Programme Project Report (PPR) for
MASTER OF COMPUTER APPLICATIONS

Programme's Mission & Objectives :

1. To provide educational opportunities for higher education through distance mode for a large segment of the population, including those in employment, women (including housewives) and adults who wish to upgrade their education or acquire knowledge in various fields of study.

2. To spread the light of education till the smallest & darkest corner.

3. To provide access to higher education to all segments of the society;

4. To offer high-quality, innovative and need-based programmes at different levels, to all those who require them;

5. To reach out to the disadvantaged by offering programmes in all parts of the country at affordable costs with our motto "nᵗ'k fgr eᵗ f'k{kk dk iᵗlkj] nᵗ'k dᵗ dᵗkuᵢ dᵗkuᵢ eᵗ"

6. To promote, coordinate and regulate the standards of education offered through open and distance learning in the country.

7. To spread more literacy in the society.

Relevance of the program with HEI's Mission and Goals :

The University understands the need of literacy in India & firmly believes that education has to be spread to the general masses. The University has acquired a commendable record of service in the field of education, health care, and social welfare. To reach with the above motive of service to the remotest corner of India, the Distance Education Programme of Swami Vivekanand Subharti University was conceived in 2009.

Nature of prospective target group of learners :

A large segment of the population living in villages, weaker sections of the society including those who are already in employment, girls belonging to the remote areas, women with social commitments (including home-makers) and anyone who wishes to upgrade their education or acquire knowledge in various fields of study.

Appropriateness of programme to be conducted in Open and Distance Learning mode to acquire specific skills and competence :

Through various programmes, distance education can be able to spread more literacy in the society and encourage the large segment of population to upgrade their education skill/s.

Course Structure :

1. Instructional Design :

The Instructional System of the University comprises six components, viz, Self Learning Material, Continuous Internal Assessment (IA) & Assignment work (AW), Theory Training

Classes, Practical Exposure Classes, Professional Project Work, Internship & Industry Integrated Learning.

1. **Self Learning Material (SLM) –**

The success and effectiveness of distance education systems largely depends on the study materials. Self-learning materials depend on exploiting the various means and ways of communication to suit it to the needs of learners. These have been so designed as to substitute effectively the absence of interaction with teachers in class room teaching mode. Their style is ideal for easy and better understanding in self-study mode.

2. **Continuous Internal Assessment (CIA)**

The progress of a learner is continuously monitored through Personal Contact Programmes, Viva & Group Discussions, Personality Development Programmes and Assignment Work. All these are compulsory and marks shall be awarded for attendance and performance of a learner in all these activities, as may be prescribed in the syllabus.

   a. **Personality Contact Programme (PCP) –** PCP sessions guide the learners as the programme proceeds. The date and venue for the PCP will be communicated to the learners through our website. During PCP, the learner gets guidance for better understanding of the subject. The learners can get their doubts cleared with the help of subject experts so as to improve their self-learning capability. The total duration of PCP seesions for a subject of four credits shall be 12-16 hours. Learners are required to attend PCP sessions for all their respective subjects.

   b. **Viva & Group Discussion (VGD) –** VGDs are designed to help the learners improve their professional communication and presentation abilities. Special emphasis is laid on learners speaking extempore, an ability necessary for building leadership skill as well as for enhancing the capability of understanding and exchanging views. The total duration of VGD sessions for a subject of four credits shall be 3-4 hrs.

   c. **Personal Development Programme (PDP) –** The PDPs are designed to improve the overall personality of the learner, and aim, especially, at the improvement of body language and strengthening of the power of expression. The purpose is to inculcate leadership, communication and presentation skills and brush up the knowledge of the learner by organizing a mix of management games, debates, quizzes and role play. The duration of PDP sessions for a subject of four credits shall be 3-4 hrs.

   d. **Assignment Work (AW) –** Distance Education learners have to depend much on self study. In order to ascertain the writing skill and level of comprehension of the learner, assignment work is compulsory for all learners. Each assignment shall consist of a number of questions, case studies and practical related tasks. The Assignment Question Papers will be uploaded to the website within a scheduled time and the learners shall be required to respond them within a specified period of time. The response of the learner is examined by a faculty member.

3. **Practical Exposure Class (PEC)** – Practical Exposure Classes are compulsory, wherever prescribed in the syllabus. A learner will not be eligible to appear for the practical examination unless he/she obtains an attendance and performance certificate in respect to PECs, held as per the schedule drawn by the Directorate of Distance Education. These classes shall generally be held on Saturdays and Sundays at a venue decided by

DDE in consultation with the institution where the PECs are to be held. The total duration of PEC sessions for a subject of one credit shall be 30 hrs.

4. **Professional Project Work (PPW)** – The PPW enables a learner to experience the regours of an environment with the real life situations. The learners shall also be required to prepare a project report, which shall be evaluated by the University. Learners shall be subjected to a comprehensive viva for proper evaluation of the Project Report. For project work, wherever mentioned in the syllabus, DDE shall provide complete guidance to the learners. Normally, one credit of PPW shall require 30 hrs or input by the learner.

5. **Internship & Industry Integrated Learning (IIIL)** – IIIL helps working professionals complete their educational credits with the help of their respective industry experience. This serves dual purpose, they can do professional work with improved capability and also earn a recognized qualification. The IIIL is required only for some specific disciplines. Normally, one credit of IIIL can be obtained by working for 6 hours in a professional environment daily for 5 days. IIIL is a compulsory component in MCA. The duration will be six months for MCA.

6. **Examinations** –

(a) The examination shall be held semester wise in June & December for the Calendar Batch and in December & June for Academic batch respectively.

(b) Admit Cards/Roll No. Slips and date sheet for appearing in the examination shall be provisional subject to fulfilling the eligibility, etc. Admit Cards/Roll Nos. and date-sheet will be issued to the candidates concerned, by e-mail or by hand, 10-12 days before the commencement of examination concerned, if the students have fulfilled all the requirements and paid their all kinds of fees/dues and submitted the requisite documents. If any candidate does not receive his/her Admit Card/Roll No. slip in time, he/she should contact the Directorate of Distance Education.

(c) An Examination Centre for theory & practical will be decided by the DDE and will be located in a government college or a school, where all the requisite facilities can be made available.

2. Curriculum design

YEAR: 1st , SEMESTER-I

S. N o.	COURSE CODE	SUBJECT	PERIOD			EVALUATION SCHEME			EXAM ESE	SUBJECT TOTAL	CREDIT	Duration of Exam
						SESSIONAL EVALUATION						
			L	T	P	CT	TA	TOTAL				
THEORY SUBJECTS												
1.	MCA-101	Professional Communication	1	1	0	20	10	30	70	100	2	3
2.	MCA-102	Accounting & Financial Management	1	1	0	20	10	30	70	100	2	3
3.	MCA-103	Computer Concepts and Programming in 'C'	1	1	0	20	10	30	70	100	2	3
4.	MCA-104	Discrete Mathematics	1	1	0	20	10	30	70	100	2	3
5.	MCA-105	Computer Organization	1	1	0	20	10	30	70	100	2	3
6	MCA-106	Computer Based Numerical & Statistical Techniques	1	1	0	20	10	30	70	100	2	3
PRACTICAL/DESIGN/DRAWING												
7.	MCA-107	Practical Lab	0	0	2	0	0	0	100	100	2	1
8.	MCA-108	Programming Lab	0	0	2	0	0	0	100	100	2	1
9.	MCA-109	Numerical Techniques Lab	0	0	2	0	0	0	100	100	2	1
		Total	6	6	6	120	60	180	720	900	18	

L - Lecture   T   - Tutorial   P- Practical   CT - Cumulative Test   TA - Teacher's Assessment   ESE   - End Semester Exam.

YEAR: 1st , SEMESTER-II

S. No.	COURSE CODE	SUBJECT	PERIOD			EVALUATION SCHEME			EXAM ESE	SUBJECT TOTAL	CREDIT	Duration of Exam
						SESSIONAL EVALUATION						
			L	T	P	CT	TA	TOTAL				
THEORY SUBJECTS												
1.	MCA-201	Data & File Structure Using 'C'	1	1	0	20	10	30	70	100	2	3
2.	MCA-202	Principles of Management	1	1	0	20	10	30	70	100	2	3
3.	MCA-203	UNIX & Shell Programming	1	1	0	20	10	30	70	100	2	3
4.	MCA-204	System Analysis & Design	1	1	0	20	10	30	70	100	2	3
5.	MCA-205	Computer Architecture & Microprocessor	1	1	0	20	10	30	70	100	2	3
6.	MCA-206	Combinatorics & Graph Theory	1	1	0	20	10	30	70	100	2	3
PRACTICAL/DESIGN/DRAWING												
7.	MCA-207	Data Structure Lab	0	0	2	0	0	0	100	100	2	1
8.	MCA-208	UNIX / LINUX Lab	0	0	2	0	0	0	100	100	2	1
9.	MCA-209	Microprocessor Lab	0	0	2	0	0	0	100	100	2	1
		Total	**6**	**6**	**6**	**120**	**60**	**180**	**720**	**900**	**18**	

L - Lecture   T   - Tutorial   P- Practical   CT - Cumulative Test   TA - Teacher's Assessment   ESE   - End Semester Exam.

S. No.	COURSE CODE	SUBJECT	PERIOD			EVALUATION SCHEME			EXAM ESE	SUBJECT TOTAL	CREDIT	Duration of Exam
						SESSIONAL EVALUATION						
			L	T	P	CT	TA	TOTAL				
THEORY SUBJECTS										
1.	MCA-301	Computer Networks	1	1	0	20	10	30	70	100	2	3
2.	MCA-302	Design & Analysis of Algorithm	1	1	0	20	10	30	70	100	2	3
3.	MCA-303	Operating System	1	1	0	20	10	30	70	100	2	3
4.	MCA-304	Database Management System	1	1	0	20	10	30	70	100	2	3
5.	MCA-305	Object Oriented Systems & C++	1	1	0	20	10	30	70	100	2	3
6.	MCA-306	Operation Research	1	1	0	20	10	30	70	100	2	3
PRACTICAL/DESIGN/DRAWING										
7.	MCA-307	DBMS Lab	0	0	2	0	0	0	100	100	2	1
8.	MCA-308	OOPS & C++ Lab	0	0	2	0	0	0	100	100	2	1
9.	MCA-309	Design & Analysis of Algorithms (DAA) Lab	0	0	2	0	0	0	100	100	2	1
		Total	6	6	6	120	60	180	720	900	18	

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S. No.	COURSE CODE	SUBJECT	PERIOD			EVALUATION SCHEME			SUBJECT TOTAL	CREDIT	Duration of Exam
						SESSIONAL EVALUATION		EXAM ESE			
			L	T	P	CT	TA	TOTAL			
THEORY SUBJECTS											
1.	MCA-401	Management Information System	1	1	0	20	10	30	70	100	2	3
2.	MCA-402	Foundation of E-Commerce	1	1	0	20	10	30	70	100	2	3
3.	MCA-403	Internet & Java Programming	1	1	0	20	10	30	70	100	2	3
4.	MCA-404	Computer Graphics & Animation	1	1	0	20	10	30	70	100	2	3
5	MCA-405	Soft Computing Techniques	1	1	0	20	10	30	70	100	2	3
6	MCA-406	ELECTIVE SUBJECT	1	1	0	20	10	30	70	100	2	3
PRACTICAL/DESIGN/DRAWING											
5.	MCA-407	MIS Lab	0	0	2	0	0	0	100	100	2	1
	MCA-408	Java Programming Lab	0	0	2	0	0	0	100	100	2	1
	MCA-409	Computer Graphics Lab	0	0	2	0	0	0	100	100	2	1
		Total	6	6	6	120	60	180	720	900	18	

L - Lecture   T   - Tutorial   P- Practical   CT - Cumulative Test   TA - Teacher's Assessment   ESE   - End Semester Exam.

