open source technology, open source development model, application of open sources, aspects of open source movement
- b. The students will be aware about the problems with traditional commercial software.
- c. The student will be familiar with basis syntax of PHP, common PHP scripts elements.
- d. The student will be familiar with creating of the server side scripting using PHP, implement PHP database connectivity, perform operation on database and open source database management system.
- e. The students will be familiar with Working of different web Servers.
- f. The students will be aware about the software tool and process like Eclipse IDE, Selenium ID.

Syllabus:

Unit-I INTRODUCTION : The need of open Sources, advantages of Open sources application , Open Source Development Model Licences and Patents ,FOSS, BSD, Free Software Movement, commercial software vs. Open Source software

Commercial aspects of Open Source movement - Certification courses issues - global and Indian. Copyrights and copy lefts, Application of Open Sources. Problems with traditional commercial software

Unit-II OPEN SOURCE SCRIPTING LANGUAGE INTRODUCTION: What is PHP? - Basic Syntax of PHP – programming in web environment - Common PHP Script Elements - Using Variables - Constants – Data types - Operators ; Statements - Working With Arrays -Using Functions – OOP - String Manipulation and Regular Expression , **File and Directory Handling , Working With Forms** , Introduction to advanced PHP concepts

Unit-III OPEN SOURCE DATABASE MANAGEMENT SYSTEM: MYSQL: Introduction - Setting up an account - Starting, Terminating and writing your own MySQL Programs - Record Selection Technology - Working with Strings - Date and Time - Sorting Query Results module - Generating Summary - Working with Metadata - Using Sequences – MySQL and Web **PHP and SQL database: PHP and LDAP ; PHP Connectivity ; Sending and receiving emails , PHP Database Connectivity:** Retrieving data from MySQL - Manipulating data in MySQL using PHP

Unit-IV WEB SERVER : Apache Web server – Working with web server – Configuring and using apache web server, WAMP server, Lighttpd, Fford, Nginx, Savant, tornado.
Open Source Software tools and Processors: Introduction – Eclipse IDE Platform – Compilers – Model driven architecture tools – Selenium ID – Features and uses Government Policy toward Open Source (E- Governance) – Wikipedia as an open Source Project
Case Studies: Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.

Text / Reference Books:

1. The Linux Kernel Book Rem Card, Eric Dumas and Frank Mevel Wiley Publications sons, 2003
2. MySQL Bible Steve Suchring John Wiley sons, 2002
3. Programming PHP Rasmus Lerdorf and Levin Tatroe O'Reilly Publications, 2002

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-309 (2)

SUBJECT NAME: NETWORK SECURITY (ELECTIVE 2)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: CN

Successive: None

Course Objectives

1. To understand the basic concept of Cryptography, Network Security and their mathematical models.
2. To understand various types of ciphers, DES, AES, message Authentication, digital Signature System and key management protocols.
3. To impart knowledge of major issues in network and computer system security, focusing mainly on threats from malicious software.
4. To understand common attacks on computer networks and methods to detect and remediate such attacks.
5. To acquire knowledge about network security tools and authentication applications and public key cryptographic algorithms.

Course Outcomes:

After the completion of this course the student will able to:

- a. Understand theory of fundamental cryptography, encryption and decryption algorithms and using concepts of mathematics in applying these algorithms.
- b. Create, select and apply appropriate encryption techniques and modern engineering and IT tools for software security.
- c. Design and develop cryptosystems using advanced security algorithms.
- d. Apply the cryptosystems so far learned to build information and network security mechanisms.

Syllabus:

- Unit-I INTRODUCTION:** What is security?, Need of security, Why is security so hard?, various goals of security, Difference between Vulnerability, Threats, Attacks and control, Security goals, aspects of security, security services, security attacks, **Encryption Techniques:** Terminology of encryption, Requirement of encryption, cryptography, cryptanalysis, cryptanalytic attacks, symmetric ciphers: Substitution ciphers, Transposition ciphers, Data Encryption Standard (DES, Advanced Encryption Standard (AES), location of encryption devices, key distribution, Public Key Cryptography and RSA, Diffie-Hellman Key Exchange, Message Authentication and Hash Functions, MD5, SHA
- Unit-II NETWORK SECURITY:** Security services, Message confidentiality, Message integrity, message authentication, digital signature, entity authentication. **Authentication applications:** Kerberos 5, X.509 Authentication service, Public key infrastructure. **Electronic mail Security:** Pretty Good Privacy (PGP), **IP Security:** IP security overview, IP security architecture, Authentication header, Encapsulating security Payload, Combining security associations, Key management.
- Unit-III SECURITY ATTACKS IN MANET:** Security issues in MANET, Attacks in MANET: External Attack, Internal attack, Black hole attack, worm hole attack, grey hole attack, Byzantine attack, Sleep Deprivation attack, Flooding attack: RREQ flooding attack, Data flooding Attack.
- Unit-IV SECURITY ATTACKS IN WIRELESS SENSOR NETWORKS:** Security issues in WSN, Attacks in WSN: Attack against Security mechanism, Attack against basic mechanism like routing: Spoofed, altered, or replayed routing, Information, Selective forwarding, Sinkhole attacks, Sybil attacks, Wormholes, HELLO flood attacks.

