

Narula Institute of Technology
Department of Computer Applications

9. **Process Management:** Categories of process, Parent & Child process, Zombie and Orphan process, mechanism of *init()*, termination of a process, process control mechanism [4P]
10. **Perl:** Scripting, Difference of Programming Language and Scripting Language, Basic scripting using PERL [4P]

Paper Name: Database Management System Lab

Paper Code: MCA 392

Contact Hour: 4P

Credit: 3

Total: 40P

COURSE OBJECTIVES

To educate students with

1. Practical Fundamental Concepts Of Database Management Systems
2. Implementing Data Models
3. Working with PL/SQL Database Languages.

COURSE OUTCOME

Upon successful completion of this course, students will be able to

1. To understand Database design methodology.
2. Acquire knowledge in fundamentals of Database Management System.
3. Be able to realise the difference between traditional file systems and DBMS.
4. Work with popular Database languages.
5. Realise various data models for Database and Write queries in SQL.

Syllabus:

1. **SQL:** SQL constructs, DDL, DML, DQL, Views and Different Data Constraints. [8P]
2. **Built-in functions:** Group Functions, Scalar Functions, Aggregate functions, Numeric functions, Date functions, Conversion functions. [8P]
3. **Join:** Joining multiple tables, Inner Join, outer Join, Cross Join, Self Join. [4P]
4. **Sub-Queries:** Parallel Sub-Query, Nested Sub-Query, Correlated Sub-Query. [8P]
5. **Introduction to PL/SQL:** Control structure, Construct PL/SQL block, Processing. [4P]
6. **PL/SQL Database Objects:** Creation and execution of Functions/Procedures/Packages, Database Trigger constructs. [8P]

Paper Name: Object Oriented Programming using C++ Lab

Paper Code: MCA 393

Contact Hour: 4P

Credit: 3

Total: 40P

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COURSE OBJECTIVES

1. To get a clear understanding of object-oriented programming concepts.
2. To learn problem solving using C++ programming language.

COURSE OUTCOME

Upon successful completion of this course, Student will be able to

1. Develop program using Object Oriented programming concepts.
2. To implement the concepts of Class, Object, Constructor, Destructor, Abstraction, Inheritance and Polymorphism.
3. Gain knowledge of Files, Streams, Templates and exception handling.

Syllabus:

1. Creating class and object
2. Constructor and destructor – create, use different types of constructor
3. Function overloading, inline function, default arguments
4. Implementation of Multiple Inheritance
5. Implementation of Multilevel Inheritance
6. Using static function and static member variable
7. Implementation of aggregation
8. Constructor in aggregation
9. Concept of Friend function and Friend Class
10. Operator overloading - concept and implementation
11. Implementation of virtual function
12. Design of abstract class and pure virtual function
13. File handling programs

SESSIONAL

Paper Name: Technical Seminar

Paper Code: MCA 380*

Contact Hour: 3L

Credit: 0

COURSE OBJECTIVE: The Aim of this Course is to develop different types of skills leading to the achievement of the following competency:

1. Acquire different learning abilities in cognitive, psychomotor and affective domains.
2. Gain knowledge of fast and rapid changing Information technology by self learning.
3. Prepare models/charts/reports based on collected information.
4. Prepare presentation in proper format.
5. Develop communication, interpersonal and presenting skills.
6. Handle questions after the presentation with confidence.

COURSE OUTCOMES :

After this course the students will be able to


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MCA 4th Semester

THEORY

Paper Name: Formal Languages and Automata Theory

Paper Code: MCA 401

Contact Hour: 3L + 1T

Credit: 4

Total: 40L

COURSE OBJECTIVES

1. The goal of this course is to teach you to formulate, analyze, and solve mathematical models that represent real-world problems.
2. To learn linear programming, network flow problems, integer programs, nonlinear programs, dynamic programming and queueing models.

COURSE OUTCOMES

Upon completion of this course, Students will be able to:

1. Understand basics of Languages, Grammars and Finite Automata.
2. Learn Regular Expression, Regular Grammar, Context Free Languages, Pushdown Automata and Turing Recognizable Languages.
3. Be exposed to a broad overview of the theoretical foundation of computer science with analytical thinking for problem-solving in related areas.

Syllabus:

Module 1: Introduction: Alphabets, strings, and languages. [4L]

Module 2: Finite Automata and Regular Languages: Deterministic and non-deterministic finite automata, regular expressions, regular languages and their relationship with finite automata, pumping lemma and closure properties of regular languages. [10L]

Module 3: Context Free Grammars and Pushdown Automata: Classification of grammars, Chomsky hierarchy, Context free grammars (CFG), parse trees, ambiguities in grammars and languages, pushdown automaton (PDA) and the language accepted by PDA, deterministic PDA, Non- deterministic PDA, properties of context free languages; normal forms. [12L]

Module 4: Turing Machines: Turing machine as a model of computation, programming with a Turing Machine, variants of Turing machine and their equivalence, universal Turing machine [6L]

Module 5: Undecidability: Recursively enumerable and recursive languages, undecidable problems about Turing machines: halting problem, Post Correspondence Problem, and undecidability problems about CFGs. [8L]

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Text Books:

1. J. E. Hopcroft, R. Motwani, and J. D. Ullman, Introduction to Automata Theory, Languages and Computation , 2nd Ed, Addison-Wesley, 2001
2. K.L.P Mishra & Chandrasekharan, Theory of Computer Science: Automata, Languages And Computation, PHI.

Reference Books:

1. H.R. Lewis, C.H. Papadimitriou, C. Papadimitriou, Elements of the Theory of Computation (2nd Ed.), Prentice-Hall, NJ, 1997
2. J.A. Anderson, Automata Theory with Modern Applications, Cambridge University Press, 2006.

Paper Name: Computer Graphics & Multimedia

Paper Code: MCA 402

Contact Hour: 3L + 1T

Credits: 4

Total: 40L

COURSE OBJECTIVES

This course is designed to provide

1. a comprehensive introduction to computer graphics
2. the ability to understand
 - a. contemporary terminology
 - b. progress
 - c. issues
 - d. trends.

COURSE OUTCOMES

Upon successful completion of this course, students will be able to -

1. Understand contemporary graphics hardware. Display mechanism, Input output mechanism.
2. Able to do scan-conversion and display objects on screen, fill regions, draw curves.
3. Able to transform objects in 2D and 3D, Clip object in 2D using different mechanisms.
4. Detect visible surfaces using algorithms, get working knowledge of multimedia.

Syllabus:

Module 1: Introduction: Application of Computer Graphics, interactive input/output devices, display, colour display techniques, LCD & LED display, Raster Scanning, Raster Refresh [4L]

Module 2: Points, lines and curves: DDA & Bresenham Line drawing algorithms, circle and ellipse drawing, polygon filling anti aliasing, Scan conversion, [5L]

Module 3: Two-dimensional viewing & Clipping: Coordinate systems, line and polygon clipping Algorithms: Cohen- Sutherland Algorithm, Midpoint subdivision algorithm, Sutherland-Hodgman Polygon Clipping. Weiler-Atherton Algorithm [6L]

Module 4: 2-D Transformations: Scaling, Rotation, Translation, Reflection, Shear, Homogeneous

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coordinate system, Rotation about an arbitrary point, reflection in an arbitrary straight line	[5L]
Module 5: Curves and Surfaces: Bezier curves and surfaces, B-Spline curves and surfaces.	[4L]
Module 6: 3-D Transformations: Scaling, Rotation, Translation, Reflection, Rotation about an arbitrary straight line, reflection in an arbitrary plane, Parallel projections, Perspective projections	[5L]
Module 7: Hidden Surface Removal: Z-Buffer Algorithm, Scan line Z Buffer Algorithm, Painter's Algorithm, Shading models and colour models.	[3L]
Module 8: Multimedia: Evolution of Multimedia, Structure and Components of Multimedia. Multimedia platforms, Application domains, Multimedia & interactivity	[3L]
Module 9: Audio Compression Techniques: Need for compression, DPCM, ADPCM, SBC, MPEG	[2L]
Module 10: Video Technology: Analog Video and its Principles, Digital Video and its Principles.	[2L]
Module 11: Video Compression: MPEG	[1L]

Text Books:

1. Computer Graphics, 2nd Ed., Hearn & Baker, PHI
2. Procedural & Mathematical Elements in Computer Graphics, Rogers, TMH

Reference Books:

1. Fundamentals of Computer Graphics & Multimedia, Mukherjee, PHI
2. Computer Graphics, Plastock, Schaum's Outline Series, TMH
3. Computer Graphics, a programming approach, by S. Harrington, TMH publication.
4. Computer Graphics, Multimedia Animation, Malay Pakhira, 2nd Ed, PHI

Paper Name: Programming with Java

Paper Code: MCA 403

Contact Hour: 3L + 1T

Credit: 4

Total: 40L

COURSE OBJECTIVE

1. To introduce students to the Java programming language.
2. To create Java programs that leverage the object-oriented features of the Java language, such as
 - a. encapsulation
 - b. inheritance
 - c. polymorphism;
 - d. use of data types, arrays and other data collections
3. To implement I/O functionality to read from and write to text files.