YEAR: 3r^d , SEMESTER-V

S. No.	COURSE CODE	SUBJECT	PERIOD			EVALUATION SCHEME				SUBJECT TOTAL	CREDIT	Duration of Exam
						SESSIONAL EVALUATION			EXAM ESE			
			L	T	P	CT	TA	TOTAL				
THEORY SUBJECTS												
1.	MCA-501	Web technology	1	1	0	20	10	30	70	100	2	3
2.	MCA-502	Elective Subjects	1	1	0	20	10	30	70	100	2	3
3.	MCA-503	.Net Framework & C#	1	1	0	20	10	30	70	100	2	3
4.	MCA-504	Software Engineering	1	1	0	20	10	30	70	100	2	3
5	MCA-505	ELECTIVE SUBJECT	1	1	0	20	10	30	70	100	2	3
6	MCA-506	Advance Operating System	1	1	0	20	10	30	70	100	2	3
PRACTICAL/DESIGN/DRAWING												
5.	MCA-507	Web Technology Lab	0	0	2	0	0	0	100	100	2	1
	MCA-508	.Net Framework & C# Lab	0	0	2	0	0	0	100	100	2	1
	MCA-509	Software Engineering Lab	0	0	2	0	0	0	100	100	2	1
		Total	**6**	**6**	**6**	**120**	**60**	**180**	**720**	**900**	**18**	

L - Lecture   T   - Tutorial   P- Practical   CT - Cumulative Test   TA - Teacher's Assessment   ESE - End Semester Exam.

S. No.	COURSE CODE	SUBJECT	PERIOD			EVALUATION SCHEME				SUBJECT TOTAL	CREDIT	Duration of Exam
						SESSIONAL EVALUATION			EXAM ESE			
			L	T	P	CT	TA	TOTAL				
THEORY SUBJECTS												
PRACTICAL/DESIGN/DRAWING												
5.	MCA-601	Practical Training	0	0	10	0	0	0	500	500	10	1
		Total	**0**	**0**	**10**	**0**	**0**	**0**	**500**	**500**	**10**	**1**

L - Lecture   T   - Tutorial   P- Practical   CT - Cumulative Test   TA - Teacher's Assessment   ESE   - End Semester Exam.

3. Detailed Syllabus

DETAILED SYLLABUS OF MCA FIRST SEMESTER

PROFESSIONAL COMMUNICATION (MCA-101)

Unit -1 Basics of Technical Communication

Technical Communication: features; Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communication; The flow of Communication: Downward, Upward, Lateral or Horizontal (Peer group); Importance of technical communication; Barriers to Communication.

Unit - II Constituents of Technical Written Communication

Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; Requisites of Sentence Construction: Paragraph Development: Techniques and Methods -Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation- various steps.

Unit - III Forms of Technical Communication

Business Letters: Sales and Credit letters; Letter of Enquiry; Letter of Quotation, Order, Claim and Adjustment Letters; Job application and Resumes. Official Letters: D.O. Letters; Govt. Letters, Letters to Authorities etc. Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts; Types; Writing of Proposal; Significance. Technical Paper, Project. Dissertation and Thesis Writing: Features, Methods & Writing.

Unit - IV Presentation Strategies

Defining Purpose; Audience & Locale; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Space; Setting Nuances of Voice Dynamics; Time-Dimension.

Unit - V Value- Based Text Readings

Following essays form the suggested text book with emphasis on Mechanics of writing,

(i) The Aims of Science and the Humanities by M.E. Prior

(ii) The Language of Literature and Science by A.Huxley

(iii) Man and Nature by J.Bronowski

(iv) The Mother of the Sciences by A.J.Bahm

(v) Science and Survival by Barry Commoner

(vi) Humanistic and Scientific Approaches to Human Activity by Moody E. Prior

(vii) The Effect of Scientific Temper on Man by Bertrand Russell.

Text Book

1. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, New Delhi .

2. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press 2007, New Delhi.

Reference Books

1. Effective Technical Communication by Barun K. Mitra, Oxford Univ. Press, 2006, New Delhi

2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., New Delhi.

3. How to Build Better Vocabulary by M.Rosen Blum, Bloomsbury Pub. London.

4. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors; Delhi.

5. Developing Communication Skills by Krishna Mohan, Meera Banerji- Macmillan India Ltd. Delhi.

6. Manual of Practical Communication by L.U.B. Pandey & R.P. Singh; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, Delhi.

ACCOUNTING AND FINANCIAL MANAGEMENT (MCA 102)

Unit I Overview: Accounting concepts, conventions and principles; Accounting Equation, International Accounting principles and standards; Matching of Indian Accounting Standards with International Accounting Standards.

Unit II

Mechanics of Accounting: Double entry system of accounting, journalizing of transactions; preparation of final accounts, Profit & Loss Account, Profit & Loss Appropriation account and Balance Sheet, Policies related with depreciation, inventory and intangible assets like copyright, trademark, patents and goodwill.

Unit III

Analysis of financial statement: Ratio Analysis- solvency ratios, profitability ratios, activity ratios, liquidity ratios, market capitalization ratios ; Common Size Statement ; Comparative Balance Sheet and Trend Analysis of manufacturing, service & banking organizations.

Unit IV

Funds Flow Statement: Meaning, Concept of Gross and Net Working Capital, Preparation of Schedule of Changes in Working Capital, Preparation of Funds Flow Statement and its analysis ;

UNIT-V
Cash Flow Statement: Various cash and non-cash transactions, flow of cash, preparation of Cash Flow Statement and its analysis.

SUGGESTED READINGS

1) Narayanswami - *Financial Accounting: A Managerial Perspective (*PHI, 2nd Edition).

2) Mukherjee - *Financial Accounting for Management* (TMH, 1st Edition).

3) Ramchandran & Kakani - *Financial Accounting for Management* (TMH, 2nd Edition).

4) Ghosh T P - *Accounting and Finance for Managers* (Taxman, 1st Edition).

5) Maheshwari S.N & Maheshwari S K – *An Introduction to Accountancy* (Vikas, 9th Edition)

6) Ashish K. Bhattacharya- *Essentials of Financial Accounting* (PHI, New Delhi)

7) Ghosh T.P- *Financial Accounting for Managers* (Taxman, 3rd Edition)

8) Maheshwari S.N & Maheshwari S K – *A text book of Accounting for Management* (Vikas, 1st Edition)

9) Gupta Ambrish - *Financial Accounting for Management* (Pearson Education, 2nd Edition)

10) Chowdhary Anil - *Fundamentals of Accounting and Financial Analysis* (Pearson Education, 1st Edition).

COMPUTER CONCEPTS AND PROGRAMMING IN C (MCA-103)

UNIT 1:

Introduction to any Operating System [Unix, Linux, Windows], Programming Environment, Write and Execute the first program, Introduction to the Digital Computer; Concept of an algorithm; termination and correctness. Algorithms to programs: specification, top-down development and stepwise refinement. Introduction to Programming, Use of high level programming language for the systematic development of programs. Introduction to the design and implementation of correct, efficient and maintainable programs, Structured Programming, Trace an algorithm to depict the logic, Number Systems and conversion methods

UNIT 2:

Standard I/O in "C", **Fundamental Data Types and Storage Classes:** Character types, Integer, short, long, unsigned, single and double-precision floating point, storage classes, automatic, register, static and external, **Operators and Expressions:** Using numeric and relational operators, mixed operands and type conversion, Logical operators, Bit operations, Operator precedence and associativity,

UNIT 3:

Conditional Program Execution: Applying if and switch statements, nesting if and else, restrictions on switch values, use of break and default with switch, **Program Loops and Iteration:** Uses of while, do and for loops, multiple loop variables, assignment operators, using break and continue, **Modular Programming:** Passing arguments by value, scope rules and global variables, separate compilation, and linkage, building your own modules.

UNIT 4:

Arrays: Array notation and representation, manipulating array elements, using multidimensional arrays, arrays of unknown or varying size, **Structures:** Purpose and usage of structures, declaring structures, assigning of structures, **Pointers to Objects:** Pointer and address arithmetic, pointer operations and declarations, using pointers as function arguments, Dynamic memory allocation, defining and using stacks and linked lists.

UNIT 5:

Sequential search, Sorting arrays, Strings, Text files, **The Standard C Preprocessor:** Defining and calling macros, utilizing conditional compilation, passing values to the compiler, **The Standard C Library:** Input/Output : fopen, fread, etc, string handling functions, Math functions : log, sin, alike Other Standard C functions.

Text Books :

1. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, <u>Pearson Addison-Wesley</u>, 2006.

2. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition [India Edition], 2007.

DISCRETE MATHEMATICS (MCA-104)

Unit-I

Relation: Type and compositions of relations, Pictorial representation of relations, Closures of relations, Equivalence relations, Partial ordering relation.

Function: Types, Composition of function, Recursively defined function

Mathematical Induction: Piano's axioms, Mathematical Induction

Discrete Numeric Functions and Generating functions

Simple Recurrence relation with constant coefficients, Asymptotic Behavior of functions

Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.

Unit –II

Propositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram, **Lattices:** Introduction, Ordered set, Hasse diagram of partially ordered set, Consistent enumeration, Isomorphic ordered set, Well ordered set, Lattices, Properties of lattices, Bounded lattices, Distributive lattices, and Complemented lattices.

Unit-III

Introduction to defining language, Kleene Closure, Arithmetic expressions, Chomsky Hierarchy, Regular expressions, Generalized Transition graph.

Unit-IV

Conversion of regular expression to Finite Automata, NFA, DFA, Conversion of NFA to DFA, Optimizing DFA, FA with output: Moore machine, Mealy machine, Conversions.

Unit-V

Non-regular language: Pumping Lemma, Pushdown Automata, and Introduction to Turing Machine and its elementary applications to recognition of a language and computation of functions.

COMPUTER ORGANIZATION (MCA – 105)

Unit-I (**Representation of Information and Basic Building Blocks**)

Introduction to Computer, Computer hardware generation, Number System: Binary, Octal, Hexadecimal, Character Codes (BCD, ASCII, EBCDIC), Logic gates, Boolean Algebra, K-map simplification, Half Adder, Full Adder, Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer, Carry lookahead adder, Combinational logic Design, Flip-Flops, Registers, Counters (synchronous & asynchronous), ALU, Micro-Operation. ALU- chip, Faster Algorithm and Implementation (multiplication & Division)

Unit-II (Basic Organization)

Von Neumann Machine (IAS Computer), Operational flow chart (Fetch, Execute), Instruction Cycle, Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & Manipulation, I/O Organization, Bus Architecture, Programming Registers

Unit-III (Memory Organization)

Memory Hierarchy, Main memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.

Unit-IV (I/O Organization)

Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

Unit-V (Process Organization)

Basic Concept of 8-bit micro Processor (8085) and 16-bit Micro Processor (8086), Assembly Instruction Set, Assembly language program of (8085): Addition of two numbers, Subtraction, Block Transfer, find greatest number, Table search, Numeric Manipulation, Introductory Concept of pipeline, Flynn's and Feng's Classification, Parallel Architectural classification.

References:

1. William Stalling, "Computer Organization & Architecture", Pearson education Asia

2. Mano Morris, "Computer System Architecture", PHI

3. Zaky & Hamacher, "Computer Organization", McGraw Hill

4. B. Ram, "Computer Fundamental Architecture & Organization", New Age

5. Tannenbaum, " Structured Computer Organization", PHI.

COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES (MCA – 106)

Unit-I

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation

UNIT-II
Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration Method, Regula-Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods.

Unit-III

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, Ill Conditioned system of equations, Refinement of solution. Gauss Seidal iterative method, Rate of Convergence

UNIT-IV
Interpolation and approximation: Finite Differences, Difference tables Polynomial Interpolation**:** Newton's forward and backward formula, Central Difference Formulae: Gauss forward and backward formula, Stirling's, Bessel's, Everett's formula.

