UNIVERSITY OF ENGINEERING & MANAGEMENT, KOLKATA

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

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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 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. Businss 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

Books:

1. Programming with C, Gottfried, TMH
2. C The Complete Reference, Schildt, TMH
3. Practical C Programming,3rd Ed,Oualline,SPD/O'REILLY
4. A First Course in programming with C, Jeyapoovan, 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: MCA104
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.

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: MCA105
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

Essential Studies for Professionals - I
Code: MCA(GS)101
Contacts: 2L+1T
Credits: 2

Module-1
HISTORY - 1 (Protestent religion: Ancient):
1. Indus valley Civilisation: Excavation, Time period, Creator, Extent, Characteristic, Art and architecture, Decline, Significance
2. Vedic Age: Time period, creator, Social, political, economic and religious conditions during Rig vedic period, later vedic period, vedic literature
3. 16 mahajanapadas: Time period, Location
4. Rise of Magadha: Hariyanka Dynasty, Sishunag Dynasty, Nanda Dynasty, Mauryan Dynasty
Buddhism, Jainism, Ajibaka Religion

Module-2
Geography

1. Earth and Universe: Origin of the earth, Geological time scales (Era, Epoch, Periods)
2. Rocks and volcanoes: Igneous rocks, Sedimentary rocks, Metamorphic rocks. Types of volcanoes
3. Human Geography and Population Geography: Determinism, Possibilism, Neo determinism, French and German school of thought, Demographic transition model, Indexes, Laws of migration.
4. Soil geography of India
   - Soil formation
   - Soil Horizons
   - Types of Soil
   - Soil erosion and conservation in India
5. National wildlife and parks of India

Module 3
ECONOMICS-1(MICRO)
1) Basic economics- Types of Economy, Branches of economics, Feature of Indian Economy, HDI.
2) Demand & supply- law of demand, factors of demand, law of supply, different elasticity.

Module-4
CONSTITUTION-1(basic)
1) Historical background- The company Rule (1773-1858), The crown rule(1858-1947), making of constitutions, features of constitution.
2) The Preamble- Ingredients, keywords, amendment of preamble.
3) Part & schedule- Details concept on part, schedule & articles & their amendments .
4) Citizenship- Constitutional provisions, Citizenship act, Comparing PIO & OCI card holders.

Books:
History:
1. India's Ancient Past (Ancient History) : R.S. Sharma
2. History of medieval India (Medieval History): Satish Chandra
3. History of Modern India (Modern History): Bipin Chandra
4. India's struggle for Independence (Modern History): Bipin Chandra
Geography:
1. Savindra Singh, R.D Dixit
Economics:
1. Indian Economy- TATA Mc Graw Hill/Ramesh Singh
2. Indian Economy – Arihant
Constitution:
1. Indian Constitution- D.D. Basu

2. Our Constitution- Subhash.C. Kashyap

Micro Programming & Architecture Lab
Code: MCA191
Contacts: 3P
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: 3P
Credits: 3
Lab to complement MCA103

Skill Development for Professionals - I
Code: MCA(GS)181
Contacts: 2L+1T
Credits: 1
Module-1

Quantitative Numerical aptitude level-1
    Quant foundation- Vedic maths & Collective tricks.
Basic Multiplication – multiplying by numbers ending in zeroes, Multiplying by 2,3,4,5,6,7,8 9, 11,12 & 111.multiplying 2 digits numbers ending in 9 & whose tens digit at to 10, Multiplying by 2 digits number of 9, multiplying by any 2 digit numbers ending in 9,
    Division- Divisibility by 2,3,4,5,6,7,8, 9, 11 & 13, Dividing by 5,9, 15,25,125,Dividing by factors.
squaring numbers- squaring any 2 digit numbers ending in 5, squaring any number ending in 5, squaring any 3 digit numbers ending with 25, squaring any numbers ending in 9, squaring any numbers consisting only nines. squaring any 2 digit numbers. Cube & cube roots.
    Percentage- Basic concept of percentage & it's shortcut rules & their   applications.
Ratio- Basic concept of Ratio & Proportion, Shortcut tricks & their applications.
Simple equation- Linear equation of 2 & more than two variables.
    Variation- Ratio , Proportion, Variation, concept of directly proportional &
    Partnership – concept, rules & Applications, Percentage Advanced problems & shortcuts.
Profit & Loss- Basic concept, formulae, shortcut tricks & their Application.