COURSE OUTCOMES

Upon successful completion of this course, student will be able to

1. Understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements;

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11. File handling programs [4P]

Paper Name: Visual Basic Lab

Paper Code: MCA 495

Contact Hour: 8P

Credit: 4

Total: 40P

Module 1: Computer Programming with Visual Basic: Presents Interface Features, Menus, Tools, Different Controls [8P]

Module 2: Different Constructs and Applications: Decision Structures (ifs and Select Case), Loops (While, for, etc.), Loop Applications, Creation of Array in Visual Basic [8P]

Module 3: VB Functions and Procedures: Creation and Execution of Sub Procedures (Val and Ref Parameters), Procedures and Functions and employment of them in different Applications [8P]

Module 4: Connecting with SQL and Oracle Database using Data Controls: Accessing Databases using the various Data Access Objects and Remote Data Objects, Accessing Databases in SQL Server using the various Data Access Objects and Remote Data Objects [8P]

Module 5: Objects and Classes: Implementation of Visual Basic in Object Oriented Paradigm, Building own Objects, Classes and Class Modules [8P]

Sample Programs:

- | | |
|---------------------------------|-----------------------|
| 1. Comparison of two Numbers | 8. Factorial |
| 2. Even or Odd Number | 9. Fibonacci Series |
| 3. Prime or Non Prime Number | 10. Bubble Sort |
| 4. Simple and Compound Interest | 11. Selection Sort |
| 5. Armstrong Number | 12. Insertion Sort |
| 6. Palindrome | 13. Binary Search |
| 7. Leap Year | 14. Linear Search |
| | 15. Simple Calculator |


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COURSE STRUCTURE FOR MCA

FIRST SEMESTER

A. THEORY							
SL. NO.	CODE	THEORY	CONTACTS (PERIODS/WEEK)				CREDITS
			L	T	P	TOTAL	
1	MCA101	Computer Organisation & Architecture	3	1	-	4	4
2	MCA102	Business Systems and Applications	3	1	-	4	4
3	MCA103	Computer Programming with C	3	1	-	4	4
4	MM101	Discrete Mathematical Structure	3	1	-	4	4
5	HU101	Business English and Communication	3	1	-	4	4
Total of Theory						20	20
B. PRACTICAL							
6	MCA191	Micro Programming & Architecture Lab	-	-	4	4	3
7	MCA193	Programming lab (C)	-	-	4	4	3
8	HU191	Business presentation and language lab	-	-	4	4	3
Total of Practical						12	9
Total of Semester						32	29


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COURSE STRUCTURE FOR MCA

SECOND SEMESTER

A. THEORY							
SL. NO.	CODE	THEORY	CONTACTS (PERIODS/WEEK)				CREDITS
			L	T	P	TOTAL	
1	MCA201	Data Communication & Computer Networks	3	1	-	4	4
2	MCA202	Information Systems Analysis & Design	3	1	-	4	4
3	MCA203	Data Structures with C	3	1	-	4	4
4	MCA204	Data Base Management System I	3	1	-	4	4
5	MCA205	Object-Oriented Programming With C++	3	1	-	4	4
Total of Theory						20	20
B. PRACTICAL							
6	MCA293	Data structure lab	-	-	4	4	3
7	MCA294	Database lab	-	-	4	4	3
8	MCA295	Object-Oriented Programming lab (C++)	-	-	4	4	3
Total of Practical						12	9
Total of Semester					32	29	



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COURSE STRUCTURE FOR MCA

Third Semester

A. THEORY							
SL. NO.	CODE	THEORY	CONTACTS (PERIODS/WEEK)				CREDITS
			L	T	P	TOTAL	
1	MCA301	Operating Systems and Systems Software	3	1	-	4	4
2	MCA302	Unix and Shell Programming	3	1	-	4	4
3	MCA303	Intelligent Systems	3	1	-	4	4
4	MM301	Statistics and Numerical Techniques	3	1	-	4	4
5	MBA301	Business Management	2	-	-	2	2
6	MBA302	Management Accounting	2	-	-	2	2
Total of Theory						20	20
B. PRACTICAL							
7	MCA392	Unix lab	-	-	4	4	3
8	MM 391	Statistics and Numerical Analysis lab	-	-	4	4	3
9	MBA392	Accounting Systems lab	-	-	4	4	3
Total of Practical						12	9
Total of Semester					32	29	


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COURSE STRUCTURE FOR MCA

Fourth Semester

A. THEORY							
SL. NO.	CODE	THEORY	CONTACTS (PERIODS/WEEK)				CREDITS
			L	T	P	TOTAL	
1	MCA401	Software Engineering & TQM	3	1	-	4	4
2	MCA402	Graphics & Multimedia	3	1	-	4	4
3	MCA403	Data Base Management System II	3	1	-	4	4
4	MM401	Operation Research & Optimisation Techniques	3	1	-	4	4
5	HU401	Environment and Ecology	3	-	-	3	3
Total of Theory						19	19
B. PRACTICAL							
6	MCA491	Software Project Management lab	-	-	4	4	3
7	MCA492	Graphics & Multimedia Lab	-	-	4	4	3
8	MCA493	Advanced Database lab	-	-	4	4	3
Total of Practical						12	9
Total of Semester						31	28


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COURSE STRUCTURE FOR MCA

Fifth Semester

A. THEORY							
SL. NO.	CODE	THEORY	CONTACTS (PERIODS/WEEK)				CREDITS
			L	T	P	TOTAL	
1	MCA E501/A/B/C	Elective 1	3	1	-	4	4
2	MCA E502/A/B	Elective 2	3	1	-	4	4
3	MCA E503/A/B	Elective 3	3	1	-	4	4
4	MCA E504/A/B	Elective 4	3	1	-	4	4
5	HU501	Values and Ethics of Profession	3	-	-	3	3
Total of Theory						19	19
B. PRACTICAL							
6	MCA E592/A/B	Elective 2 Lab	-	-	4	4	3
7	MCA591	Minor project and seminar	-	-	12	12	9
Total of Practical						16	12
Total of Semester					35	31	


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COURSE STRUCTURE FOR MCA

Sixth Semester

A. THEORY							
SL. NO.	CODE	THEORY	CONTACTS (PERIODS/WEEK)				CREDITS
			L	T	P	TOTAL	
			0	0	-	0	0
Total of Theory						0	0
B. PRACTICAL							
1	MCA691	Major project and seminar	-	-	36	36	29
Total of Practical						36	29
Total of Semester					36		29

Electives for Semesters 5

Elective No	Course Code	Topic
2	MCA E502A	System Administration and Linux
	MCA E502B	Windows Programming With VB
3	MCA E503A	Advanced Unix programming
	MCA E503B	Object Oriented Programming With Java
4	MCA E504A	Compiler Design
	MCA E504B	E-Commerce
1	MCA E501A	Distributed database management
	MCA E501B	Image Processing
	MCA E501C	Parallel Programming

Summary

Semester No	Contact hr/wk	Credit
1	32	29
2	32	29
3	32	29
4	31	28
5	35	31
6	36	29
Total		175

Semester duration: 15 weeks

COURSE STRUCTURE FOR MCA

Detailed MCA Syllabus

Computer Organisation & Architecture

Code: MCA101

CONTACTS: 3L + 1 T

CREDITS: 4

Data and number representation- binary-complement representation, BCD-ASCII, conversion of numbers from one Number system to the other, (r-1)'s & r's complement representation, binary arithmetic.