Interpolation with unequal intervals: Langrange's Interpolation, Newton Divided difference formula, Hermite's Interpolation Approximation of function by Taylor's series and Chebyshev polynomial

Unit-V

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson's rules, Boole's Rule, Weddle's Rule Euler- Maclaurin Formula

Solution of differential equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods, Predictor-corrector method, Automatic error monitoring, stability of solution.

References:

1. Rajaraman V., "Computer Oriented Numerical Methods", PHI

2. Gerald & Wheatley, "Applied Numerical Analyses", AW

3. Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New

Age Int.

4. Grewal B. S., "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

5. T. Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods", TMH

6. Pradip Niyogi, "Numerical Analysis and Algorithms", TMH

7. Francis Scheld, "Numerical Analysis", TMH

9. Gupta S. P., "Statistical Methods", Sultan and Sons

PROGRAMMING LAB (MCA - 107)

• Write C program to find largest of three integers.

• Write C program to check whether the given string is palindrome or not.

• Write C program to find whether the given integer is (i) a prime number (ii) an Armstrong number.

• Write C program for Pascal triangle.

• Write C program to find sum and average of n integer using linear array.

• Write C program to perform addition, multiplication, transpose on matrices.

• Write C program to find fibbonacci series of iterative method using user-defined function.

• Write C program to find factorial of n by recursion using user-defined functions.

• Write C program to perform following operations by using user defined functions: (i) Concatenation (ii) Reverse (iii) String Matching

• Write C program to find sum of n terms of series: $n - n*2/2! + n*3/3! - n*4/4! + $ ....

• Write C program to interchange two values using (i) Call by value. (ii) Call by reference.

• Write C program to sort the list of integers using dynamic memory allocation.

• Write C program to display the mark sheet of a student using structure.

• Write C program to perform following operations on data files: (i) read from data file. (ii) write to data file.

• Write C program to copy the content of one file to another file using command line argument.

ORGANIZATION LAB (MCA - 108)

• Study and Bread Board Realization of Logic Gates. K-Map, Flip-Flop equation, realization of characteristic and excitation table of various Flip Flops.

• Implementation of Half Adder, Full Adder and Subtractor.

• Implementation of Ripple Counters and Registers.

• Implementation of Decoder and Encoder circuits.

• Implementation of Multiplexer and D-Multiplexer circuits.

NUMERICAL TECHNIQUES LAB (MCA - 109)

Write programs in C

• To implement floating point arithmetic operations i.e., addition, subtraction, multiplication and division.

• To deduce errors involved in polynomial interpolation. Algebraic and trancedental equations using Bisection, Newton Raphson,

Iterative, method of false position, rate of conversions of roots in tabular form for each of these methods.

• To implement formulae by Bessels, Newton, Stirling, Langranges etc.

• To implement method of least square curve fitting.

• Implement numerical differentiation.

• Implement numerical integration using Simpson's 1/3 and 3/8 rules, trapezoidal rule.

• To show frequency chart, regression analysis, Linear square fit, and polynomial fit.

SWAMI VIVEKANAND SUBHARTI UNIVERSITY

DETAILED SYLLABUS OF MCA SECOND SEMESTER

DATA & FILE STRUCTURES USING 'C' (MCA 201)

Unit -I

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices, and Vectors.

Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion. Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

Unit - II

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque, and Priority Queue.

Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Unit - III

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary trees, Huffman algorithm.

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. 15

Unit - IV

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting.

Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

Unit - V

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

References Text Books

1. Y. Langsam, M. Augenstin and A. Tannenbaum, Data Structures using C and C++, Pearson Education Asia, 2nd Edition, 2002.

2. Ellis Horowitz, S. Sahni, D. Mehta Fundamentals of Data Structures in C++, Galgotia Book Source, New Delhi.

Reference Books

1. S. Lipschutz, Data Structures Mc-Graw Hill International Editions, 1986.

2. Jean-Paul Tremblay, Paul. G. Soresan, An introduction to data structures with Applications, Tata Mc-Graw Hill International Editions, 2nd edition 1984.

3. A. Michael Berman, Data structures via C++, Oxford University Press, 2002.

4. M. Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education, 2002, 2nd edition.

PRINCIPLES OF MANAGEMENT (MCA- 202)

UNIT I

Management: Concept, Nature, Importance; Management : Art and Science, Management As a Profession, Management Vs. Administration, Management Skills, Levels of Management, Characteristics of Quality Managers.

Evolution of Management: Early contributions, Taylor and Scientific Management, Fayol's Administrative Management, Bureaucracy, Hawthorne Experiments and Human Relations, Social System Approach, Decision Theory Approach.

Business Ethics and Social Responsibility: Concept, Shift to Ethics, Tools of Ethics.

UNIT II

Introduction to Functions of Management

Planning: Nature, Scope, Objectives and Significance of Planning, Types of Planning, Process of Planning, Barriers to Effective Planning, Planning Premises and Forecasting, Key to Planning, Decision Making.

Organizing: Concept, Organisation Theories, Forms of Organisational Structure, Combining Jobs: Departmentation, Span of Control, Delegation of Authority, Authority & Responsibility, Organisational Design.

UNIT III

Staffing: Concept, System Approach, Manpower Planning, Job Design, Recruitment & Selection, Training & Development, Performance Appraisal

Directing: Concept, Direction and Supervision

Motivation: Concept, Motivation and Performance, Theories Of Motivation, Approaches for Improving Motivation, Pay and Job Performance, Quality of Work Life, Morale Building.

UNIT IV

Leadership: The Core of Leadership: Influence, Functions of Leaders, Leadership Style, Leadership Development.

Communication: Communication Process, Importance of Communication, Communication Channels, Barriers to Communication.

UNIT-V

Controlling: Concept, Types of Control, Methods: Pre-control: Concurrent Control: Post-control, An Integrated Control System, The Quality Concept Factors affecting Quality, Developing a Quality Control System, Total Quality Control, Pre-control of Inputs, Concurrent Control of Operations. Post Control of Outputs.

Change and Development: Model for Managing Change, Forces for Change, Need for Change, Alternative Change Techniques, New Trends in Organisational Change.

Suggested Reading:

1. Stoner, Freeman & Gilbert Jr - Management (Prentice Hall of India, 6th Edition)

2. Koontz - Principles of Management (Tata Mc Graw Hill, Ist Edition 2008)

3. Robbins & Coulter - Management (Prentice Hall of India, 8th Edition)

4. Robbins S.P. and Decenzo David A. - Fundamentals of Management: Essential Concepts and Applications (Pearson Education, 5th Edition)

5. Hillier Frederick S. and Hillier Mark S. - Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets (Tata Mc Graw Hill, 2nd Edition 2008)

6. Weihrich Heinz and Koontz Harold - Management: A Global and Entrepreneurial Perspective (Mc Graw Hill, 12th Edition 2008)

UNIX & SHELL PROGRAMMING (MCA - 203)

Unit-1 Introduction

Introduction to Unix, Unix system organization (the kernel and the shell), Files and directories, Library functions and system calls, Editors (vi and ed).

Unit-2 Unix Shell programming

Types of Shells, Shell Metacharacters, Shell variables, Shell scripts, Shell commands, the environment, Integer arithmetic and string Manipulation, Special command line characters, Decision making and Loop control, controlling terminal input, trapping signals, arrays.

Unit-3 Portability With C

Command line Argument, Background processes, process synchronization, Sharing of data, userid, group-id, pipes, fifos, message queues, semaphores, shared variables, Introduction to socket programming.

Unit-4 Unix System Administration

File System, mounting and unmounting file system, System booting, shutting down, handling user account, backup, recovery, security, creating files, storage of Files, Disk related commands.

Unit-5 Different tools and Debugger

System development tools: lint, make, SCCS (source code control system), Language development tools: YACC, LEX, M4, Text formatting tools: nroff, troff, tbl, eqn, pic, Debugger tools: Dbx, Adb, Sdb, Strip and Ctrace.

References

1. Parata, "Advanced Unix programming guide", BPB

2. Yashwant Kanitkar, "Unix Shell Programming", BPB

3. Meeta Gandhi, Tilak Shetty, Rajiv Shah, "The 'C' Odyssey Unix – the open boundless C", BPB

4. Sumitabh Das, "Unix Concepts and applications", TMH

5. Mike Joy, Stephen Jarvis, Michael Luck, "Introducing Unix and Linux", Palgrave Macmillan.

6. Rachel Morgan, Henry McGilton, "Introducing Unix System V", TMH

SYSTEM ANALYSIS & DESIGN (MCA – 204)

Unit – I

System Concepts and Information Systems Environment: The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

Unit – II

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance.

The Role of the Systems Analyst: Historical Perspective, The War Effort, What Dues it take to do System Analysis, Academic & Personal Qualifications, The Multifaceted role of the Analyst, The Analyst/User Interface, Behavioral issues.

Unit – III

Systems Planning & Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Unit – IV

Information Gathering: What Kind of Information do we need? Information about the firms, Information gathering tools, The art of Interviewing, Arranging the Interview, Guides to a Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

The Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

Unit – V

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements of form Design.

H/W / S/W Selection and Maintenance: The Computer Industry, S/W Industry, a Procedure for H/W /S/W Selection, Major Phases in Selection, Criteria for S/W Selection, The Used Computer, The Computer Contract.

References

1. Elias M.Awad, "Systems Analysis & Design", Galgotia Publication.

2. Hoffer, "Modern Systems Analysis & Design", Addision Wesley.

3. Kendall, "Introduction to System Analysis & Design", McGraw Hill

COMPUTER ARCHITECTURE & MICROPROCESSOR (MCA – 205)

Unit-I

Introduction to Parallel computing; Parallelism in Uniprocessor Systems, Parallel computer structures, Architectural Classification schemes, parallel processing applications. Pipelining Processing: An overlapped parallelism, Instruction and Arithmetic pipelines,

Unit-II

Principles of designing pipelined processors, Internal forwarding and register tagging, Hazard detection and resolution, Job sequencing and collision prevention, Characteristics of Vector processing, Multiple vector task dispatching, SIMD array processors, Masking and Data routing

Unit-III

SIMD Interconnection network: Static, Dynamic networks, Cube interconnection network, Shuffle exchange and Omega Network, SIMD matrix multiplication. Multiprocessor Architecture: Tightly and loosely coupled multiprocessors.

Unit -IV

Multiprocessor scheduling strategies and deterministic scheduling models, Introduction to Data Flow computing and data flow Graph. Introduction to 8 Bit and 16 Bit Intel Microprocessor Architecture and Register set.

Unit-V

Assembly language programming based on Intel 8085; Instructions: Data Transfer, Arithmetic, Logic, Branch operations, Looping Counting, Indexing, Programming Techniques, Counters and Time Delays, Stacks and Subroutines, Conditional call and Return Instructions, Advanced Subroutine Instructions.

References:

1. Hwang and Briggs, "Computer Architecture and parallel processing", McGraw Hill

2. R.S Goankar, "Microprocessor architecture, programming and application with the 8085", Pen Ram International.

3. Peterson & Heresy, "Quantitative approach to computer architecture", Morgan Kaufman

4. Hwang, "Advanced Computing Architecture", McGraw Hill

5. Quin, "Parallel Computing, Theory and Practices", McGraw Hill

6. Daniel Tabak, "Advanced Microprocessor", McGraw Hill

7. Hall D.V., "Microprocessor and Interfacing, Program and hardware", TMH

COMBINATORICS & GRAPH THEORY (MCA-206)

Unit 1

Rules of sum and products, Permutation, Combination, Permutation groups and application, Probability,Ramsey theory, Discrete numeric function and generating function, Combinatorial problems, Difference equation.