Module-2
Objective English-1
    1. Introduction of Parts of speech

2. Kinds of Noun, Rules & Application.
3. Definition of Pronoun, Examples, Rules & Application
4. Kinds of Adjectives & Degree of comparison.
5. Kinds of Verbs & Usages.

Module-3
Logical Mental Ability-1
CODING AND DECODING & DIRECTION SENSE
a)Conditional Coding ,b)Word-Pattern Coding, c)Chinese Coding, d)Direction Senese Test, e)Direction Distance Test, f)Shadow based Questions
SERIES & NUMBERS
a)Alphabet Series, b)Random Series, c)Number Series, d)Letter Gap, e)Missing Number Series, f)Series Completion, g)Order And Ranking, h)Interchange, i)Comparison
BLOOD RELATIONS
Family Tree Questions, Indication Type BR, Coding Blood Relations, Miscellaneous Blood Relations
ANALOGY
Word Analogy, Classification, Odd-Out
CUBE
Dice, Miscellaneous Problems
DATA SUFFICIENCY
a)Problems on Blood Relation, ages, Numbers
b)Logical Test Based on Data Sufficiency
NON VERBAL REASONING
a) Image Formation
b) Water –Images
c) Mirror Image
d) Image completion
e) Paper Cutting And Folding

Module-4
Computer proficiency: Basics of C programming.

Books:
Numerical Aptitude
Fastrack objective Arithmetic: Arihant
Quantitative aptitude for Competitive exam (4th Edition): TATA Mc Graw Hill
Quantitative aptitude for Competitive exam (3rd Edition): PEARSON

Objective English
Objective English: Kiran Publication

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General English: Arihant

Logical Mental Ability
Analytical &Logical Reasoning: M.K. Pandey/B.S.C. Publication,A modern approach to verbal & non verbal Reasoning: R.S. Agarwal

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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, BIPLOAR, MANCHESTER, DIFF. MANCHESTER).
Digital To Analog – ASK, PSK, FSK, QPSK.
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.
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

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.

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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

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Essential Studies for Professionals - II
Code: MCA(GS)201
Contacts: 2L+1T
Credits: 2

Module-1
HISTORY-2
1. Post Mauryan Empire: The sungas, The Indo-greek, Sakas
2. Gupta Period: Chandragupta-I, Samudragupta, Chandragupta II, Kumargupta I, Skandagupta, Economic condition, land grants, caste system, position of women, education system
3. History of South India: Cholas, Chalukyas, Pallavas
4. Post gupta period: Palas, Senas

MODULE 2
GEOGRAPHY
Physiographic Divisons of India
1. The Himalayas: Greater Himalayas, Middle Himalayas, Shiwaliks
2. Northern Plains: Punjab plains, Ganga Bramhaputra plain
3. Deccan plateau
4. Coastal plains and islands: Western coastal plains, Eastern coastal plains, Lakshadeep islands, Andaman and nicobar islands
5. Indian monsoon and climate: Factors affecting climate of India, Summer season, Local winds, S.W monsoon winds, Season of retreating monsoon, Winter Season and westerly disturbances, Vagaries of monsoon.

MODULE 3
ECONOMICS(MICRO)
1)Production- Factors of production, fixed inputs, variable inputs, PPC, concept of TP, AP, MP, concept of revenue, AR, MR.
2)Cost- Concept of implicit & explicit cost, sunk cost, oportunity cost, shapes of FC, AFC, AC, MC, VC, AVC. Relation between AR & MR, AC & MC.
3)Market structure- perfect competition, monopoly, oligopoly, duopoly, monopsony, duopsony, oligopsony.

Module-4
CONSTITUTION
1) Fundamental Rights- Concept & different articles, Right to equality, prohibition of discrimination on certain ground, Equality of opportunity, abolition of untouchability & titles, right to freedom, right to education, right against exploitation, right to freedom of religion, cultural & educational

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rights, different writes & scopes
2) DPSP- Classification of directive principle, sanctioned of directive principal, criticism, Distinction between fundamental rights & directive principle
3) Fundamental Duties, criticism, significance
4) Union Legislature, President, Vice President, LokSabha ,Rajya Sabha, P.M., Speaker of Lok Sabha
5)State Legislature ,CM & Governor. Legislative assembly and Legislative Council

Books:
History:
India's Ancient Past (Ancient History) : R.S. Sharma
History of medieval India (Medieval History): Satish Chandra
History of Modern India (Modern History): Bipin Chandra
India's struggle for Independence (Modern History): Bipin Chandra
Geography:
India- Khullar
Economics:
University of Engineering & Management, Kolkata
49
Indian Economy- TATA Mc Graw Hill/Ramesh Singh
Indian Economy – Arihant
Constitution:
Indian Constitution- D.D. Basu
Our Constitution- Subhash.C. Kashyap

Data Structure Lab
Code: MCA293
CONTACTS: 3P
CREDITS: 3
Experiment of data structure problems written in C as covered in the theory sessions.