Text / Reference Books:

1. William Stallings, Cryptography and Network Security, 3rd Edition. PHI New Delhi
2. William Stallings, Network Security Essentials, 2nd Edition. PHI New Delhi
3. Charles P. Pfleeger, Security in computing, 4th Edition Pearson, New Delhi
4. KazemSohrari, Wireless sensor networks, Technology, Protocols and applications, Wiley Publishers

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-309 (3)

SUBJECT NAME: MOBILE COMPUTING (ELECTIVE 2)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: IWD

Successive: None

Course Objectives:

1. To understand concept of wireless communication along with its history, application, and market.
2. To make the student familiar with basic terminology like frequency, signals, bandwidth, signals and spread spectrum etc.
3. To introduce the concept of cellular system and design of cellular system. To make the students familiar with different handoff strategies.
4. To introduce the MAC and Telecommunication system and make the student familiar with the wireless LAN including Bluetooth technology.
5. To introduce the concept of Mobile Network layer, IP Packet delivery and adhoc network routing and make the student familiar with mobile transport layer along with satellite communication.

Course Outcomes

Upon successful completion of the course, the student will be:

- a. Able to understand the concept of wireless communication, its advantages over traditional wired network communication, different application of wireless communication system.
- b. Learn various terms such as frequencies, signals, multiplexing, modulation and spread spectrum techniques, frequency reuse and hand off strategies.
- c. Understand and classify different multiplexing strategies and modulation strategies.
- d. Differentiate between ALOHA and slotted ALOHA. Familiar with GSM, GSM system architecture, GSM protocol architecture, handover procedure and security.
- e. Learned IEEE standard 802.11, CSMA/CA access method, fragmentation, MAC Management, Bluetooth, piconet, scatternet, Bluetooth protocol stack and ad hoc network.

- f. Understand the concept of Mobile IP, its goals and other terminologies. Able to differentiate between IPV4 and IPV6 along with mobile transport layer, TCP, satellite communication, categories, routing and handover in satellite communication.

Syllabus:

Unit-I Examples of wireless communication systems, paging systems, Cordless telephone systems, comparison of various wireless systems, Introduction to mobile computing, issues in mobile computing, impacts of mobility and portability in wireless communication.

Unit-II **SECOND GENERATION CELLULAR NETWORKS, THIRD GENERATION WIRELESS NETWORKS, CELLULAR SYSTEM: GSM-**mobile services, architecture radio interlace, protocol, localization, calling, handover, security, new data services, Blue tooth and Personal Area Networks.

Unit-III **HANDOFF MANAGEMENT:** Radio Link Transfer, Link transfer types, Hard handoff, MCHO Link transfer, MAHO/NCHO Link transfer, Subrating MCHO Link transfer, Soft Handoff, Adding a new BS, Dropping a BS

Unit-IV Frequency reuse, interference and system capacity, improving coverage and capacity, tracking and grade of service, improving coverage and capacity, intelligent cell concept, in building communication.

Text / Reference Books:

1. Wireless Communications: Theodore S Rappaport; Pearsons
2. Mobile Cellular Telecommunication: W.C.Y. Lee; McGraw Hill
3. Mobile Communications: Jochen Schiller; Pearson
4. Wireless and Mobile Network Architectures: Yi-Bing Lin, WILEY

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-309 (4)

SUBJECT NAME: DIGITAL IMAGE PROCESSING (ELECTIVE 2)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: CG

Successive: NOne

Course Objectives:

1. To learn the fundamental concepts and applications of digital image processing.
2. To understand the elements of visual perception.
3. Understanding of the basic concepts of two-dimensional signal acquisition, sampling, and quantization.
4. To understand of 2D Fourier transforms concepts.
5. To understand of the fundamental image enhancement algorithms such as histogram equalization and specification techniques, Color image enhancement etc.
6. To understand the concepts of and how to perform Image restoration and reconstruction, image compression and image segmentation methods.