Unit II

Recurrence Relation-Introduction, Linear recurrence relation with constant coefficient, Homogeneous solution, Particular solution, Total solution, Solution by the method of generating function.

Unit III

Graphs, sub-graphs, some basic properties, Walks, Path & circuits, Connected graphs, Disconnected graphs and component, Eular and Hamiltonian graphs, Various operation on graphs, Tree and fundamental circuits, Distance diameters, Radius and pendent vertices, Rooted and binary trees, Counting trees, Spanning trees, Finding all spanning trees of a graph and a weighted graph.

Unit IV

Cut-sets and cut vertices, some properties, All cut sets in a graph, Fundamental circuit and cut sets, Connectivity and seperatability, Network flows, mincut theorem, Planar graphs, Combinatorial and geometric dual, Kuratowski to graph detection of planarity, Geometric dual, Some more criterion of planarity, Thickness and Crossings, Vector space of a graph and vectors, basis vectors, cut set vector, circuit vector, circuit and cut set verses sub spaces, orthogonal vector and sub space. Incidence matrix of graphs, sub matrices of A(G), circuit matrix, cut set matrix, path matrix and relationship among Af, Bf, Cf, fundamental circuit matrix and range of Bf adjacency matrix, rank nullity

theorem.

Unit V

Coloring and covering partitioning of graph, Chromatic number, Chromatic partitioning, Chromatic polynomials, Matching, covering, Four color problem, Directed graph, Types of directed graphs, Directed paths and connectedness, Euler digraph, Trees with directed edges, Fundamental circuit in digraph, Matrices A, B, C of digraph adjacency matrix of digraph, Enumeration and its types, Counting of labeled and unlabeled trees, Polya's theorem, Graph enumeration with polyas theorem, Graph theoretic algorithm.

References

1. Deo Narsing, "Graph Theory with applications to engineering & computer science", PHI

2. Tremblay & Manohar, " Discrete mathematical structures with applications to computer Science", TMH

3. Joshi K. D., "Fundamental of discrete mathematics", New Age International

4. John Truss, "Discrete mathematics for computer scientist"

5. C. L. Liu, "Discrete mathematics"

DATA STRUCTURE LAB (MCA - 207)

Write Program in C or C++ for following:

• Sorting programs: Bubble sort, Merge sort, Insertion sort, Selection sort, and Quick sort.

• Searching programs: Linear Search, Binary Search.

• Array implementation of Stack, Queue, Circular Queue, Linked List.

• Implementation of Stack, Queue, Circular Queue, Linked List using dynamic memory allocation.

• Implementation of Binary tree.

• Program for Tree Traversals (preorder, inorder, postorder).

• Program for graph traversal (BFS, DFS).

• Program for minimum cost spanning tree, shortest path.

UNIX / LINUX LAB (MCA - 208)

• Write Shell Script for UNIX environment.

• Understanding of basic commands of UNIX administration, user authorization, grant of users right and privileges, backup and recovery.

• Source Code Control System understanding Lex and Yacc, debugger tools (Lint, make etc.)

• Write program in C for Process Creation, Parent/Child process relationship, forking of process. Inter Process Communication and socket programming implementation of exec system call, pipe, semaphore and message queue.

MICROPROCESSOR LAB (MCA - 209)

• Study of 8085 and 8086/8088 Kit.

• Assembly Language Programs for 8088 kit

(i) address and data transfer. (ii) addition, subtraction. (iii) block transfer. (iv) find greatest numbers. (v) find r's and (r-1)'s complements of signed and unsigned number

• Assembly Language Programs for 8086/8088

(i) Multiplication of two decimal/binary/hexadecimal/octal numbers. (ii) Division of two decimal/binary/hexadecimal/octal numbers. (iii) Conversion of lower case to upper case character.

• Test the performance of Booth's Algorithm for (i) Signed numbers. (ii) Unsigned numbers.

SWAMI VIVEKANAND SUBHARTI UNIVERSITY

DETAILED SYLLABUS OF MCA THIRD SEMESTER

COMPUTER NETWORKS (MCA - 301)

Unit-I

Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, services, networks topology, Physical Layer-transmission, switching methods, Integrated services digital networks, terminal handling.

Unit-II

Medium access sub layer: Channel allocations, LAN protocols, ALOHA Protocols- Pure ALOHA, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, FDDI, Data Link Layer- elementary data link protocols, sliding windows protocols, error handling, High Level Data Link Control

Unit-III

Network Layer: Point-to Point networks, routing algorithms, congestion control algorithms, internetworking, TCP/IP packet, IP addresses, IPv6.

Unit-IV

Transport Layer: Design issues, connection management, TCP window Management, User Datagram Protocol, Transmission Control Protocol.

Unit-V

Application Layer: Network Security, DES, RSA algorithms, Domain Name System, Simple Network Management Protocol, Electronic mail, File Transfer Protocol, Hyper Text Transfer Protocol, Cryptography and compression Techniques.

References

1. A. S Tanenbaum, "Computer Networks, 3rd Edition", PHI

2. W. Stallings, "Data and Computer Communication", Macmillan Press

3. Comer, "Computer Networks & Internet", PHI.

4. Comer, "Internetworking with TCP/IP", PHI

5. Forouzan, "Data Communication and Networking", TMH

DESIGN & ANALYSIS OF ALGORITHM (MCA - 302)

Unit-I

Introduction:

Algorithms, Analysis of Algorithms, Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort Medians and order statistics

Unit-II

Elementary Data Structure: Stacks, Queues, Linked list, Binary Search Tree, Hash Table

Advanced Data Structure: Red Black Trees, Splay Trees, Augmenting Data Structure Binomial Heap, BTree, Fibonacci Heap, and Data Structure for Disjoint Sets Union-find Algorithm, Dictionaries and priority Queues, mergeable heaps, concatenable queues

Unit-III

Advanced Design and Analysis Techniques: Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis

Unit-IV

Graph Algorithms: Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem

Unit –V

Randomized Algorithms, String Matching, NP-Hard and NP-Completeness Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials & the FFT, Number Theoretic Algorithms, Computational Geometry

References

1. Horowitz Sahani, " Fundamentals of Computer Algorithms", Golgotia

2. Coremen Leiserson etal, " Introduction to Algorithms", PHI

3. Brassard Bratley, "Fundamental of Algorithms", PHI

4. M T Goodrich etal, "Algorithms Design", John Wiley

5. A V Aho etal, "The Design and analysis of Algorithms", Pearson Education

OPERATING SYSTEM (MCA - 303)

Unit-I

Introduction: Definition and types of operating systems, Batch Systems, multi programming, time–sharing parallel, distributed and real-time systems, Operating system structure, Operating system components and services, System calls, system programs, Virtual machines.

Unit-II

Process Management: Process concept, Process scheduling, Cooperating processes, Threads, Interprocess communication, CPU scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real-time scheduling and Algorithm evaluation.

Unit-III

Process Synchronization and Deadlocks: The Critical-Section problem, synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, Monitors, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling.

Unit-IV

Storage management: Memory Management-Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging in MULTICS and Intel 386, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrasing, Page Size and other considerations, Demand segmentation, File systems, secondary Storage Structure, File concept, access methods, directory implementation, Efficiency and performance, recovery, Disk structure, Disk scheduling methods, Disk management, Recovery, Disk structure, disk scheduling methods, Disk management, Swap-Space management, Disk reliability.

Unit-V

Security & Case Study: Protection and Security-Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, language based protection, The Security problem, Authentication, One Time passwords, Program threats, System threats, Threat Monitoring, Encryption.

Windows NT-Design principles, System components, Environmental subsystems, File system, Networking and program interface, Linux system-design principles, Kernel Modules, Process

Management, Scheduling, Memory management, File Systems, Input and Output, Interprocess communication, Network structure, security

References

1. Abraham Siberschatz and Peter Baer Galvin, "Operating System Concepts", Fifth

Edition, Addision-Wesley

2. Milan Milankovic, "Operating Systems, Concepts and Design", McGraw-Hill.

3. Harvey M Deital, "Operating Systems", Addison Wesley

4. Richard Peterson, "Linux: The Complete Reference", Osborne McGraw-Hill

DATABASE MANAGEMENT SYSTEM (MCA - 304)

Unit- I

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Unit- II

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters.

Unit- III

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

Unit- IV

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Unit- V

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi-version schemes, Recovery with concurrent transaction. Transaction Processing in Distributed system, data fragmentation. Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distrusted database.

References

1 Date C J, "An Introduction To Database System", Addision Wesley

2 Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill

3 Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley

4 Paul Beynon Davies, "Database Systems", Palgrave Macmillan

5 Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication

6 Majumdar & Bhattacharya, "Database Management System", TMH

7 Ramakrishnan, Gehrke, "Database Management System", McGraw Hill

8 Bharti P.K, "An introduction to Database Systems", JPNP

OBJECT ORIENTED SYSTEMS & C++ (MCA - 305)

Unit-I

Object Modeling

Object & classes, Links and Associations, Generalization and Inheritance, Aggregation, Abstract classes, A sample object model, Multiple Inheritance, Meta data, candidate keys, constraints.

Unit-II

Dynamic Modeling

Events and States, Operations and Methods, Nested state Diagrams, Concurrency, Relation of Object and Dynamic Models, advanced dynamic model concepts, a sample dynamic model.

Unit-III

Functional Modeling

Functional Models, Data flow Diagrams, Specifying Operations, Constraints, a sample functional model.

Unit-IV

Programming in C++

Classes and objects in C++, Functions, Constructors, Destructors, Inheritance, Functions overloading, Operator Overloading, I/O Operations. Real life applications, Extended Classes, Pointer, Virtual functions, Polymorphisms, Working with files,

Class templates, Function templates.

Unit-V

Translating object oriented design into an implementation, OMT Methodologies, examples and case studies to demonstrate methodology, comparison of Methodology, SA/SD, and JSD.

References

1. Rambaugh James etal, "Object Oriented Design and Modeling", PHI-1997

2. Bjarne Stroustrup, "C++ Programming Language", Addison Wesley

3. Balagurusamy E, "Object Oriented Programming with C++", TMH, 2001

4. Booch Grady, "Object Oriented Analysis and Design with application 3/e", Pearson

5. Lipman, Stanley B, Jonsce Lajole, " C++ Primer Reading", AWL, 1999

6. Dillon and Lee, "Object Oriented Conceptual Modeling", New Delhi PHI-1993

7. Stephen R. Shah, "Introduction to Object Oriented Analysis and Design", TMH

8. Berzin Joseph, "Data Abstraction: the object oriented approach using C++", McGraw Hill

9. Mercer, "Computing Fundamental with C++", Palgrave Macmillan

OPERATION RESEQARCH (MCA-306)

UNIT-I Network Analysis: Terminology of network, shortest route problem, minimal spanning tree problem, max-flow problem. Project Scheduling by PERT, CPM: Diagram, representation, critical path calculation, construction of time chart and resource labeling, probability and cost consideration in project scheduling, project control.

UNIT-II

Linear Programming: Simplex Method Revised simplex method, Duality in Linear programming, Application of Linear Programming to Economic and Industrial Problems.

UNIT-III

Nonlinear Programming: The Kuhn-Tucker conditions, Quadratic programming, Convex programming.

UNIT-IV

Replacement Models: Introduction, Replacement policies for items whose efficiency deteriorates with time, Replacement policies for items that fail completely.

UNIT-V

Sequencing Model: Classification of self problems, processing of n jobs through two machines, three machines, processing of two jobs through m machines.

Suggested Books:

(1) Taha, Operations Research, Macmillan.

(2) B.E. Gillet, Introduction to Operations Research, McGraw-Hill.

(3) S.S.Rao, Optimization Theory and Applications, Wiley Eastern.

(4) G.Hadley, Linear programming, Addison-Wesley.