Database Lab
Code: MCA294
CONTACTS: 3P
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 in C++
Code: MCA295

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CONTACTS: 3P
CREDITS: 3
Lab to complement MCA205

Skill Development for Professionals - **II**
Code: MCA(GS)281
Contacts: 2L+1T
Credits: 1

Module -1
Quantitative Numerical Aptitude-2
1) Average- Concept on average, different missing numbers in average estimation, shortcuts & their application.
2) Mixture & Allegation – Proportion & mixtures in percentages, populations & liquids, shortcuts & their application.
3) Number system- concept of different numbers , remainder theorem, factors.
4) Time & Work- Basic concept, Different problems & their shortcut tricks.Time & Speed & Tides- concept of speed , time & Distance, relative speed, formulae & their application. upstream & Downstream, pipes & cistern.

Module -2
Objective English-2
1. Types of Adverbs & Application.
2. Types of Conjunctions & Application.
3. Fill in the blanks with Prepositions & Articles.
4. Present Tense & Usages.
5. Past & Future Tenses.

Module-3
Logical Mental ability -2
SYLLOGISM
a)Logical Venn Diagram
b)The If Else Statement
SEATING ARRANGEMENT
a) Circular seating arrangement
b) Square seating Arrangement
c) Line Arrangement
PUZZLES
a) Seating Arrangement
b) Classification
c) Seating Arrangement with Blood relations.

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Module-4
Computer Proficiency: Advanced C programming.

Books:
Quant
1. Fastrack objective Arithmetic: Arihant
2. Quantitative aptitude for Competitive exam (4th Edition): TATA Mc Graw Hill
3. Quantitative aptitude for Competitive exam (3rd Edition): PEARSON

Verbal Ability
1. Objective English: Kiran Publication
2. General English: Arihant

LOGICAL REASONING
1. Analytical &Logical Reasoning: M.K. Pandey/B.S.C. Publication
2. A modern approach to verbal & non verbal Reasoning: R.S. Agarwal

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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
2. Operating Systems, Milenkovic, TMH
3. Modern Operating System, 2nd Ed, Tannenbaum, PHI
4. Systems Programming & Operating Systems, Dhamdhere, TMH
5. Systems Programming, Donovan, TMH
6. Guide to Operating Systems, Palmer,VIKAS
7. Operating Systems,Prasad,Scitech
8. Operating System ,P.Bhatt, PHI

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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.

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: MCA304
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 Statisics for Engineers,Rao,Scitech
11. Numerical Methods in Computer Application,Wayse,EPH

Business Management
Code: MCA305
Contacts: 2L
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: MCA306
Contacts: 2L
Credits: 2

Financial accounting, financial statements and analysis
Conceptual framework of cost accounting

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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
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

Essential Studies for Professionals - III
Code: MCA(GS)301
Contacts: 2L+1T
Credits: 2

Module-1
History-3:
1. Pre sultanate age: Md. Bipin Karim, Aluptagin, Sabuktagin, Sultan Mamud, Md. Ghori
2.Delhi Sultanate: Slave dynasty, Khalji dynasty, Tughlaw dynasty, Sayyed dynasty, Lodhi dynasty
3. Bhakti and Sufi movement: Kabir, Gurunanak, Chaitanya, Namdev
4. Mughal Period: Babur, Humayun, Sher shah suri, Akbar, Jehangir, Shah Jahan, Aurangzeb, Aministrative system, Din-i-ilahi, Art and architecture, Land revenue system

Module-2

GEOGRAPHY

1. Drainage system
    - Types of river (Perennial, Non perennial, Inland drainage)
    - Courses of river: Upper, Middle, Lower courses
    - Landforms carved out by river based on the courses.
    - Basic terminologies: Antecedent rivers, Consequent rivers, Fault guided river, Tributary, Distributary
    - Indian river system (Himalayan, Peninsular, Coastal)
2. Types of Irrigation in India
    - Well

- Tanks
- Canal
3. Problems of irrigation in India
4. Status of Irrigation in India as per 2011 census
5. Clouds and Precipitation: Forms of precipitation, Types of rainfall, Types of clouds.