Structure of a digital machine (VON-Neumann architecture), Logic gates, basic logic operations, truth tables, Boolean expression, simplification.

Combination circuits, adders, multiplexer, Sequential circuits, Registers.

ROM, PROM, EPROM and dynamic RAM, Digital Components, bus structure- Address bus, Data bus & DMA controller.

Karnaugh Map, Coder, Decoder, Counter – Asynchronous & Synchronous.

Flip Flops – RS, JK, and D & T.

Basic Computer Organisation & Design, Micro-programmed Control.

Data representation, Register transfer & micro-operations, Central processing unit, Pipeline & vector processing, Computer arithmetic.

Input - output organisation, Memory organisation, Microprocessors (8085), Personal Computing.

CPU architecture, instruction format, addressing mode, stacks and handling of interrupts.

Assembly language – Elementary problems.

Books:

1. Computer System Architecture, Morris Mano, PHI
2. Computer Organization, Hamacher, MGH
3. Computer Architecture, Carter, Schaum Outline Series, TMH
4. System Architecture, Buad, VIKAS
5. The Fundamentals of Computer Organization, Raja Rao, Scitech
6. Computer Organization & Design, Pal Chowdhury, PHI

Business Systems and Applications

Code: MCA102

CONTACTS: 3L + 1 T

CREDITS: 4

Use of computers for managerial applications

Technology issues and data and information processing in organisations

Introduction to Information Systems, shift in Information system thinking, latest trends in Information Technology

Computer Based Information Systems- office automation systems, decision making and MIS, transaction processing systems, decision support system, Group Decision Support, Executive Information systems, DSS generator

Overview on: -

1) Artificial Intelligence based systems, end user computing, distributed data processing, Knowledge Management, Business system.

2) Deciding on IS architecture, IT leadership & IS strategic planning, IS strategy and effects of IT on competition

3) ERP, re-engineering work processes for IT applications, Business Process Redesign

COURSE STRUCTURE FOR MCA

Knowledge engineering and data warehouse.

Books:

1. Management Information System, O'Brien, TMH, 5th Ed.
2. Management Information System, Kelkar, PHI
3. Management Information System, Jawadekar, TMH
4. Business Information Systems, Munish Kumar, VIKAS
5. ERP: Concepts & Practice, Garg, 2nd Ed, PHI
6. Business Application in Computer, M.M.Oka, EPH
7. Management Information System, M.M.Oka, EPH

Computer Programming with C

Code: MCA103

CONTACTS: 3L + 1 T

CREDITS: 4

Overview of C

Constants, variables & data types

Operators and expressions

Managing input and output operators

Decision-making and branching/Looping.

Arrays, handling of character Strings.

User-defined functions

Structures and unions

Pointers, file management in C

Dynamic memory allocations in relation to array (Use malloc(), calloc(), realloc(), free())

Overview of Pre-processor statements.

Program through Command Line Arguments

1. Programming with C, Gottfried, TMH
2. C The Complete Reference, Schildt, TMH
3. Practical C Programming, 3rd Ed, Oqualline, SPD/O'REILLY
4. A First Course in programming with C, Jeyapooan, VIKAS
5. The C answer Book, Tondo, 2nd Ed, PHI
6. C Programming Made Easy, Raja Ram, SCITECH
7. Projects Using C, Varalaxmi, SCITECH
8. Mastering Algorithms With C, Loudan, SPD/O'REILLY

Discrete Mathematical Structure

Code: MM101

CONTACTS: 3L + 1 T

CREDITS: 4

Set Theory foundation mapping (bijective, surjective, injective), Relations-equivalence, Poset, Lattice

Mathematical induction, Propositional logic, Logical equivalence.

Permutation and combinations.

Generating functions, Recurrence relations.

Concepts of Graph Theory, sub-graphs, cyclic graphs.

Trees, spanning trees, binary trees.

Algorithms- Kruskal's , Prim's , Dijkstra's , Flyod's , Warshall's, DFS, BFS.

Isomorphism, Homomorphism of Graphs.

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Finite automata – Construction & Conversion of NFA, DFA, State minimization, Mealy M/C, Moore M/C.

Definition Of Grammars – Type 0,1,2,3.

Fuzzy sets – basic properties

Books:

- 1.Theory of Computer Science, Mishra & Chandrasekharan, PHI
- 2.Discrete Mathematics for Comp. Scientists & Mathematicians, Mott, Kandel & Baker, PHI
- 3.Discrete Mathematical Structure, C.L.Liu, TMH
- 4.Discrete Mathematical Structure, G.S.RAO, New Age International
- 5.Discrete Mathematics With Applications, Rosen, TMH, 5th Ed
6. Discrete Mathematics, Ash & Ash, MH.
7. Discrete Mathematical Structure, Somasundaram, PHI
8. Discrete Mathematical Structure, Dubey, EXCEL BOOKS
9. Discrete Mathematics, Iyenger, VIKAS
- 10.Discrete Structure and Graph Theory, Bhisma Rao, Scitech
- 11.Invitation to Graph Theory, Arumugam, Scitech
12. Discrete Structure and Graph Theory, S.K.S Rathore, EPH

Business English and Communication

Code: HU101

CONTACTS: 3L + 1 T

CREDITS: 4

This should cover general and technical writing, oral communications and listening skills: letter writing, technical report writing, and business communication.

Expression: Practical communication skill development, business presentation with multimedia, speaking skill, prepared speech, extempore speech

Reading skill: comprehension test

Writing: precise, technical/business letter, organisation of writing material, poster presentation, writing technical document, preparing software user manual, preparing project documentation.

Books:

- 1.Business Correspondence & Report Writing, Sharma, TMH
- 2.Business Communication Strategies, Monipally, TMH
- 3.English for Technical communication, Laxminarayanan, Scitech
4. Business Communication, Kaul, PHI
- 5.Communication Skill for Effective Mgmt., Ghanekar, EPH

Data Communication & Computer Networks

Code: MCA201

CONTACTS: 3L + 1 T

CREDITS: 4

Introduction to computer network- Topology; Base Band & Broad Band Topology; Guided & Unguided Media.

Overview of Data & Signal Bits. Baud & Bit Rate. Modulation (AM, PM, FM);

Multiplexing (TDM, FDM, STDM).

Encoding (RZ, NRZ, BIPOAR, MANCHESTER, DIFF. MANCHESTER).

Digital To Analog – ASK, PSK, FSK, QPSK.



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Transmission methods – Synchronous & Asynchronous, Flow Control, Error Control, Error Detection methods.
Goals of Layered protocols- Introduction to OSI, TCP/IP, IBM, SNA, ATM.
Bit oriented (BSC) & Character oriented Protocol (SDLC, LAPB, LAPD, LLC)
HDLC- frame format, station, states, configuration, access control.
LAN Topology – Ethernet (IEEE 802.3), Token Bus (IEEE 802.4), Token Ring (IEEE 802.5)
Introduction to WAN – DQDB (IEEE 802.6) & FDDI.
Switching Technologies – Circuit, Message, and Packet.
X.25, X.21, RS-232 C – frame format, channel, packet frames, facilities (In brief Only).
ISDN- D channel, B-Channel, International Standards, NT1, NT2, TA, TE Devices.
Introduction to leased lines, DSL, Digital Carriers.
Bridging & Routing – Static & Dynamic (In Brief).
IP, IP addressing, ICMP, ARP.RARP.
Congestion Control, TCP, UDP.
HTTP,FTP,Telnet,SMTP.
Introduction to data security (private key, public key, ISO standards).
Introduction to Mobile technology (Topology, FDM, TDM, CDMA), Satellite Communication (LEO, GEO, TDM).