(5) K. Swarup, P.K. Gupta & M. Mohan, Operations Research, S. Chand & Sons, 2003.

DBMS LAB (MCA - 307)

The programme to be implemented using SQL

1. Create Table, SQL for Insertion, Deletion, Update and Retrival using aggregating functions.

2. Write Programs in PL/SQL, Understanding the concept of Cursors.

3. Write Program for Join, Union & intersection etc.

4. Creating Views, Writing Assertions, Triggers.

5. Creating Forms, Reports etc.

6. Writing codes for generating read and update operator in a transaction using different situations.

7. Implement of 2PL concerning central algorithm.

8. Developing code for understanding of distributed transaction processing. Students are advised to use Developer 2000 Oracle 8+ version for above experiments. However, depending on the availability of Software's students may use power builder / SQL Server / DB2 etc. for implementation.

OOPS & C++ LAB (MCA - 308)

Write programs in C/C++ for

1. Program illustrating overloading of various operators.

2. Program illustrating use of Friend, Inline, Static Member functions, default arguments.

3. Program illustrating use of destructor and various types of constructor.

4. Program illustrating various forms of Inheritance.

5. Program illustrating use of virtual functions, virtual Base Class.

6. Program illustrating how exception handling is done.

DESIGN & ANALYSIS OF ALGORITHMS (DAA) LAB (MCA - 309)

Write Programs in C/C++ for

1. Creation of a binary search tree and insertion & deletion into it.

2. Creation of a Red Black tree and all the associated operations on it.

3. Implementing an AVL tree and all the associated operations on it.

4. Multiplication of two matrices using Strassen's Matrix Multiplication method.

5. Solving Knapsack problem.

6. Implementing shortest path algorithms (Dijkastra's and Bellman Ford Algorithm).

7. Finding the minimum cost Spanning Tree in a connected graph.

8. Solving 8 Queen's problem.

9. Finding the number of connected components in a Graph.

SWAMI VIVEKANAND SUBHARTI UNIVERSITY

DETAILED SYLLABUS OF MCA FOURTH SEMESTER

MANAGEMENT INFORMATION SYSTEM (MCA-401)

Unit 1: Foundation of Information Systems: Introduction to information system in business, fundamentals of information systems, Solving business problems with information systems, Types of information systems, Effectiveness and efficiency criteria in information system.

Unit 2: An overview of Management Information Systems: Definition of a management information system, MIS versus Data processing, MIS & Decision Support Systems, MIS & Information Resources Management, End user computing, Concept of an MIS, Structure of a Management information system.

Unit 3: Concepts of planning & control: Concept of organizational planning, The Planning Process, Computational support for planning, Characteristics of control process, The nature of control in an organization.

Unit 4: Business applications of information technology: Internet & electronic commerce, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information System for Managerial Decision Support, Information System for Strategic Advantage.

Unit 5: Managing Information Technology: Enterprise & global management, Security & Ethical challenges, Planning & Implementing changes.

Advanced Concepts in Information Systems: Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management, and Procurement Management.

Text Books

1. O Brian, "Management Information System", TMH

2. Gordon B. Davis & Margrethe H. Olson, "Management Information System", TMH.

References

1. O Brian, "Introduction to Information System", MCGRAW HILL.

2. Murdick, "Information System for Modern Management", PHI.

3. Jawadekar, " Management Information System", TMH.

4. Jain Sarika, "Information System", PPM

5. Davis, "Information System", Palgrave Macmillan

FOUNDATION OF E-COMMERCE (MCA - 402)

Unit 1

Introduction: Electronic Commerce - Technology and Prospects, Definition of E- Commerce, Economic potential of electronic commerce, Incentives for engaging in electronic commerce, forces behind ECommerce, Advantages and Disadvantages, Architectural framework, Impact of E-commerce on business.

Network Infrastructure for E- Commerce: Internet and Intranet based E-commerce- Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).

Unit II

Mobile Commerce: Introduction, Wireless Application Protocol, WAP technology, Mobile Information device, Mobile Computing Applications.

Unit III

Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design, Limitation of Firewalls.

Unit IV

Encryption: Encryption techniques, Symmetric Encryption- Keys and data encryption standard, Triple encryption, Asymmetric encryption- Secret key encryption, public and private pair key encryption, Digital Signatures, Virtual Private Network.

Unit V

Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking. EDI Application in business, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References

1. Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison Wesley.

2. Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH

3. P. Loshin, John Vacca, "Electronic commerce", Firewall Media, New Delhi

INTERNET & JAVA PROGRAMMING (MCA - 403)

Unit-1

Internet: Internet, Connecting to Internet: Telephone, Cable, Satellite connection, Choosing an ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing.

Unit- II

Core Java: Introduction, Operator, Data type, Variable, Arrays, Control Statements, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout managers, Menus, Images, Graphics.

Unit-III

Java Swing: Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame.

JDBC: The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.

Unit-IV

Java Beans: Application Builder tools, The bean developer kit(BDK), JAR files, Introspection, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB)

Introduction to RMI (Remote Method Invocation): A simple client-server application using RMI.

Unit-V

Java Servlets: Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging Servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).

References:

1. Margaret Levine Young, "The Complete Reference Internet", TMH

2. Naughton, Schildt, "The Complete Reference JAVA2", TMH

3. Balagurusamy E, "Programming in JAVA", TMH

4. Dustin R. Callway, "Inside Servlets", Addison Wesley

5. Mark Wutica, "Java Enterprise Edition", QUE

6. Steven Holzner, "Java2 Black book", dreamtech

COMPUTER GRAPHICS AND ANIMATION (MCA -404)

Unit I

Graphics Primitives: Display Devices: Refresh Cathode Ray Tube, Raster Scan Display, Plasma display,Liquid Crystal display, Plotters, Printers.

Input Devices: Keyboard, Trackball, Joystick, Mouse, Light Pen, Tablet, and Digitizing Camera.

Input Techniques: Positioning techniques, Positioning Constraints, Scales & Guidelines, Rubber-Band techniques, Dragging, Dimensioning techniques and Graphical Potentiometers, Pointing and Selection: the use of selection points, defining a boundary rectangle, multiple selections, Menu selection.

Unit II

Mathematics for Computer Graphics: Point representation, Vector representation, Matrices and operations related to matrices, Vector addition and vector multiplication, Scalar product of two vectors, Vector product of two vectors.

Line Drawing Algorithms: DDA algorithms, Bresenham's Line algorithm.

Segment & Display files: Segments, Functions for segmenting the display file, Posting and unposting a segment, segment naming schemes, Default error conditions, Appending to segments, Refresh concurrent with reconstruction, Free storage allocation, Display file Structure.

Graphics Operations: Clipping: Point Clipping, Line Clipping. Polygon Clipping.

Filling: Inside Tests, Flood fill algorithm, Boundary-Fill Algorithm and scan-line polygon fill algorithm.

Unit III

Conics, Curves and Surfaces: Quadric surfaces: Sphere, Ellipsoid, and Torus. Superquadrics: Superellipse, superellipsoid. Spline & Bezier Representations: Interpolation and approximation splines, parametric continuity conditions, Geometric Continuity Conditions, Spline specifications. Bezier curves and surfaces.

Unit IV

Transformation: 2D transformation, Basic Transformations, Composite transformations: Reflection, Shearing, Transformation between coordinate systems.

3 D Graphics: 3 D Display Methods, 3 D modeling, 3 D transformations, Parallel projection, Perspective projection, Visible lines and surfaces identification, Hidden surface removal

Unit V

Animation : Introduction to Animation, Principles of Animation, Types of Animation, Types of Animation Systems : Scripting, Procedural, Representational, Stochastic, etc.

Animation Tools : Hardware –SGI, PC's, Amiga etc.

Software : Adobe Photoshop, Animation studio, Wave front etc.

Gif Animator : Microsoft GIF Animation, GIF Construction, GIFmation etc.

GKS: GKS Standards, GKS Primitives – Polyline, Polymarker, and Fill area, Text, GKS Workstation and Metafiles.

References:

1. Donald Hearn and M. Pauline Baker, "Computer Graphics", PHI

2. Steven Harrington, "Computer Graphics: A Programming Approach", TMH

3. Prajapati A. K, "Computer Graphics", PPM Ed 2

4. Foley James D, "Computer Graphics", AW Ed 2

5. Newman and Sproul, "Principle of to Interactive Computer Graphics", McGraw Hill

6. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill

7. Rogers and Adams, "Mathematical Elements of Computer Graphics", McGraw Hill

SOFT COMPUTING TECHNIQUES (MCA-405)

UNIT-I
Introduction to Genetic Algorithm, Genetic Operators and Parameters, Genetic Algorithms in Problem Solving, Theoretical Foundations of Genetic Algorithms, Implementation Issues.

UNIT-II
Neural Model and Network Architectures, Perceptron Learning, Supervised Hebbian Learning, Backpropagation, Associative Learning,

UNIT-III
Competitive Networks, Hopfield Network, Computing with Neural Nets and applications of Neural Network.

UNIT-IV
Introduction to Fuzzy Sets, Operations on Fuzzy sets, Fuzzy Relations, Fuzzy Measures, Applications of Fuzzy Set Theory to different branches of Science and Engineering.

UNIT-V
Different computing Methodologies: cloud computing, Grid computing, Ubiquitous computing, Pervasive computing

Suggested Books:

(1) M. Mitchell, An Introduction to Genetic Algorithms, Prentice-Hall, 1998.

(2) D. E. Goldberg, Genetic Algorithms in Search, Optimization, and Machine Learning, Addison-Wesley, 1989.

(3) Z. Michalewicz, Genetic Algorithms+ Data Structures = Evolution Programs, Springer-Verlag, 1994.

(4) N.K. Sinha & M. M. Gupta(Eds), Soft Computing & Intelligent Systems: Theory & Applications, Academic Press, 2000.

(5) M.T. Hagan, H. B. Demuth, And M. Beale, Neural Network Design, Thompson Learning, 1996.

(6) C. Lau (Ed), Neural Networks, IEEE Press, 1992.

(7) J. Freeman and D. Skapura, Neural Networks: Algorithms, Applications, and Programming Techniques, Addison-Wesley, 1991.

(8) G. J. Klir and T. A. Folger, Fuzzy Sets, Uncertainty, and Information, PHI, 1988.

(9) G. J. Klir, and B. Yuan, Fuzzy Sets and Fuzzy Logic: Theory and Applications, Prentice-Hall, 1995.

(10) H. J. Zimmerman, Fuzzy Set Theory and Its Applications, Kluwer Academic Press, 1991.

ELECTIVE SUBJECT COMPILER

DESIGN (MCA-406/(1))

Unit-1

Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler

Programming Languages: High level languages, The lexical and syntactic structure of a language, Data elements, Data Structure, Operations, Assignments, Program unit, Data Environments, Parameter Transmission.

Lexical Analysis: The role of Lexical Analyzer, A simple approach to the design of Lexical Analyzer, Regular Expressions , Transition Diagrams, Finite state Machines, Implementation of Lexical Analyzer, Lexical Analyzer Generator: LEX, Capabilities of Lexical Analyzer

Unit-II

The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of CFG.

Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers, Bottom–up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC

Unit-III

Intermediate Code Generation: Different Intermediate forms: three address code, Quadruples & Triples. Syntax Directed translation mechanism and attributed definition. Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postfix translation.

Unit-IV

Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management

Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors.

Unit-V

Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection

References:

1. Alfred V Aho , Jeffrey D. Ullman, "Principles of Compiler Design", Narosa

2. A.V. Aho, R. Sethi and J.D Ullman, "Compiler: principle, Techniques and Tools", AW

3. H.C. Holub "Compiler Design in C", Prentice Hall Inc.

4. Apple, "Modern Computer Implementation in C: Basic Design", Cambridge press

CRYPTOGRAPHY AND NETWORK SECURITY (MCA 406/(2))

Unit-I

Introduction to Cryptography: Introduction To Security: Attacks, Services & Mechanisms, Security, Attacks, Security Services. Conventional Encryption: Classical Techniques, Conventional Encryption Model, And Steganography, Classical Encryption Techniques. Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes Of Operation.