Course Outcomes:

- a. The student will able to learn the fundamental concepts of digital image processing.
- b. The student will able to understand the application of image processing in real world.
- c. The student will able to understand the elements of visual perception.
- d. The student will able to acquire the basic knowledge of two-dimensional signal acquisition, sampling, quantization, and concepts of 2D Fourier transform.
- e. The student will able to understand the fundamental image enhancement algorithms and the concepts of Image restoration and reconstruction and the image compression and image segmentation methods

Syllabus:

Unit-I DIGITAL IMAGE FUNDAMENTALS: Components of Image Processing System, Fundamental Steps in Digital Image Processing, Image Processing Applications,

Element of Visual Perception, brightness, contrast, hue, saturation, Sampling and Quantization, dither, Colour image fundamentals RGB, HSI models. Two-dimensional mathematical preliminaries, 2D Transforms - DFT, DCT, KLT, SVD.

Unit-II IMAGE ENHANCEMENT : Histogram, equalization and specification techniques, noise, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contraharmonic mean filters, Homomorphic filtering, Color image enhancement.

Unit-III IMAGE RESTORATION: Model of Restoration Process, Unconstrained Restoration, Constrained Restoration, Inverse filtering-removal of blur caused by uniform linear motion, Wiener filtering, Geometric transformations, spatial transformations.

Unit-IV IMAGE SEGMENTATION: Segmentation Introduction – Region based and Edge based techniques, Edge Detection, Edge Operators, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Region-Based Approach, Region Growing Based Segmentation, Region Splitting, and Region Merging.

Unit-V IMAGE COMPRESSION: Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG.

Text / Reference Books:

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing', Pearson, Second Edition, 2004.
2. Anil K. Jain, Fundamentals of Digital Image Processing', Pearson 2002.
3. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
4. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, 'Digital Image Processing using MATLAB', Pearson Education, Inc., 2004.
5. D, E. Dudgeon and R.M. Mersereau, Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
6. William K. Pratt, , Digital Image Processing' , John Wiley, New York, 2002
7. Milan Sonka et al, 'IMAGE PROCESSING, ANALYSIS AND MACHINE VISION', Brooks/Cole, Vikas Publishing House, 2nd edition, 1999,

MASTER OF COMPUTER APPLICATION

CODE: MCA-17-309 (5)

SUBJECT NAME: SOFTWARE PROJECT MANAGEMENT (ELECTIVE 2)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: SE,

Successive: None

Course Objectives:

1. To understand the fundamental principles of Software Project management and will also have a good knowledge of responsibilities of project manager and how to handle these.
2. To understand the projec planning process and be familiar with the different methods and techniques used for project management.
3. To learn about project reporting, defect analysis and prevention.
4. To study various quality techniques.

Course Outcomes:

- a. Understand the issues and challenges faced while doing the Software project Management.
- b. Identify, formulate, review and analyze complex software project management using principles of mathematics.
- c. Understand why majority of the software projects fails and how that failure probability can be reduced effectively. They will completely understand the complete software project planning process.
- d. Perform project Scheduling, tracking, risk analysis, quality management and Project Cost estimation using different techniques and will be able to give quality software by making systematic approach i.e. Software engineering.

Syllabus:

Unit-I PROJECT MANAGEMENT CONCEPTS: Management Spectrum, People, Product, Process, Project, W5HH Principle. Problems with software projects, project

management and CMM, project management process: planning, execution and closure. Stepwise overview of project planning

Unit-II SOFTWARE PROJECT PLANNING: Programme management and project evaluation, Project planning objectives, project planning infrastructure, process planning, Selection of an appropriate process model effort estimation models, estimation techniques: Function Point Analysis, COCOMO, Use case point analysis. Activity planning & Risk Management: project schedules, projects and activities, network planning models, activity on node & activity on arrow networks.