Books:

- 1.Data Communication & Networking, Forouzan, TMH
- 2.Computer Networks, Tannenbaum, PHI
- 3.Data & Computer Communications, Stallings, PHI
- 4.Communication Networks, Walrand, TMH
- 5.Computer Communication Networks, Shanmugam & Rajeev, ISTE/EXCEL
- 6.Data Communications, Prakash C. Gupta, PHI
- 7.Computer Networking, Tittel, Schaum Outline Series, TMH
- 8.Data & Network Communications, Miller, VIKAS
- 9.Data Communication & Network, Dr. Prasad, Wiley Dreamtech
- 10.Computer network Theory, Prasad, Scitech
- 11.TCP/IP Network Administration, Hunt, SPD/O'REILLY

Information Systems Analysis & Design

Code: MCA202

CONTACTS: 3L + 1 T

CREDITS: 4

Overview of System analysis and design: Development life cycle, Requirements determination, Logical design, Physical design, Program design, Risk and feasibility analysis, SRS, prototyping

Information requirement analysis: Process modelling with physical and logical data flow diagrams, Data modelling with entity relationship diagrams, Addition modelling method, Developing proposal: feasibility studies, cost benefit analysis.

System design: Process descriptions, Input/output controls, object modelling, Database design, and User Interface design, Documentation

Introduction to - Project management, scheduling, measurement of quality and productivity, ISO and capability maturity models, Strategic planning, system audit.

Quality assurance: reviews, walkthroughs, and inspection.

Books:

- 1.Analysis & Design of Information Systems, Senn, MH.

COURSE STRUCTURE FOR MCA

- 2.Information Systems:Analysis & Design, Ram Bansal 'Vigyacharya',New Age International
- 3.Analysis, Design of Information System,Rajaraman, PHI
4. System Analysis & Design,Parthasarathi,EPH
- 5.System Analysis, Design & MIS, EXCEL BOOKS
- 6.Analysis, Design & implementation of Information Systems, Sharma, VIKAS
- 7.System Analysis & Design Hand Book, V.K. Jain, Wiley Dreamtech

Data Structures with C

Code: MCA203

CONTACTS: 3L + 1 T

CREDITS: 4

Algorithm concept, Complexity – Big O- Notation, time space trade-off.

Array- Row/Column major representation, sparse matrix, shifting.

Linked List- Singly, circular, doubly, doubly & circular

Stack- Push, Pop, Conversion from infix – to postfix, evaluation of postfix expression.

Stack representation using array & linked list.

Queue – insert, delete, representation using array & linked list, circular queue (operations),deque(operations),priority queue(operations)-Both iterative & recursive implementation.

Garbage collection-different techniques.

Tree- definition – traversal algorithms (pre, post, in).

Threaded tree (One Way & Two Way), heap tree, Avl tree-balancing , B-tree, Trie

Binary search tree, Huffman algorithm, Creation of Heap.

Sorting with complexity analysis – bubble, merge, quick, selection, insertion, shell, tournament, radix, heap .

Search- Linear & Binary (Complexity Analysis).

Recursion Technique- overview including tail recursion.

Hashing- definition. Functions- Midsquare, Folding, remainder, Collision resolution & linear probing.

Overview On – Sequential file, random access file, indexed sequential, hash file.

Pattern matching algorithms- Brute force, Knuth-Morris-Pratt.

Books:

1. Data Structure Using C, Ajay Agarwal, Cyber Tech
- 2.Data Structure Using C, Radhakrishnan & Shrinivasan, ISTE/EXCEL
- 3.C and Data Structures,Radhaganesan,Scitech
- 4.Data Structure Using C & C++, Tannenbaum, PHI
- 5.Data Structures & Program Design in C,2nd Ed, Kruse, Tondo & Leung, PHI
6. Mastering Algorithms With C,Loudan, SPD/O'REILLY

Data Base Management System I

Code: MCA204

CONTACTS: 3L + 1 T

CREDITS: 4

Introduction to DBMS, architecture, administration roles, data dictionary, Traditional models, three-level architecture, hierarchical model, network model and relational model



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COURSE STRUCTURE FOR MCA

Relational model – definitions and properties, keys integrity rules, relational algebra, joins, set operations, Tuple relational calculus and Domain relational calculus.

SQL constructs, PL/SQL, Query & its optimisation techniques

Singled valued functional dependencies.

Database design, conceptual, logical and physical models, ER diagram and model, normal forms (1,2,3,BCNF).

Storage structure- Sequential, Indexed Sequential.

B+ tree – creation, insertion & deletion.

Indexing- Primary, Secondary, Multi Level.

Books:

- 1.Data Base System Concepts, Silverchatz, Korth & Sudarshan, MH.
- 2.Data Base Management Systems, Majumder & Bhattacharyya, TMH
- 3.Oracle PL/SQL Programming,Feuerstein, SPD/O'REILLY
- 4.Data Base Management System, A.K. Pujari, ISTE/EXCEL
- 5.Fundamentals of Data Base Mgmt. System , Vig & Walia, ISTE/EXCEL
6. Data Base Management Systems,Leon, VIKAS
- 7.Data Base Processing:Fundamentals, Design & Implementation, Kroenke,PHI
- 8.SQL PL/SQL for Oracle 8 & 8i, P.S Deshpande, Wiley Dreamtech
- 9.Data Base Management Systems, V.K Jain, Wiley Dreamtech
- 10.Beginning SQL Programming,Kauffman, SPD/WROX

Object-Oriented Programming With C++

Code: MCA205

CONTACTS: 3L + 1 T

CREDITS: 4

Basics of Object Oriented programming and software design

C++ object-oriented programming, C++ & ANSI standard C, Predefined classes in C++

Building objects with classes, Defining operations on objects, Using Inheritance in C++,

Virtual functions and Polymorphism

Function overloading, Operator Overloading

Constructor, Constructor overloading, Destructor, Friend Function.

Overview of File Handling,streams

Advanced Topics in C++ - Overview of Template (Class & Functions).

Exception Handling.

Books:

1. Object-Oriented Programming With C++, Balagurusamy, TMH
- 2.Object Oriented Programming & C++,R.Rajaram,New Age International
- 3.C++ The Complete Reference, Schildt, 4th Ed, TMH
- 4.Programming in C++, Shah & Thaker, ISTE/EXCEL
- 5.Beginning C++, The Complete Language, Horton,SPD/WROX
6. Object-Oriented Programming With C++, Suburaj, VIKAS
7. Object-Oriented Programming With C++ & JAVA, Samanta, PHI
- 8.Object-Oriented Programming With C++, N.R Parsa, Wiley Dreamtech
- 9.Programming with C++, Radhaganesan, Scitech
- 10.Projects using C++, Varalaxmi, Scitech
- 11.Object Oriented modelling & Design, RumBaugh, PHI
- 12.Revolutionary Guide to Object Oriented Programming Using C++, Olshevsky, SPD/WROX

COURSE STRUCTURE FOR MCA

Operating Systems and Systems Software

Code: MCA301

CONTACTS: 3L + 1 T

CREDITS: 4

Importance of OS, Basic concepts and terminology, types of OS, different views, journey of a command execution, design and implementation of OS

Process: Concept and views, OS view of processes, OS services for process management, scheduling algorithms, performance evaluation; Interprocess communication and synchronisation, mutual exclusion, semaphores, hardware support for mutual exclusion, queuing implementation of semaphores, classical problem of concurrent programming, critical region and conditional critical region, monitors, messages, deadlocks.

Resource manager, file management, processor management, device management, Memory management – paging, swapping, page replacement algorithm, design issues for paging system, segmentation, Scheduling algorithm and performance evaluation

Security and protection, policies and mechanism, authentication, protection and access control, formal models of protection, cryptography, worms and viruses.