Unit-II

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, RC2 Placement & Encryption Function, Key Distribution, Random Number Generation, Placement Of Encryption Function.

Unit-III

Public Key Encryption: Public-Key Cryptography: Principles Of Public-Key Cryptosystems, RSA Algorithm, Key Management, Fermat's & Euler's Theorm, Primality, The Chinese Remainder Theorem.

Unit-IV

Hash Functions: Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Birthday Attacks, Security Of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signatures, Authentication Protocol, Digital Signature Standard (DSS), Proof Of Digital Signature Algorithm.

Unit-V

Network & System Security: Authentication Applications: Kerberos X.509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP), S / Mime, Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management, Web Security: Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (Set), System Security: Intruders, Viruses, Firewall Design Principles, Trusted Systems.

Text Book:

1. William Stallings, "Cryptography and Network Security: Principles and Practice", Prentice Hall, New Jersey.

Reference Books:

1. Johannes A. Buchmann, "Introduction to cryptography", Springer- Verlag.

2. Atul Kahate, "Cryptography and Network Security", TMH

DATA COMPRESSION (MCA 406/(3))

Unit-I

Introduction: Compression Techniques: Loss less compression, Lossy compression, Measures of performance, Modeling and coding.

Mathematical Preliminaries for Lossless compression: A brief introduction to information theory: - Models: -Physical models, Probability models, Markov models, composite source model, Coding? - Uniquely decodable codes, Prefix codes.

Unit-II

Huffman coding: The Huffman coding algorithm, minimum variance Huffman codes, length of Huffman codes, extended Huffman codes, non binary Huffman codes, Adaptive Huffman codes: Update procedure, Encoding procedure, decoding procedure, Golomb codes, Rice codes, Tunstall codes, Applications: loss less image compression, Text compression and Audio compression.

Unit-III

Arithmetic coding: Coding a sequence, generating a binary code, Comparison of Huffman and Arithmetic coding, Application: Bi –level image compression -The JBIG standard, JBIG2 Image compression, Dictionary Techniques:-Introduction, Static Dictionary: Diagram Coding, Adaptive dictionary: The LZ77 Approach, The LZ78 approach, Applications: File Compression-UNIX compress, Image compression: - The Graphics interchange Format (GIF), Predictive Coding: - Prediction with partial match (PPM): The basic algorithms, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multiresolution Approaches, facsimile Encoding, Dynamic Markov Compression.

Unit-IV

Mathematical Preliminaries for Lossy Coding: -Distortion criteria, Models. Scalar Quantization, the Quantization problem, Uniform Quantization, adaptive Quantization, Non uniform Quantization.

Unit-V

Vector Quantization: Advantages of Vector Quantization over Scalar Quantization, The linde-Buzo-Gray algorithm, Tree stuctured Vector quantzers, Structured Vector Quantizers.

Text Book:

1. Khalid Sayood, "Introduction to Data Compression", Morgan Kaufmann Publications.

Reference Book:

1. Ralf Steinmetx and Klara Nahrstedt, "Multimedia Computing and communication and applications", Prentice Hall

CLIENT SERVER COMPUTING (MCA- 406(4))

Unit I

Client/Server Computing: DBMS concept and architecture, Single system image, Client Server architecture, mainframe-centric client server computing, downsizing and client server computing, preserving mainframe applications investment through porting, client server development tools, advantages of client server computing.

Unit II

Components of Client/Server application: The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA).The server: Detailed server functionality, the network operating system, available platforms, the network operating system, available platform, the server operating system.

Unit III

Client/Server Network: connectivity, communication interface technology, Interposes communication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network management, Client-server system development: Software, Client–Server System Hardware: Network Acquisition, PC-level processing unit, Macintosh, notebooks, pen, UNIX workstation, x-terminals, server hardware.

Unit IV

Data Storage: magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, fault tolerance, RAID, RAID-Disk network interface cards. Network protection devices, Power

Protection Devices, UPS, Surge protectors. **Client Server Systems Development**: Services and Support, system administration, Availability, Reliability, Serviceability, Software Distribution, Performance, Network management, Help Disk, Remote Systems Management Security, LAN and Network Management issues.

Unit V

Client/Server System Development: Training, Training advantages of GUI Application, System Administrator training, Database Administrator training, End-user training. The future of client server Computing Enabling Technologies, The transformational system.

References:

1. Patrick Smith & Steave Guengerich, "Client / Server Computing", PHI

2. Dawna Travis Dewire, "Client/Server Computing", TMH

3. Majumdar & Bhattacharya, "Database management System", TMH

4. Korth, Silberchatz, Sudarshan, "Database Concepts", McGraw Hill

5. Elmasri, Navathe, S.B, "Fundamentals of Data Base System", Addison Wesley

Data Mining & Warehousing (MCA-406(5))

Unit – I

Dss-Uses, definition, Operational Database. Introduction to DATA Warehousing. Data-Mart, Concept of Data-Warehousing, Multi Dimensional Database Structures. Client/Server Computing Model & Data Warehousing. Parallel Processors & Cluster Systems. Distributed DBMS implementations.

Unit – II

DATA Warehousing. Data Warehousing Components. Building a Data Warehouse. Warehouse Database. Mapping the Data Warehouse to a Multiprocessor Architecture. DBMS Schemas for Decision Support. Data Extraction, Cleanup & Transformation Tools. Metadata.

Unit – III

Business Analysis. Reporting & Query Tools & Applications. On line Analytical Processing(OLAP). Patterns & Models. Statistics. Artificial Intelligence.

Unit – IV

Knowledge Discovery, Data Mining. Introduction to Data-Mining. Techniques of Data-Mining. Decision Trees. Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms. Rule Introduction. Selecting & Using the Right Technique.

Unit – V

Multimedia Data-Mining, Multimedia-Databases, Mining Multimedia Data, Data-Mining and the World Wide Web, Web Data-Mining, Mining and Meta-Data. Data Visualization & Overall Perspective. Data Visualization. Applications of Data-Mining.

References:

1. Berson, "Data Warehousing, Data-Mining & OLAP", TMH

2. Mallach, "Decision Support and Data Warehousing System", TMH

3. Bhavani Thura-is-ingham, "Data-Mining Technologies, Techniques Tools & Trends", CRC Press

4. Navathe, "Fundamental of Database System", Pearson Education

5. Margaret H. Dunham, "Data-Mining. Introductory & Advanced Topics", Pearson Education

6. Pieter Adriaans, Dolf Zantinge, "Data-Mining", Pearson Education

MIS LAB (MCA – 407)

• Use of designer tools like for making DFD/ERDs using **process analyst tool** or any other tool etc.

• Laboratory experiments in use of interactive SQL and other 4GLs.

• Designing and implementing fully functional information system by using any language.

• Develop software for implementation of information system for the supply chain management.

• Develop the software module for the testing of the software routines.

Note: Students are advised to use **Oracle 91, JAVA2, and Visual Basic 6**. However depending upon the availability of software's, Mini project may also be planned & carried out through out the semester to understand the important concepts of database and testing until the end of semester.

JAVA PROGRAMMING LAB (MCA - 408)

1. Write a program in Java for illustrating, overloading, over riding and various forms of inheritance.

2. Write programs to create packages and multiple threads in Java.

3. Write programs in Java for event handling Mouse and Keyboard events.

4. Using Layout Manager create different applications.

5. Write programs in Java to create and manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using swing/AWT.

6. Using Java create Applets.

7. Use Java Language for Client Server Interaction with stream socket connections.

8. Write a program in java to read data from disk file.

COMPUTER GRAPHICS LAB (MCA - 409)

Write program in any suitable language

1. Write a program to draw a line using DDA algorithm.

2. Write a program for implementing Bresenham's algorithm for line generation.

3. Write a program for generation of circle.

4. Write a program to demonstrate Cohen-Sutherland line clipping method.

5. Write a program to implement Sutherland-Hodgeman polygon clipping algorithm.

6. Write a program to rotate a triangle. (By asking the user to input the coordinates of the Triangle and the angle of rotation).

7. Write a program to perform one point perspective projection of an object.

8. Write a program to implement Depth-Buffer method to display the visible surfaces of a given polyhodron.

9. Write a program to implement 3-D rotation of an object.

10. Write a program to draw polyline using any algorithm.

11. Write a program to draw a Bezier curve and surface.

Note : Students are advised to use C, C++ language for writing program; Use of open GL is desirable.

SWAMI VIVEKANAND SUBHARTI UNIVERSITY

DETAILED SYLLABUS OF MCA FIFTH SEMESTER

WEB TECHNOLOGY (MCA- 501)

Unit-I

History of the web, Growth of the Web, Protocols governing the web, Introduction to Cyber Laws in India,

Introduction to International Cyber laws, Web project, Web Team, Team dynamics.

Unit-II

Communication Issues, the Client, Multi-departmental & Large scale Websites, Quality Assurance and testing, Technological advances and Impact on Web Teams.

Unit-III

HTML: Formatting Tags, Links, List, Tables, Frames, forms, Comments in HTML, DHTML. JavaScript: Introduction, Documents, Documents, forms, Statements, functions, objects in JavaScript, Events and Event Handling, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

Unit IV

XML: Introduction, Displaying an XML Document, Data Interchange with an XML document, Document type definitions, Parsers using XML, Client-side usage, Server Side usage.

Unit V

Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VBScript, Active Server Pages (ASP).

Text Book:

1. Burdman, "Collaborative Web Development", Addison Wesley.

2. Sharma &Sharma, "Developing E-Commerce Sites", Addison Wesley

3. Ivan Bayross, "Web Technologies Part II", BPB Publications.

References:

1. Shishir Gundavarma, "CGI Programming on the World Wide Web", O'Reilly & Associate.

2. DON Box, "Essential COM", Addison Wesley.

3. Greg Buczek, "ASP Developer's Guide", TMH.

ELECTIVE SUBJECT-1

MULTIMEDIA SYSTEM (MCA 502(1))

Unit I

Evolution of Multimedia and its objects, Scope of multimedia in business & work, Production and planning of Multimedia applications. Multimedia hardware, Memory & Storage Devices, Communication Devices, Multimedia Software, Presentation and object generation tools, Video, sound, Image capturing, Authoring Tools, Card & Page Based Authoring Tools.

Unit II

Production and Planning of Multimedia building blocks, Text, sound (MIDI), Digital Audio, Audio File Formats, MIDI under Windows environment, Audio & Video Capture.

Unit III

Macromedia products, Basic drawing techniques, Advance animation techniques, Creating multi layer combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.

Unit IV

Digital Audio Concepts, Sampling variables, Loss Less compression of sound, Lossy compression & Silence compression.

Unit V

Multimedia monitor bitmaps, Vector drawing, Lossy graphic compression, Image file formatic animations Image standards, J P E G compression, Zig Zag coding, Video representation, colors, video compression, MPEG standards, MHEG standard, recent development in multimedia. Multimedia Application Planning, Costing, Proposal preparation, and Financing-Case study of a typical industry.

References:

1. Andreas Halzinger, "Multimedia Basics", Vol-I to Vol-III, Firewall Media, New Delhi.

2. Tay Vaughan, "Multimedia Making It work", Tata McGraw Hill.

3. Buford, "Multimedia Systems", Addison Wesley.

4. Agarwal and Tiwari, "Multimedia Systems", Excel.

5. Rosch, "Multimedia Bible", Sams Publishing

6. Sleinreitz, "Multimedia Systems", Addison Wesley

7. Ken Milburn, John Croteau, "Flash 4 web special Effects, Animation & Design Handbook", Dreamtech Press.

8. John Villamil–Casanova & Louis Molina, "Multimedia-Production, Planning & Delivery", PHI

DISTRIBUTED DATABASE SYSTEM MCA- 502(2)

Unit-1

Introduction to Distributed Data system, Distributed Database Architecture, Distributed Data base Design, Transaction processing Concurrency Control techniques, Security.