Module-3

MACRO ECONOMICS

1) National income- Concept of GDP, GNP, NNP both in FC & MP, PCI
2)Tax – Concept of TAX , objective of TAX, Direct & Indirect Tax, Progressive, Regressive &ProportionalProportional tax.
3)RBI & Banking- Traditional Functions of RBI, CRR, SLR, REPO, Reverse repo, MSF, LAF market, capital market, capital market, Money market, FOREX.
4)Budget- concept of budget, components of budget, different types of deficit
5)Keynesian outlook- IS,LM & different multipliers.
6)Inflation& Deflation- Inflation & its impact, Deflation & its impact, WPI, CPI, GDP deflator.

Module-4

CONSTITUTION-3(Advance)
1) Central State relation, Interstate relation,
2) Supreme Court-Appointment of Chief Justice, Acting Chief Justice, Qualification, Oath or Affirmation, Tenure of Judge, Removal of Judges, Salaries & allowance, Adhoc Judge, Procedure of the court, write jurisdiction, Power of Judicial review
3)High Court-Appointment of Chief Justice, Acting Chief Justice, Qualification, Oath or Affirmation, Tenure of Judge, Removal of Judges, Salaries & allowance, Adhoc Judge, Procedure of the court, write jurisdiction, Power of Judicial review
4)Duties& Powers of Attorney & Advocate General in Brief
5)Panchayati Raj- Three tier system, Different committees recommendation
6)Municipality, Municipal Council & Corporation, Official Languages & related Articles.

Ref Books:

History:
India's Ancient Past (Ancient History) : R.S. Sharma

History of medieval India (Medieval History): Satish Chandra
History of Modern India (Modern History): Bipin Chandra
India's struggle for Independence (Modern History): Bipin Chandra

Geography:
India- Khullar
Economics:
Indian Economy- TATA Mc Graw Hill/Ramesh Singh
Indian Economy – Arihant

Constitution:
Indian Constitution- D.D. Basu
Our Constitution- Subhash.C. Kashyap

Unix lab
Code: MCA391
Contacts: 3P
Credits: 3

Lab complement to MCA 302

Statistics and Numerical Analysis lab
Code: MCA392
Contacts: 3P
Credits: 3

Programs to be written through C- language.
Familiarization of the language "LINGO".

Accounting Systems lab
Code: MCA393
Contacts: 3P
Credits: 3
Lab to complement MCA306
Laboratory exercises using a business accounting software package (Tally 5.0).

Skill Development for Professionals - III
Code: MCA(GS)381

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Contacts: 2L+1T
Credits: 1

Module-1
Quantitative Numerical aptitude-3

1) Simple & Compound Interest- Basic concept of SI & CI, different formulas & their applications, concept of Growth & Contraction of Business.
2) Data Interpretation- Tables, pie chart, histogram, Bar chart, solution tricks & techniques.
3) Quant Review- Miscellaneous problems from different chapters & short cuts.
4) Indices & Surds- Basic concept, Formulae & their applications, Finding out the square roots, Elimination of Surds, Equation solve.
5) Quadratic Equation- polynomials, degree, powers, Equation & factors Solution.Progression- Concept of AP, GP & HP

Module-2
Objective English-3

1. Error based on Noun & Pronoun.
2. Error based on Adjective & Degree of comparison.
3. Error based on Adverb & Synonym And Antonym.
4. Error Based on Verbs & Some Special Phrasal Verbs.
5. Reading Comprehension Passage.

Module-3
Logical Mental Ability-3

a)Statement And Assumption, b)Statement And Conclusion, c)Statement And Course Of Action, d)Cause And Effect, e)Drawing Inference
Machine Input-Output
a) Pattern Based I/O
Inequality
a) Coded Inequality, b) Jumbled Inequality, c) Conditional inequality
Calendar And Clock
a)Miscellaneous Problems

Module-4

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Computer proficiency: C programming, Basics of C++.

Books:

Numerical Aptitude
1. Fastrack objective Arithmetic: Arihant
2. Quantitative aptitude for Competitive exam (4th Edition): TATA Mc Graw Hill
3. Quantitative aptitude for Competitive exam (3rd Edition): PEARSON

Verbal Ability
1. Objective English: Kiran Publication
2. General English: Arihant

LOGICAL REASONING
1. Analytical &Logical Reasoning: M.K. Pandey/B.S.C. Publication
2. A modern approach to verbal & non verbal Reasoning: R.S. Agarwal.