In-process communication & synchronisation, File systems, security and protection mechanism, Input/output systems, processes and processors in distributed system

Performance measurement, monitoring and evaluation

Multiprocessor system, classification and types, OS functions and requirements, introduction to parallel computing, multiprocessor interconnection synchronisation.

Distributes OS - rationales, algorithms for distributed processing.

Introduction to compilers, Assemblers, loaders & linkers, Introduction to OS, OS services and kernel, Multiprogramming and time sharing, Processor scheduling

Performance measurement and monitoring – measures, evaluation techniques, bottlenecks and saturation, feedback loops.

Introduction to Unix OS

Books:

1. Operating Systems, Galvin & Silverschatz, John Wiley
1. Operating Systems, Milenkovic, TMH
2. Modern Operating System, 2nd Ed, Tannenbaum, PHI
3. Systems Programming & Operating Systems, Dhamdhare, TMH
4. Systems Programming, Donovan, TMH
5. Guide to Operating Systems, Palmer, VIKAS
6. Operating Systems, Prasad, Scitech
7. Operating System, P. Bhatt, PHI

COURSE STRUCTURE FOR MCA

Unix and Shell Programming

Code: MCA302

CONTACTS: 3L + 1 T

CREDITS: 4

Overview of The UNIX Operating System

General Purpose Utilities.

File system & Handling ordinary Files.

Shell commands & simple programming. (Bourne Shell)

Vi editor advanced Vi Editor.

Basic & More File attributes

Concept of I-Node.

Simple filters. grep command.

Overview of process.

Overview of sed & awk.

Overview of TCP/IP networking- basic concept of 4 layers, network class, basic concepts of the applications, subnet.

Books:

1.UNIX: Concepts & Applications, Sumitava Das, TMH

2.Your UNIX –The Ultimate Guide, Sumitava Das, TMH

3.Design of UNIX Operating System,Maurice Bach, PHI

4.Learning the UNIX operating Systems,Peek,SPD/O'REILLY

5.Mastering UNIX/LINUX/Solaris Shell Scripting, Randal k. Michael, Wiley Dreamtech

6.Unix,Xavier,Scitech

7.Learning the Vi Editor,Lamb, SPD/O'REILLY

Intelligent Systems

Code: MCA303

CONTACTS: 3L + 1 T

CREDITS: 4

Overview of Artificial intelligence- Problems of AI, AI technique, Tic – Tac – Toe problem.

Problems, Problem Space & search.

Heuristic Search Techniques,

Knowledge representation issues.

Representing knowledge using rules.

Symbolic reasoning under uncertainty.

Statistical reasoning.

Weak slot & filler structures.

Strong slot & filler structures.

COURSE STRUCTURE FOR MCA

Game planning –Minimax search procedure, adding alpha beta cut-off's, iterative deepening,

Planning.

Natural language processing, Understanding.

Learning – induction & explanation based learning.

Expert systems- expert system shells, knowledge acquisition.

Basic knowledge of programming language like Prolog & Lisp.

Books:

- 1.Artificial Intelligence, Ritch & Knight, TMH
- 2.Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
- 3.Logic & Prolog Programming, Saroj Kaushik, New Age International
- 4.Expert Systems, Giarranto, VIKAS

Statistics and Numerical Techniques

Code: MM 301

CONTACTS: 3L + 1 T

CREDITS: 4

Basic Statistics-measure of central tendency, dispersion, Probability, distribution-introduction to mass function, density function, distribution function (Binomial, Poisson, Normal), estimation of parameters (unbiasedness-concept of noise/error, consistency)

Interpolation-Newtons Forward, Backward, Sterling & Bessel's Interpolation formula, Lagrange's Interpolation

Integration- Trapezoidal, Simpson's 1/3 rd, Weddel's Rule, Romberg Integration, Gauss-Legendre two & three point formula, Newton Cotes Formula.

Gram-Schmidt orthogonalisation, Tchebycheff polynomial

Solution of transcendental equations- Method of Iteration, Method of Bisection, Newton - Raphson Method, Regula-Falsi method, Secant Method.

Solution of system of linear equations- Gauss Elimination Method, Gauss-Jacobi, Gauss-Seidel, LU factorisation, Tri-diagonalisation.

Inverse Interpolation.

Least Square Curve fitting- linear & non-linear

Solution of Differential Equations- Picard's method, Euler-modified method, Taylor's Series method, Runge-Kutta method, Milne's Predictor-Corrector method.

Books:

- 1.Numerical Analysis, Shastri, PHI
- 2.Numerical Analysis, S. Ali Mollah
- 3.Numerical Analysis, James B. Scarbarough
4. Numerical Methods for Mathematics, Science & Engg., Mathews, PHI
- 5.Numerical Analysis, G.S.Rao, New Age International
- 6.Programmed Statistics (Questions – Answers), G.S.Rao, New Age International
- 7.Numerical Analysis & Algorithms, Pradeep Niyogi, TMH
- 8.Computer Oriented Numerical Mathematics, N. Dutta, VIKAS
- 9.Numerical Methods, Arumugam, Scitech
- 10.Probability and Statistics for Engineers, Rao, Scitech
- 11.Numerical Methods in Computer Application, Wayse, EPH

COURSE STRUCTURE FOR MCA

Business Management

Code: MBA301

CONTACTS: 2

CREDITS: 2

Basics of management; Planning, scheduling, organising, staffing, directing, controlling
Managerial economics and financial management, productivity management

Human resource development and management, selection, training and role of IT

Introduction to management control systems: goals, strategies; Performance measures

Strategy: firm and its environment, strategies and resources, industry structure and analysis, corporate strategies and its evaluation, strategies for growth and diversification, strategic planning

Books:

1. Essentials of Management, Koontz, TMH
2. Management: Text & Cases, Satya Raju, 2nd Ed, PHI
3. BO and Principles of Management, A. Roy, TMH
4. Mgmt. Text & Cases, V.S. P. Rao & Harikrishna, EXCEL BOOKS
5. Mgmt. Concept & Strategies, Chandan, VIKAS
6. Management Science, Rao, Scitech
7. Principal & Practice of Mgmt., Ghanekar, EPH
8. Principal & Practice of Mgmt, Amrita Singh, EPH

Management Accounting

Code: MBA302

CONTACTS: 2

CREDITS: 2

Financial accounting, financial statements and analysis

Conceptual framework of cost accounting

Cost-volume profit (CVP) relationship, budgeting, cost accumulation system, variable and absorption costing system

Financial accounting computer packages.

Books:

1. Management Accounting, Khan & Jain, TMH
2. Management Accounting, M.E. Thukaram Rao, New Age International

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3. Financial Accounting for Business Managers, Bhattacharyya, PHI
4. Management Accounting, I.M. Pande, VIKAS
5. Accounting and Financial management for MCA & MBA Students, Ramachandran, Scitech
6. Management Accounting for non-specialists, Atrill, PHI
7. Management Accounting, A.P. Rao, EPH

Software Engineering & TQM

Code: MCA401

CONTACTS: 3L + 1 T

CREDITS: 4

Introduction to Software Engineering, Software life cycles - different models, Software Project Management

Structured system design, Cost Estimation-COCOMO, Data Oriented Analysis and Design Object Oriented Analysis & Design, development methodologies- Computer Aided Software Engineering (CASE) tool, Object Oriented modelling.

Software quality assurance, Software testing techniques and strategies, test planning, reporting and bug fixing, Test automation, regression testing

Software maintenance, Software Complexity & Reliability

Books:

1. Software Engineering, Rogers G. Pressman, MH
2. Fundamentals of Software Engineering, 2nd Ed. , Ghezzi, PHI
3. Software Engineering, Pankaj Jalote, PHI
4. Classical and Object Oriented Software Engineering, Schach, TMH
5. Software Engineering: Principles & Practice, Van Vliet, SPD/JOHN WILEY
6. Software Engineering, K.K. Aggarwal & Yogesh Singh, New Age International
7. Software Engineering, Leon, VIKAS
8. Software Testing Fundamentals: Methods & Metrics, Marmie Hutcheson, And Wiley Dreamtech
9. Managing for Total Quality, Logothetis, PHI
10. TQM, J. Kiron, EPH



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COURSE STRUCTURE FOR MCA

Graphics & Multimedia

CODE: MCA 402

CONTACTS: 3L + 1 T

CREDITS: 4

Application of Computer Graphics, Graphics Devices, Cathode Ray Tube, Raster Scanning, Raster Refresh graphics displays.