Risk Management: identification, assessment and projection, control, RMMM plan, Measurement and tracking planning, Configuration management: baselines, configuration items, configuration process, version control, change control, configuration audit, SCM standards

Resource allocation: nature of resources, scheduling resources,

Unit-III PROJECT EXECUTION AND CLOSURE: project reporting structures, categories of reporting, collecting the data: partial completion reporting, risk reporting. Visualizing progress: Gantt chart, Slip chart, Ball charts, Check sheet, Histogram, parito chart, Run Chart, Control Chart, Scatter plot Timeline charts. Earned value analysis, prioritizing monitoring, Project tracking, Milestone analysis, Cost impact of software defects, Defect amplification and removal, Defect analysis and prevention.

Project Closure analysis: role of closure analysis, performing closure analysis, closure analysis report

Unit-IV SOFTWARE QUALITY ASSURANCE: Project management vs. quality management, quality concepts, Inspection and Reviews: process, data collection, monitoring and control. Statistical SQA, SQA plan, techniques to help enhance software quality ,quality metrics, ISO 9000 standard, BS 6079:1996 standard

Case Study: Software Project Management in CMM level 5 organizations

Text / Reference Books:

1. Software project management by Bob Hughes and Mike Cotterell, TMH
2. Software project management in practice by Pankaj Jalote, Pearson Education
3. Software Project management by Sanjay Mahapatra
4. Software Engineering by R.S. Pressman, McGraw Hill
5. Software Testing: Principles and practices by Naresh Chauhan, Oxford University press, India

CODE: MCA-17-309 (6)

SUBJECT NAME: DATA WAREHOUSING & DATA MINING (ELECTIVE 2)

NO OF CREDITS: 4

MCA SEMESTER V

SESSIONAL: 25

L P T

THEORY EXAM: 75

4 0 0

TOTAL: 100

Pre- Requisite: ADMS

Successive: None

Course Objectives

1. To understand the basic principles, concepts and applications of data warehousing and data mining.
2. To differentiate Online Transaction Processing and Online Analytical processing
3. Describe the designing of Data Warehousing so that it can be able to solve the problems.
4. Learn Multidimensional schemas suitable for data warehousing along with DMQL
5. To understand various tools of Data Mining and their techniques to solve the real time problems and the task of data mining as an important phrase of knowledge discovery process.
6. To develop further interest in research and design of new Data Mining techniques.

Course outcomes:

After undergoing the course, Students will be able to understand

- a. Design a data mart or data warehouse for any organization along with OTAP and OLAP
- b. Develop skills to write queries using DMQL and extract knowledge using data mining techniques
- c. Explore recent trends in data mining such as web mining, spatial-temporal mining
- d. How Data Mining is one step in the whole KDD process.
- e. The use of tools and techniques of data mining and the design of new data mining techniques.S

Syllabus:

- Unit-I** Need for data warehouse, definition, Database Vs data warehouse, Data Mart, Data warehouse architecture, Star, snowflake and galaxy schemas for multidimensional databases, Defining various schemas, fact and dimension data, Concept hierarchies, Metadata repository, back end tools and utilities.
- Unit-II** Data warehouse and OLAP technology, multidimensional data model and different OLAP operations, OLAP Servers: ROLAP, MOLAP and HOLAP, Data warehouse implementation, efficient computation of data cubes, processing of OLAP queries, indexing OLAP data.
- Unit-III** Data Preprocessing: Cleaning, data integration and transformation, data reduction; Data mining concept, task primitives, Types of Data Mining, KDD, Architecture of data mining, Data generation & Summarization based characterization, Analytical characterization, Mining class comparisons, Mining descriptive statistical measures in large databases, Data Mining query language.
- Unit-IV** **MINING ASSOCIATION RULES IN LARGE DATABASES:** Association rule mining, single dimensional Boolean association rules from Transactional DBS, Multi-level association rules from transaction DBS, multidimensional association rules from relational DBS and DWS, Constraint based association mining.
Classification and Prediction: Classification by decision tree induction, Back propagation, Bayesian classification, classification based on association rules, classifier accuracy, Prediction, Linear and Non-linear regression.
Cluster analysis: Various techniques, Partitioning, hierarchical and density based methods, Web mining, spatial data mining.

Text / Reference Books:

1. Jiawei Han & Micheline Kamber : Data Mining - Concepts & Techniques, Harcourt India Pvt. Ltd. (Morgan Kaufmann Publishers).
2. W.H. Inmon : Building Data Warehouse, John Wiley & Sons.
3. S. Anahory and D. Murray : Data Warehousing, Pearson Education, ASIA.
4. Michell Corey, M. Abbey, I Azramson & Ben Taub : Oracle 8i Building Data Warehouse, TMH.