Unit-2

Types of Data Fragmentations, Fragmentation and allocation of fragments, Distribution transparency, access primitives, integrity constraints.

Unit-3

Grouping and aggregate function, Query processing , Equivalence transformation of queries.

Unit-4

Evaluation, parametric queries, Query optimization, Join and general queries.

Unit-5

Management of Distributed transaction and concurrency control: Distributed Date base Administration, Catalouge Management Authorisation, Security and protection. Examples of distributed database systems. Cost Analysis

References:

1. Ceri & Palgathi, "Distributed Database System", McGraw Hill.

2. Raghu Rama Krishnan and Johannes Gechrib, "Database Management Systems", Mc Graw Hill.

3. Date C. J, "An Introduction to Database System, Vol1 & II", Addition Wesley.

4. Korth, Silbertz, Sudarshan , "Database Concepts", McGraw Hill.

5. Elmasari , Navathe, "Fundamentals of Data Base Systems", Addition Wesley.

6. Data C. J , "An Introduction to Database System" , Addition Wesley

7. RamaKrishnan , Gehke, "Database Management System", McGraw Hill

ERP SYSTEMS (MCA -502(3))

Unit-I

Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering and Information Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP, ERP Drivers, Decision support system.

Unit-II

ERP Domain, ERP Benefits classification, Present global and Indian market scenario, milestones and pitfalls, Forecast, Market players and profiles, Evaluation criterion for ERP product, ERP Life Cycle: Adoption decision, Acquisition, Implementation, Use & Maintenance, Evolution and Retirement phases, ERP Modules.

Unit- III

Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendors evaluation criterion, ERP Implementation approaches and methodology, ERP implementation strategies, ERP Customization, ERP-A manufacturing Perspective.

Unit- IV

Critical success and failure factors for implementation, Model for improving ERP effectiveness, ROI of ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations.

Unit- V

Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units through Soft System approaches or qualitative Analysis tools, Learning and Emerging Issues, ERP and E-Commerce.

References

1. A. Lexis Leon, "Enterprise Resource Planning", TMH

2. Brady, Manu, Wegner, " Enterprise Resource Planning", TMH

ADVANCED CONCEPTS IN DATABASE SYSTEMS (MCA 502(4))

Unit-I

Query Processing, Optimization & Database Tuning: Algorithms For Executing Query Operations.Heuristics For Query Optimizations, Estimations Of Query Processing Cost, Join Strategies For Parallel Processors, Database Workloads, Tuning Decisions, DBMS Benchmarks, Clustering & Indexing, Multiple Attribute Search Keys, Query Evaluation Plans, Pipelined Evaluations, System Catalogue In RDBMS.

Unit-II

Extended Relational Model & Object Oriented Database System: New Data Types, User Defined Abstract Data Types, Structured Types, Object Identity, Containment, Class Hierarchy, Logic Based Data Model, Data Log, Nested Relational Model And Expert Database System.

Unit-III

Distributed Database System:

Structure Of Distributed Database, Data Fragmentation, Data Model, Query Processing, Semi Join, Parallel & Pipeline Join, Distributed Query Processing In R * System, Concurrency Control In Distributed Database System, Recovery In Distributed Database System, Distributed Deadlock Detection And Resolution, Commit Protocols.

Unit –IV

Enhanced Data Model For Advanced Applications: Database Operating System, Introduction To Temporal Database Concepts, Spatial And Multimedia Databases, Data Mining, Active Database System, Deductive Databases, Database Machines, Web Databases, Advanced Transaction Models, Issues In Real Time Database Design.

Unit-V

Introduction To Expert Database And Fuzzy Database System:

Expert DataBases: Use of Rules of Deduction in Databases, Recursive Rules.

Fuzzy DataBases: Fuzzy Set & Fuzzy Logic, Use Of Fuzzy Techniques to Define Inexact and Incomplete

DataBases.

References

1. Majumdar & Bhattacharya, "Database Management System", TMH.

2. Korth, Silbertz, Sudarshan, " Database Concepts", McGraw Hill.

3. Elmasri, Navathe, "Fundamentals Of Database Systems", Addison Wesley.

4. Data C J," An Introduction To Database System", Addison Wesley.

5. Ramakrishnan, Gehrke, "Database Management System", McGraw Hill.

6. Bernstein, Hadzilacous, Goodman, " Concurrency Control & Recovery", Addison Wesley.

7. Ceri & Palgatti, "Distributed Databases", McGraw Hill.

.NET FRAMEWORK AND C# (MCA- 503)

Unit-I

The .NET framework: Introduction, Common Language Runtime, Common Type System, Common Language Specification, The Base Class Library, The .NET class library Intermediate language, Just-in-Time compilation, garbage collection, Application installation & Assemblies, Web Services, Unified classes.

Unit-II

C# Basics: Introduction, Data Types, Identifiers, variables & constants, C# statements, Object Oriented Concept, Object and Classes, Arrays and Strings, System Collections, Delegates and Events, Indexes Attributes, versioning.

Unit-III

C# Using Libraries: Namespace-System, Input Output, Multi-Threading, Networking and Sockets, Data Handling, Windows Forms, C# in Web application, Error Handling.

Unit-IV

Advanced Features Using C#: Web Services, Windows services, messaging, Reflection, COM and C#, Localization.

Unit-V

Advanced Features Using C#: Distributed Application in C#, XML and C#, Unsafe Mode, Graphical Device Interface with C#, Case Study (Messenger Application)

Text Books

1. Shibi Panikkar and Kumar Sanjeev, "C# with **.**NET Frame Work", Firewall Media.

2. Shildt, "C#**:** The Complete Reference", TMH

Reference Books

1. Jeffrey Richter, "Applied Microsoft .Net Framework Programming", (Microsoft)

2. Fergal Grimes, "Microsoft .Net for Programmers", (SPD)

3. TonyBaer, Jan D. Narkiewicz, Kent Tegels, Chandu Thota, Neil Whitlow, "Understanding the **.**Net Framework", (SPD)

4. Balagurusamy, "Programming with C#", TMH

SOFTWARE ENGINEERING (MCA- 504)

Unit-I Introduction: Introduction to software engineering, Importance of software, The evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis,Software engineering problems, Software Development Life Cycle, Software Process.

Unit-II Software Requirement Specification: Analysis Principles, Water Fall Model, The Incremental Model, Prototyping, Spiral Model, Role of management in software development, Role of matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and Control.

Software-Design: Design principles, problem partitioning, abstraction, top down and bottom up-design, Structured approach, functional versus object oriented approach, design specifications and verification, Monitoring and control, Cohesiveness, coupling, Forth generation techniques, Functional independence, Software Architecture, Transaction and Transform Mapping, Component – level Design, Forth Generation Techniques

Unit-III Coding: Top-Down and Bottom –Up programming, structured programming, information hiding, programming style and internal documentation.

Testing: Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification & validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and debugging.

Unit-IV Software Project Management: The Management spectrum- (The people, the product, the process, the project), cost estimation, project scheduling, staffing, software configuration management, Structured Vs. Unstructured maintenance, quality assurance, project monitoring, risk management.

Unit-V Software Reliability & Quality Assurance: Reliability issues, Reliability metrics, Reliability growth modeling, Software quality, ISO 9000 certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM.

CASE (Computer Aided Software Engineering): CASE and its Scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

References

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed. Boston: McGraw Hill, 2001

2. Jalote, Pankaj, "Software Engineering Ed.2", New Delhi: Narosa 2002

3. Schaum's Series, "Software Engineering", TMH

4. Ghezzi, Carlo and Others, "Fundamentals of Software Engineering", PHI

5. Alexis, Leon and Mathews Leon, "Fundamental of Software Engineering", Vikas

6. Sommerville, Ian, "Software Engineering", AWL, 2000

7. Fairly, "Software Engineering", New Delhi: TMH

8. Pfleerger, S, "Software Engineering", Macmillan, 1987

ELECTIVE SUBJECT-2

ADVANCED COMPUTER NETWORKS (MCA 505(1))

Unit 1:

Introduction: Overview of computer network, seven-layer architecture, TCP/IP suite of protocol, etc. Mac protocols for high-speed LANS, MANs & WIRELESS LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet etc.) Fast access technologies. (For example, ADSL, Cable Modem, etc.)

Unit 2:

IPv6: why IPv6, basic protocol, extension & option, support for QoS, security, etc, neighbor discovery, auto-configuration, routing. Change to other protocols. Application programming interface for IPv6. 6bone.

Unit 3:

Mobility in network. Mobile. Security related issues. IP Multicasting. Multicasting routing protocols, address assignments, session discovery, etc.

Unit 4:

TCP extensions for high-speed networks, transaction-oriented application, other new option in TCP.

Unit 5:

Network security at various layers. Secure-HTTP, SSL, ESP, Authentication header, Key distribution protocols. Digital signatures, digital certificates.

References:

1. W. R. Stevens, "TCP/IP illustrated, Volume 1: The protocols", Addison Wesley 1994.

2. G. R. Wright. "TCP/IP illustrated, Volume 2: The implementation", Addison Wesley 1995

REAL TIME SYSTEM (MCA 505(2))

Unit-I

Introduction to Real Time Systems, Prioritites, Embedded Systems, Task, Classification & Requirements, Deadlines, Soft, Hard.

Unit-II

Firm Real Time Systems, Introduction to Real Time Operating Systems, Task Management, Inter Process Communication, Case Studies of Maruti II, HART OS, VRTX etc.

Unit-III

Characterizing Real Time Systems and Task, Task Assignment & Scheduling Theory, Fixed and Dynamic Priority Scheduling Uniprocessor (RM and EDF), Multiprocessor (Utilization Balancing, Next-fit for RM & Bin-Packing Assignment for EDF) Scheduling

Unit-IV

Programming Languages and Tools, Real Time Databases Real Time Communication, FDDI, Specification and Verification using Duration Calculus, Flow Control, Protocols for Real Time (VTCSMA, Window, IEEE 802.3, IEEE 802.4, IEEE 802.5, Stop and Go Protocol, Media Access Protocol),

Unit-V

Fault, Fault Classes, Fault Tolerant Real Time System, Clocks, Clock Synchronization, Issues in Real Time Software Design.

References

1. Krishna, C.M, "Real Time Systems", McGraw Hill

2. Jane W.S. Liu, "Real Time Systems", Pearson Education Asia

3. Levi and Agarwal, "Real Time Systems", McGraw Hill

4. Mathi & Joseph, "Real Time System: Specification, Validation & Analysis", PHI

MOBILE COMPUTING (MCA 505(3))

Unit I

Issues in Mobile Computing, Wireless Telephony, Digital Cellular Standards, Bluetooth Technology, Wireless Multiple Access Protocols, Channel Allocation in Cellular Systems.

Unit II

Data Management Issues: Mobility, Wireless Communication and Portability, Data Replication and Replication Schemes, Basic Concept of Multihopping, Adaptive Clustering for Mobile Network, Multicluster Architecture.

Unit III

Location Management, Location Based Services, Automatically Locating Mobile Uses, Locating and Organizing Services, Issues and Future Directions, Mobile IP, Comparison of TCP and Wireless.

Unit IV

Transaction Management, Data Dissemination, Cache Consistency, Mobile Transaction Processing, Mobile Database Research Directions, Security Fault Tolerance for Mobile N/W.