Graphics Operations –2D & 3D Graphics, Bezier, B-Spline, Hermite, Bresenham Line & Circle Drawing Algorithms, Polygon filling, Edge Filling Algorithms.

Clipping—Cohen-Sutherland subdivision line clipping algorithm, Mid-Point subdivision algorithm, 2-dimensional clipping algorithm (Convex Boundaries & Partially visible lines), Cyrus-Beck algorithm for Partially & Totally Visible Lines), Visible Surfaces- Floating Horizon Algo. , Upper & Lower Horizon, Roberts algo, Warnock algo, Scan-line Z-buffer algo.

Rendering- introduction (illumination models), shading- Gouraud Shading, Phong Shading.

Shadowing- Shadow Algorithms

Introduction to GKS.

Multimedia, concepts, design, hardware, standards – MPEG, JPEG, MIDI, multimedia design methodology, development and testing

Books:

1. Computer Graphics, 2nd Ed., Hearn & Baker, PHI
2. Procedural & Mathematical Elements in Computer Graphics, Rogers, TMH
3. Computer Graphics, Plastock, Schaum Outline Series, TMH
4. Engineering Graphics, K. Venugopal, New Age International
5. Computer Graphics, EXCEL BOOKS
6. Introduction to Computer Graphics, A. Mukherjee, VIKAS
7. Fundamentals of Computer Graphics & Multimedia, Mukherjee, PHI
8. Computer Graphics, Bhandari & Joshi, EPH

Data Base Management System II

Code: MCA403

CONTACTS: 3L + 1 T

CREDITS: 4

Database Design: Multivalued dependencies, theory of normalisation-4NF, 5NF, 6NF DKNF

ANSI SQL2: DDL, DML, constraints and assertions, views, database security.

Transaction processing, concurrency control, Recovery management. Transaction model properties, lock base protocols, Two-phase locking, Live – Lock, Time- Stamp Protocol.

Brief introduction to distributed database, temporal database and object-oriented database.

Embedded SQL & Applications.

Books:

COURSE STRUCTURE FOR MCA

- 1.Database System Concepts, Silberschatz Korth, Sudarshan, MH
2. Database Management Systems,Ramakrishnan, MH
3. Database Management Systems, A.k. Pujari, ISTE/EXCEL
- 4.Oracle PL/SQL Programming,Feuerstein, SPD/O'REILLY
5. Database Management Systems, Leon, VIKAS
6. Data Base Processing:Fundamentals, Design & Implementation, Kroenke,PHI
7. SQL PL/SQL for Oracle 8 & 8i, P.S Deshpande, Wiley Dreamtech
- 8.Data Base Management Systems, V.K Jain, Wiley Dreamtech
9. Beginning SQL Programming,Kauffman, SPD/WROX

Operation Research & Optimisation Techniques

Code: MM401

CONTACTS: 3L + 1 T

CREDITS: 4

Linear Programming-Simplex Method, Duality Method, Assignment Problem, Transportation Problem.

Integer Programming-Cutting Plane, Branch & Bound

Network Optimisation Models- The shortest path problem, Minimum Spanning Tree Algorithm, Maximal Flow Algorithms, PERT/ CPM.

Dynamic Programming- Characteristics, Deterministic & Probabilistic Dynamic Programming.

Queuing Theory- Basic Structure, Exponential distribution, Birth-and-Death Model, M/M/I Queue.

Game Theory-Two person Zero Sum game, saddle point determination, algebraic method, graphical method etc.

Inventory Control- Determination of EOQ, Components, Deterministic Continuous & Deterministic Periodic Review Models, Stochastic Continuous & Stochastic Periodic Review Models.

Sequencing- Two men two machines, Three Men Two Machines

Books:

- 1.Operation Research, Kanti Swaroop
2. Operation Research,V.K. Kapoor
3. Operation Research,Paneer Selvam,PHI
- 4.Operations Research, Hillier & Lieberman, TMH



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5. Operations Research, Kalavati, VIKAS
6. Operation Research, Humdy Taha, PHI
7. Statistics, Random Process & Queuing Theory, Prabha, Scitech
8. Operations Research, Vijayakumar, Scitech
9. Quantitative Techniques, Vol.1 & II, L.C. Jhamb, EPH

Environment and Ecology

Code: HU401

CONTACTS: 3L

CREDITS: 3

Introduction, components of the environment, environmental degradation

Ecology: Elements of Ecology; Ecological balance and consequences of change, principles of environmental impact assessment

Air Pollution and Control: Atmospheric composition, energy balance, climate, weather, dispersion, sources and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer, standards and control measures.

Water Pollution and Control: Hydrosphere, natural water, pollutants: their origin and effects, river / lake / ground water pollution, standards and control.

Land Pollution: Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid wastes); their origin and effects, collection and disposal of solid waste, recovery and conversion methods.

Noise Pollution: Sources, effects, standards and control.

Books:

1. Environmental Science, Cunningham, TMH
2. Environmental Science, Wright & Nebel, PHI
2. Fundamentals of Ecology, Dash, TMH
3. Environmental Pollution Control Engineering, C.S.Rao, New Age International
5. Environmental Pollution Analysis, S.N.Khopkar, New Age International
6. Environmental Management, N.K. Oberoi, EXCEL BOOKS
7. Environmental Management, Mukherjee, VIKAS
8. Ecosystem Principles & Sustainable Agriculture, Sithampanathan, Scitech

COURSE STRUCTURE FOR MCA

Values and Ethics of Profession

Code: HU 501

CONTACTS: 3L

CREDITS: 3

Science, Technology and Engineering as Knowledge and as Social and Professional Activities (2 lectures)

Effects of Technological Growth:

Rapid Technological growth and depletion of resources. Reports of the Club of Rome. Limits of growth; sustainable development (2 lectures)

Energy Crisis; Renewable Energy Resources (2 lectures)

Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations. Environmental Ethics (4 lectures)

Appropriate Technology Movement of Schumacher: later developments (2 lectures)

Technology and developing nations. Problems of Technology transfer. Technology assessment, impact analysis (4 lectures)

Human Operator in Engineering projects and industries. Problems of man machine interaction. Impact of assembly line and automation. Human centered Technology (4 lectures)

Ethics of Profession:

Engineering profession: Ethical issues in engineering practice. Conflicts between business demands and professional ideals. Social and ethical Responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond. Case studies. (8 lectures)

Profession and Human Values

Value Crisis in contemporary society (2 lectures)

Nature of values: Value Spectrum of a 'good' life (2 lectures)

Psychological values: Integrated personality; mental health (2 lectures)

Societal values: The modern search for a 'good' society, justice, democracy, secularism, rule of law; values in Indian Constitution (4 lectures)

Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity (2 lectures)

Moral and ethical values: Nature of moral judgments; canons of ethics; Ethics of virtue; ethics of duty; ethics of responsibility (8 lectures)



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COURSE STRUCTURE FOR MCA

Books:

1. Blending the best of the East & West, Dr. Subir Chowdhury, EXCEL
2. Ethics & Mgmt. & Indian Ethos, Ghosh, VIKAS
3. Business Ethics, Pherwani, EPH
4. Ethics, Indian Ethos & Mgmt., Balachandran, Raja, Nair, Shroff Publishers

Electives

System Administration and Linux

Code: MCA E502A

CONTACTS: 3L + 1 T

CREDITS: 4

Introduction to System Administration
Essential Administrative Tools.
Starting and shutdown
User Accounts
Security
TCP / IP Network Management
Getting started in LINUX.
Linux Data Management
POSIX Threads
Pipes, Semaphores, Message Queues, Shared Memory, Sockets
Tool Command Language
PERL & CGI.

Books:

1. Linux Administration : A Beginner's Guide, Shah, TMH
2. LINUX: The Complete Reference, Petersen, TMH
3. Guide to LINUX installations & administration, Wealls, VIKAS
4. Red Hat LINUX-Administrator's Guide, Cox, PHI
5. LINUX Network Administrator's Guide, Kirch, SPD/O'REILLY
6. Essentials System Administration, Frisch, SPD/O'REILLY
7. Installing & administering LINUX, Linda, McKinnon, Wiley Dreamtech
8. CGI Programming with PERL, Gundavaram, SPD/O'REILLY

Windows Programming With VB

COURSE STRUCTURE FOR MCA

Code: MCA E502B

CONTACTS: 3L + 1 T

CREDITS: 4

Windows concepts and terminology, key elements

Creating the look, communication via messages, windows resources and functions, adding multimedia and sound resources

Writing windows applications, taking control of windows, adding menus, dialog boxes, Special controls.

Introduction to Visual Basic & difference with BASIC. Concept about form Project, Application, Tools, Toolbox, Controls & Properties. Idea about Labels, Buttons, Text Boxes.

Data basics, Different type variables & their use in VB, sub-functions & Procedure details, Input box () & MsgBox (). Making decisions, looping

List boxes & Data lists, List Box control, Combo Boxes, data Arrays.

Frames, buttons, check boxes, timer control, Programming with data, built in functions, database basics, file concepts, ODBC data base connectivity. Data form Wizard, query, and menus in VB Applications, Graphics.

Books:

1. Win32 API Programming With VB , Roman,SPD/O'REILLY
- 2.Learn Microsoft VB 6.0 Now,Halvorson, PHI/MSP
- 3.Visual Basic 6 from the Ground Up, Cornell,TMH
- 4.Visual Basic 6, CDG, TMH
- 5.Visual basic 6.0 in 30 days, Krishnan, Scitech
- 6.Beginning VB 6 ,Wright,SPD/WROX

E-Commerce

Code: MCA E504B

CONTACTS: 3L + 1 T

CREDITS: 4

Computer Systems in Electronic Business

Business Process Re-Engineering

Electronic commerce Policy and Theory

Supply Chain Management

Customer Relationship Management

International trading network & communication protocols

Electronic payment standards

E-Commerce strategy, Marketing and Business Processes

Books:

- 1.E-Commerce & managerial Perspective,Joseph,PHI
- 2.E Commerce, Rayport, TMH
3. E Commerce, Diwan & Sharma, EXCEL
- 4.Creating & winning E-Business, Napier,VIKAS
- 5.Beginning E-Commerce,Reynolds,SPD/WROX
6. E-Commerce,M.M. Oka, EPH


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COURSE STRUCTURE FOR MCA

Object Oriented Programming with Java

Code: MCA E503B

CONTACTS: 3L + 1 T

CREDITS: 4

Oops Concept and Introduction to JAVA

An overview of Java

Data Types - variables and arrays

Operators, Control statements

Classes and objects, Inheritance, String and string buffer, Packages, Interfaces, Exception handling, Multithreaded Programming, Applets, Event handling

Abstract Window Toolkit

Books:

- 1.Object Oriented Programming with JAVA, Wu, TMH
- 2.Beginning JAVA 2 :SDK 1.4,Horton,SPD/WROX
- 3.JAVA 2: The Complete Reference, Schildt, TMH
- 4.Programming in JAVA, EXCEL BOOKS
5. Object Oriented Programming with C++ & Java,Samanta,PHI
6. Object Oriented Application ,Development using JAVA,Doke, VIKAS
- 7.Programming with Java 2,Xavier, Scitech
- 8.Projects on Java 2, Xavier, Scitech

Compiler Design

Code: MCA E504A

CONTACTS: 3L + 1 T

CREDITS: 4

Classification of grammars. Context free grammars. Deterministic finite state automata (DFA) Non-DFA Scanners. Top down parsing, LL grammars. Bottom up parsing. Polishing expressions Operator precedence grammar. IR grammars. Comparison of parsing methods. Error handling.

Symbol table handling techniques. Organisation for non-block and block structured languages. Run time storage administration. Static and dynamic allocation. Intermediate forms of source program. Polish N-tuple and syntax trees. Semantic analysis and code generation. Code optimisation, folding, and redundant sub-expression evaluation. Optimisation within iterative loops.

Books:

- 1.Compiler Design, Aho & Ullman
2. Compiler Design in C, Holub,PHI

COURSE STRUCTURE FOR MCA

Advanced Unix programming

Code: MCA E503A

CONTACTS: 3L + 1 T

CREDITS: 4

Organisation of Unix. User interface, Programmer interface. The environment of Unix process System calls. Process control, File related system calls.

Process related system calls. Signals programming using system calls. Advanced I/O multiplexing.

Memory mapped I/O. Inter-process communication: Pipes, shared memory, semaphores, messages. Advanced inter-process communications. Streams, Pipes, Open server.

Basics of Visual programming tools like X-windows.

Books:

- 1.Design of UNIX Operating System, Bach,PHI
- 2.Your UNIX: The Ultimate Guide, Sumitava Das, TMH
3. UNIX Systems Administration, Maxwell, TMH
- 4.UNIX Power Tools,Powers,SPD/O'REILLY
- 5.Essentials of System Administration,Frisch,SPD/O'REILLY
- 6.UNIX File Systems:Evaluation, Design & Implementation, Steve D. Pate, Wiley Dreamtech

Distributed database management

Code: MCA E501A

CONTACTS: 3L + 1 T

CREDITS: 4

Distributed DBMS features and needs. Reference architecture. Levels of distribution transparency, replication. Distributed database design – fragmentation, allocation criteria.

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Storage mechanisms. Translation of global queries. / Global query optimisation. Query execution and access plan. Concurrency control – 2 phases locks. Distributed deadlocks. Time based and quorum based protocols. Comparison. Reliability- non-blocking commitment protocols.

Partitioned networks. Checkpoints and cold starts. Management of distributed transactions- 2 phase unit protocols. Architectural aspects. Node and link failure recoveries.

Distributed data dictionary management. Distributed database administration. Heterogeneous databases-federated database, reference architecture, loosely and tightly coupled.

Alternative architecture. Development tasks, Operation- global task management. Client server databases-SQL server, open database connectivity. Constructing an application.

Books:

1. Database System Concepts, Silberschatz Korth, Sudarshan, MH
2. Database Management Systems, Ramakrishnan, MH
3. Beginning SQL Server 2000 programming, Dewson, SPD/WROX
4. Database Management Systems, Leon, VIKAS
5. My SQL :Enterprise Solutions, Alexander Pachev, Wiley Dreamtech

Image Processing

Code: MCA E501B

CONTACTS: 3L + 1 T

CREDITS: 4

Image digital representation. Elements of visual perception. Sampling and quantisation. Image processing system elements. Fourier transforms. Extension to 2-D, DCT, Walsh transform, Hadamard transforms. Enhancement and segmentation. Point and region dependent techniques. Image encoding: Fidelity criteria. Transform compression. KL, Fourier, DCT, Spatial compression, Run length coding. Huffman and contour coding. Restoration Models: Constrained & unconstrained, Inverse filtering, Least squares filtering, Recursive filtering.

Books:

1. Digital Image Processing & Analysis, Chanda & Majumder, PHI
2. Fundamentals of Digital Image Processing, Jain, PHI
1. Image Processing, Analysis & Machine Vision, Sonka, VIKAS

COURSE STRUCTURE FOR MCA

Parallel Programming

Code: MCA E501C

CONTACTS: 3L + 1 T

CREDITS: 4

Processes and processors. Shared memory. Fork. Join constructs. Basic parallel programming techniques- loop splitting, spin locks, contention barriers and row conditions.

Variations in splitting, self and indirect scheduling. Data dependency-forward and backward block scheduling. Linear recurrence relations. Backward dependency. Performance tuning overhead with number of processes, effective use of cache.