Unit V

What is Ad-hoc Network? , Problems with Message Routing in Wireless Ad-hoc Mobile Networks, Routing scheme based on signal strength, Dynamic State Routing (DSR), Route Maintenance and Routing error, Fisheye Routing (FSR), Ad-hoc on Demand Distance Vector (ADDV)

Text Books & References:

1. Shambhu Upadhyaya, Abhijeet Chaudhary, Kevin Kwiat, Mark Weises, "Mobile Computing", Kluwer Academic Publishers

2. UWE Hansmann, Lothar Merk, Martin-S-Nickious, Thomas Stohe, "Principles of Mobile Computing", Springer International Edition

NEURAL NETWORK (MCA- 505(4))

Unit – I

Introduction: Neural network, Human brain, biological and artificial Neurons, model of Neuron Knowledge representation, Artificial intelligence and Neural network, Network architecture, Basic Approach of the working of ANN – training, Learning and generalization.

Unit – II

Supervised learning: Single- layer networks, perception-linear separability, limitations of multi layer network architecture, back propagation algorithm (BPA) and other training algorithms, applications of adaptive multi-layer network architecture, recurrent network, feed-forword networks, radial- basis-function (RBF) networks.

Unit – III

Unsupervised learning: Winner-takes-all networks, Hamming networks, maxnet, simple competitive learning vector-quantization, counter-propagation network, adaptive resonance theory, Kohonen's self organizing maps, principal component analysis.

Unit – IV

Associated models: Hopfield networks, brain-in-a-box network, Boltzman machine.

Unit - V

Optimization methods: Hopfield networks for-TSP, solution of simultaneous linear equations, Iterated radiant descent, simulated annealing, fenetic algorithm.

Text Books:

1. Simon Haykin, "Neural Networks – A Comprehensive Foundation", Macmillan Publishing Co., New York, 1994.

2. K. Mahrotra, C.K. Mohan and Sanjay Ranka, "Elements of Artificial Neural Networks", MIT Press, 1997 – Indian Reprint Penram International Publishing (India), 1997

Reference Books:

1. A Cichocki and R. Unbehauen, "Neural Networks for optimization and Signal processing", John Wiley and Sons, 1993.

2. J.M. Zurada, "Introduction to Artificial Neural networks", (Indian edition) Jaico Publishers, Mumbai, 1997.

3. Limin Fu. "Neural Networks in Computer Intelligence", TMH.

ADVANCED OPERATING SYSTEM (MCA-506)

UNIT-1

Distributed Systems, Communication in distributed systems, processes and processors in distributed systems. Threads, systems Models, Process allocation, scheduling in distributed systems, fault tolerance, real-time distributed systems.

UNIT-2

Theoretical issues in distributed systems: Logical clock, mutual exclusion, deadlock detection, agreement protocols, resource security and protection, concurrency control.

UNIT-3

Distributed File System: Design and implementation, trends. Distributed shared Memory, consistency models, page-based distributed shared memory, shared variable distributed shared memory, object-based distributed shared memory.

UNIT-4

Multiprocessor OS, Database OS: General features and theoretical issues.

UNIT-5

Case Studies: Amoeba, Mach, chorus, DCE, etc. Multimedia Operating Systems: Process scheduling, File system, Caching, Disk scheduling for multimedia.

Suggested Books :

1. A.S. Tanenbaum, Distributed Operating System, Prentice-Hall, 1995.

2. A.S. Tanenbaum, Modern Operating Systems, Pearson Education Asia, 2001.

3. M. Singhal and N. G. Shivaratri, Advance Concepts in Operating Systems, McGraw-Hill, 1994.

4. J. W. S. Liu, Real-Time Systems, Pearson Education, 2000.

WEB TECHNOLOGY LAB (MCA - 507)

1. Design a HTML page to display your CV

2. Design a HTML form to reserve a railway ticket.

3. Write a Java Script program that finds the greatest common divisor of two numbers.

4. In the form mentioned in problem 2 to reserve a railway ticket add the following validations using java Script.

• From city and to city are two different cities.

• Age of passengers should not be greater than 150.

• Name of the passenger should be a string of a maximum length 20.

5. Write a program for illustrating client/server side scripting with help of ASP.

6. Write a piece of code in XML for creating DTD, which specifies set of rules.

7. Create style sheet in CSS/XSL and display the document in Internet Explorer.

8. **Mini Project** : Develop a web portal for your college.

.NET FRAMEWORK & C# LAB (MCA - 508)

Write programs in C# illustrating

1. The use of sequence, conditional and iteration construct.

2. Various operators like logical, arithmetical, relational, etc.

3. Overloading of various operators.

4. Use of Fried, Inline, and Static Member functions, default arguments.

5. Use of destructor and various types of constructor.

6. Various forms of Inheritance.

7. Use of virtual functions, virtual Base Class, delegates.

8. File operation.

9. Simple web application using ASP Net.

10. Use of Active X controls.

Note : Students are advised to develop a small project illustrating the handling of database & screens in order to fully understand the C#.

SOFTWARE ENGINEERING LAB (MCA - 509)

1. Program for Configuration Management.

2. Perform SA/SD for the following software.

• Hotel Automation System

• Book Shop Automation Software.

• Word processing Software.

• Software Component Cataloguing Software.

3. Design and development of test cases for testing.

4. Writing program in Java for Computing Cyclomatic complexity.

5. Development of Software tool for Halstead Analysis.

6. Perform Cost/Benefit analysis.

7. Illustration of various activities of Software development using MS Project 2000.

8. Lab exercise involving development of various practical applications using software like VJ++VB, SYBASE, JDK.

Students are to be given a major assignment to be completed using one or more of these tools. Student's exposure to any CASE tool is desirable.

9. Case studies : Payroll System, Banking System, Purchase Order System, Library Management System, Railway Reservation System, Bill Tracking System, College Admission System, Sales Management System.

4. Course Duration :

Minimum Duration: 3 Years   **Maximum Duration: 6 Years**

5. Faculty and support staff requirement : 02 full time Faculty of Professor/Assoc./Asst. Professor level

Procedure for admission, curriculum transaction and evaluation :

A. Admission Procedure:

1. **Procedure for Obtaining Admission Form and Prospectus**
   a. The prospectus containing Admission Form can be obtained in person from :
      The Directorate of Distance education, Swami Vivekanand Subharti University, Subhartipuram, NH-58, Delhi-Haridwar Bypass Road, Meerut or its city office located at Lokpriya Hospital Complex, Samrat Palace, Garh Road, Meerut on payment of Rs. 125/- in cash or by demand draft.

   b. The Prospectus can also be obtained by post by sending a demand draft of Rs. 175/- drawn in favour of "SVSU, Distance Education", payable at Meerut along with a filled requisite proforma (available at DDE website i.e. www.subhartidde.com) for "Obtaining the Prospectus and Admission Form" to the Directorate of Distance Education.

2. **Submission of Admission Form:**
   a. An applicant should submit the admission form duly filled with all enclosures completed, personally or by post, to the Directorate of Distance education, Swami Vivekanand Subharti University, Subhartipuram, NH-58, Delhi-Haridwar Bypass Road, Meerut-250005.
   b. The application for admission should be submitted along with the following :
      i. A demand draft for the course fee (as per fee structure table) drawn in favour of "SVSU, Distance Education" payable at Meerut.
      ii. Duly attested photocopy of Aadhar Card, statement of marks and other relevant documents/certificated pertaining to the qualifying examination, by a gazetted officer or Principal of the college from where these were obtained, should be submitted at the time of admission.
      iii. Self attestation of document/s is permissible, if the originals are produced before the Registrar of Swami Vivekanand Subharti University or Asst. Director/Deputy Director/Director of Directorate of Distance Education.
      iv. 4 recent passport size color photographs should be provided in which 2 photographs should be pasted on the admission form & Enrollment form accordingly and another two photographs should be attached/stapled with the form.
   c. The learners are advised to check up the eligibility criteria of a course they wish to apply for, from our website www.subhartidde.com or DDE Prospectus.

3. **Admission Procedure -**
   a. Applications can be sent to the Directorate of Distance Education directly or through its city office. The applicant's eligibility will be checked and accordingly he/she shall be granted admission and an acknowledgement of the receipt of the fee and the application form shall be issued.

b. An Identity Card, mentioning the enrollment number of the learner, shall be issued by University as soon as the admission is confirmed. Learners are advised to keep their Identity Card safely, as it will be required for attending counseling sessions/PCPs and also for the receipt of study material, mark sheets, Degree etc in person. In case of loss of Identity Card, a duplicate can be issued on receiving a written request along with a fee of Rs. 100/-. The Identity Card shall be valid for the entire duration of the Programme.

c. The University conduct entrance examination twice in a year for admission in MBA and MCA or any other programme, as may be decided by the University. Learners can obtain information relating to the entrance examination from the Directorate of Distance Education or its website www.subhartidde.com. The University may, as an alternative, consider granting admission on the basis of the score obtained by an applicant in any central or state level entrance examination for a similar course.

4. **Minimum Eligibility and Fee Structure –**
1. **Minimum Eligibility and Fee Structure for ODL –**

Sr. No.	Title of Programme	Course Duration			Annual Fees Per
		Eligibility	Minimum	Maximum *	Year (In Rs.)
1	Master of Computer Applications (MCA)	Graduation with Mathematics or eq. (The students who have not pursued Mathematics as a distinct subject, are required to pass the qualifying exam)	3 Years	6 Years	

2. **Minimum Minimum Eligibility and Fee Structure for OL –**

Sr. No.	Title of Programme	Course Duration			Annual Fees Per
		Eligibility	Minimum	Maximum *	Year (In Rs.)
1	Master of Computer Applications (MCA)	Graduation with Mathematics or eq. (The students who have not pursued Mathematics as a distinct subject, are required to pass the qualifying exam)	3 Years	6 Years	

B. Curriculum transaction and evaluation :

The University follows the following evaluation system:
   a. Continuous evaluation through personal contact programmes, assignment work, viva, group discussion and personality development programmes.
   b. Semester wise Examination
   c. Evaluation of practicals, wherever prescribed
   d. Evaluation of professional project report, wherever prescribed
   e. A learner shall be declared 'pass' at the end of the academic/calendar year, if he/she secures minimum 40% marks in each subject (including project report, internship, industry integrated learning and practicals, wherever prescribed) separately in the Semester wise Examination and the internal assessment. If a learner fails to secure 40% marks in any subject or in internal assessment, he/she will still be promoted to the next academic/calendar year, but he/she will have to appear in back paper for the subject in which he/she has not been able to obtain the requisite passing marks. The examination for learners giving back paper in any subject shall be held along with the subsequent examination for the relevant subject. In case, the learner fails to secure minimum 40% marks in internal assessment, he/she will have to resubmit the assignments for evaluation.

Requirement of the laboratory support and Library Resources :

Resources are available of Library for the learners during PCPs. The University has a rich Central Library with more than 3.80 lac books, 181 journals (Foreign & Indian), Internet Section of 200 nodes, Computer Centres, Museum, Instrumentation (USIC) workshop, Student's Guest House, etc.

The resources for laboratory also available as per the need of the programme.

Cost estimate of the programme and the provisions :

a. Cost estimate: Approx. Rs.   2,080,994.00/-

                        (The cost estimate may vary depending upon the no. of students enrolled)

b. Provisions: Swami Vivekanand Subharti University

Quality assurance mechanism and expected programme outcomes :

In accordance to the UGC Guidelines, the University has established an Internal Quality Assurance Cell, as per ordinance no. VI (1), dated 11.02.2009, to instill a momentum of quality consciousness amongst its all Institutions including Directorate of Distance Education, aiming for continuous improvement.

1. The cell holds various events regularly and maintain the documentation of the various programmes/activities leading to quality improvement.
2. The cell is responsible for incorporating various new changes/developments regarding up-gradation of learning material and spreading awareness of Quality Culture in the various institutions of the University.
3. The cell also prepares 'Annual Quality Assurance Report (AQAR)' as per the laid guidelines and parameters.