Parallel programming examples: Average, mean squared deviation, curve fitting, numerical integration, travelling salesman problem, Gaussian elimination. Discrete event time simulation. Parallel Programming constructs in HPF, FORTRAN 95. Parallel programming under Unix.

Books:

- 1.Parallel Computing, Quinn,TMH
- 2.Introduction to Parallel Processing ,Sashi Kumar,PHI
- 3.Elements of Parallel Computing, Rajaraman,PHI
- 4.Fundamentals of Parallel Processing, Jordan, PHI
5. Advanced Computer Architecture, Hwang, TMH



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COURSE STRUCTURE FOR MCA

Laboratory

Micro Programming & Architecture Lab

Code: MCA191

CONTACTS: 4P

CREDITS: 3

Basic skills lab in using Personal Computer and common software tools
Logic Gates, Flip- Flop, Multiplexer, Coder & Decoder, 8085 Assembly Language (Turbo Assembler), Micro processor (8085 Kit).

Programming lab (C)

Code: MCA193

CONTACTS: 4P

CREDITS: 3

Lab to complement MCA103

Business presentation and language lab

Code: HU191

CONTACTS: 4P

CREDITS: 3

Windows Overview, Office features, Templates and Wizards, MS Word, PowerPoint, Outlook, MS Excel, MS Access
Preparing business presentation with computers using PowerPoint, Developing structured project report with Word and Excel, practising English and communication skills

Data structure lab

Code: MCA293

CONTACTS: 4P

CREDITS: 3

Experiment of data structure problems written in C as covered in the theory sessions.

Database lab

Code: MCA294

CONTACTS: 4P

CREDITS: 3

Study of commercial DBMS package (Oracle-latest version).
Developing database application with Oracle, creation of a database, writing SQL queries and retrieving data.

Object-Oriented Programming lab (C++)

Code: MCA295

CONTACTS: 4P

CREDITS: 3

Lab to complement MCA205



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COURSE STRUCTURE FOR MCA

Unix lab

Code: MCA392

CONTACTS: 4P

CREDITS: 3

Lab complement to MCA 302

Statistics and Numerical Analysis lab

Code: MM391

CONTACTS: 4P

CREDITS: 3

Programs to be written through C- language.

Familiarization of the language "LINGO".

Accounting Systems lab

Code: MBA392

CONTACTS: 4P

CREDITS: 3

Lab to complement MBA302

Laboratory exercises using a business accounting software package (Tally 5.0).

Software Project Management lab

Code: MCA491

CONTACTS: 4P

CREDITS: 3

Lab to complement MCA401.

Exercises in using commercial CASE tool for software engineering practice.

COURSE STRUCTURE FOR MCA

Using project management software using MS Project

Graphics & Multimedia Lab

Code: MCA492

CONTACTS: 4P

CREDITS: 3

Lab to complement MCA402

Creating and experimenting with computer graphics. Developing web pages with HTML, DHTML.

Advanced Database lab

Code: MCA493

CONTACTS: 4P

CREDITS: 3

Lab to complement MCA403.

Using RDBMS like Oracle, application partitioning , developing applications in distributed environment -front end/back end.

4 GL's Forms management and reports writers.

Minor project and seminar

Code :MCA591

Credits:9

Contacts: 12P

System Administration & Linux Lab

Code: MCA E592A

Credits: 3

Contact: 4P

Lab complement to MCA E502A

Windows Programming Lab

Code: MCA E592B

Credits: 3

Contact: 4P



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COURSE STRUCTURE FOR MCA

Lab complement to MCA E502B

Major project and seminar

Code : MCA 691

Credits: 29

Contacts: 36P



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Narula Institute of Technology
Department of Computer Applications

Course Curriculum & Syllabus of Master of Computer Application (MCA) Program

First Semester								
SN	Course Code	Course Name	Contact Hours/Week				Credits	
			L	T	P	Total		
THEORY								
1	MCA 101	Computer Organization & Architecture	3	1	-	4	4	
2	MCA 102	System Analysis & System Programming	3	1	-	4	4	
3	MCA 103	Programming with C	3	1	-	4	4	
4	MCA 104	Discrete Mathematical Structures & Graph Theory	3	1	-	4	4	
5	HU 101	Business English & Communication	3	1	-	4	4	
PRACTICAL								
6	MCA 191	Computer Architecture & Microprogramming Lab	-	-	4	4	3	
7	MCA 193	C Language Lab	-	-	4	4	3	
8	HU 191	Business English & Communication Lab	-	-	4	4	3	
Total						32	29	

Second Semester								
SN	Course Code	Course Name	Contact Hours/Week				Credits	
			L	T	P	Total		
THEORY								
1	MCA 201	Data Communication & Computer Networks	3	1	-	4	4	
2	MCA 202	Software Engineering & TQM	3	1	-	4	4	
3	MCA 203	Data Structures & Algorithms	3	1	-	4	4	
4	MCA 204	Operating Systems	3	1	-	4	4	
5	MCA 205	Statistical & Numerical Methods	3	1	-	4	4	
PRACTICAL								
6	MCA 293	Data Structure & Algorithm Lab	-	-	4	4	3	
7	MCA 294	Operating Systems Lab	-	-	4	4	3	
8	MCA 295	Statistical & Numerical Computing Lab	-	-	4	4	3	
SESSIONAL								
9	MCA 280 *	Technical Communication	-	-	-	-	0	
Total						32	29	

* Qualifying/Mandatory Paper


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Department of Computer Applications

Third Semester							
SN	Course Code	Course Name	Contact Hours/Week				Credits
			L	T	P	Total	
THEORY							
1	MCA 301	UNIX & Shell Programming	3	1	-	4	4
2	MCA 302	Database Management System	3	1	-	4	4
3	MCA 303	Object Oriented Programming Using C++	3	1	-	4	4
4	MCA 304	Operation Research & Optimization Techniques	3	1	-	4	4
5	MBA 301	Management & Accountancy	3	1	-	4	4
PRACTICAL							
6	MCA 391	UNIX & Shell Programming Lab	-	-	4	4	3
7	MCA 392	Database Management System Lab	-	-	4	4	3
8	MCA 393	Object Oriented Programming Using C++ Lab	-	-	4	4	3
SESSIONAL							
	MCA 380*	Technical Seminar	-	-	-	-	0
Total						32	29

* Qualifying/Mandatory Paper

Fourth Semester							
SN	Course Code	Course Name	Contact Hours/Week				Credits
			L	T	P	Total	
THEORY							
1	MCA 401	Formal Language and Automata Theory	3	1	-	4	4
2	MCA 402	Computer Graphics & Multimedia	3	1	-	4	4
3	MCA 403	Programming with Java	3	1	-	4	4
4	MCA 404	Artificial Intelligence	3	1	-	4	4
5	HU 401	Values & Ethics	3	1	-	4	4
PRACTICAL							
6	MCA 492	Computer Graphics & Multimedia Lab	-	-	4	4	3
7	MCA 493	Java Lab	-	-	4	4	3
8	MCA 495	Visual Basic Lab	-	-	8	8	4
Total						36	30



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Fifth Semester							
SN	Course Code	Course Name	Contact Hours/Week			Credits	
			L	T	P	Total	
THEORY							
1	MCA 501	Distributed System	3	1	-	4	4
2	MCA E 502 A/B/C	Elective – 1	3	1	-	4	4
3	MCA E 503 A/B/C	Elective – 2	3	1	-	4	4
4	MCA E 504 A/B/C	Elective – 3	3	1	-	4	4
5	MCA E 505 A/B/C	Elective – 4	3	1	-	4	4
PRACTICAL							
6	MCA E 592 A/B/C	Elective – 1 Lab	-	-	4	4	3
7	MCA 596	Minor Project	-	-	8	8	6
8	MCA 580*	Group Discussion	-	-	-	-	0
Total						32	29

* Qualifying/Mandatory Paper

Sixth Semester							
SN	Course Code	Course Name	Contact Hours/Week				Credits
			L	T	P	Total	
1	MCA 691	Major Project	-	-	30	30	30
2	MCA 692	Grand Viva	-	-	-	-	4
Total						30	34


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