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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& Metrices, Marmie Hutcheson, And Wiley Dreamtech
9. Managing for Total Quality,Logothetis,PHI
10. TQM,J.Kiron,EPH

Graphics & Multimedia
CODE: MCA402
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. Porcedural & 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:
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

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Operation Research & Optimisation Techniques
Code: MCA404
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
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: MCA405
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

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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
3. Fundamentals of Ecology,Dash, TMH
4. 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, Sithamparanathan, Scitech

Essential Studies for Professional - IV
Paper Code: MCA(GS)401
Contacts: 2L+1T
Credits: 2

Module-1
Indian Geography
1. Natural vegetation of India
2. Minerals and multipurpose river projects of India
3. Agriculture of India
    - Types of Agriculture (Intensive subsistence, Extensive subsistence, Mixed farming, Jhoom cultivation)
    - Types of crops (Rice, Wheat, Sugarcane, Pulses, Cotton, Jute, Tobacco)

Module-2
HISTORY
1.Socio cultural Changes: Introduction of western Education, Ram Mohan Roy and BramhoSamaj, Young Bengal movevemnt, Arya samaj, Ramkrishna Mission, Aligarh movement, Vidyasagar
2. Revolt of 1857: Cause, Character, cause of failure, impact

3. Partition of Bengal: Cause, Swadeshi and Boycott, Newspaper
4. Indian National congress

Module-3
INDIAN POLITY
1)Election Commission- Related Articles, Power & Function & Provision of Election
2)Emergency Provisions- Related Articles, Conditions Application, Supreme power during emergency.
3)National Commission for SC/ST/OBC, Function of the commissions, Special offer & related articles for SC/ST/OBC
4)Different amendments of Indian Constitution & the related articles
5)Formation UPSC, Related Articles, Scope & Power, Duties of CAG, Formation SPSC, Related Articles, Scope & Power.

Module-4
Economics- (Indian Economy)
    I.   Indian Planning & NITI Aayog
    II.   Indian Foreign trade and International organizations
    III.   Balance of Payment and Balance of Trade.

Books:
History:
University of Engineering & Management, Kolkata
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India's Ancient Past (Ancient History) : R.S. Sharma
History of medieval India (Medieval History): Satish Chandra
History of Modern India (Modern History): Bipin Chandra
India's struggle for Independence (Modern History): Bipin Chandra
Geography: Savindra Singh, R.D Dixit
Economics:
Indian Economy- TATA Mc Graw Hill/Ramesh Singh
Indian Economy – Arihant
Constitution:
Indian Constitution- D.D. Basu
Our Constitution- Subhash.C. Kashyap

Software Project Management lab
Code: MCA491
Contacts: 3P
Credits: 3

Lab to complement MCA401.

Exercises in using commercial CASE tool for software engineering practice.

Using project management software using MS Project

Graphics & Multimedia Lab
Code: MCA492
Contacts: 3P
Credits: 3
Lab to complement MCA402

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

Advanced Database lab
Code: MCA493
Contacts: 3P
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.

Skill Development for Professionals - IV
Code: MCA(GS)481
Contacts: 2L+1T
Credits: 1

Module-1

Quantitative Numerical Aptitude -4 (advance)

1) Permutation & Combination.
2) Probability- basic concepts of probability , different theorems & applications, binomial, poison & normal Distributions.
3) Geometry- Concept of different shapes like triangle, quadrilateral, rectangle, square, circle etc. different theorems & their applications.
4) Mensuration- Formulae on triangles, square, Rhombus, parallelogram, sphere, circle, cone, pyramid etc, Application based problem solving. Coordinate Geometry- Locus, Straight lines, Circle etc

Module-2

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Verbal English

1. Miscellaneous Corrections on Tense part 1.
2. Miscellaneous Corrections on Tense part 2.
3. Fill in the blanks (Single Blank)
4. Miscellaneous Vocabulary

Module-3
1.Communication DevelopMent.
2.Personality Development.

Module-4
Problem Based learning on C & C++ Programming language.

Books:

Quant
1. Fastrack objective Arithmetic: Arihant
2. Quantitative aptitude for Competitive exam (4th Edition): TATA Mc Graw Hill
3. Quantitative aptitude for Competitive exam (3rd Edition): PEARSON

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Elective – I :

Distributed database management
Code: MCA501A
CONTACTS: 3L + 1 T
CREDITS: 4

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

Image Processing
Code: MCA501B
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
3. Image Processing, Analysis & Machine Vision, Sonka, VIKAS

Parallel Programming
Code: MCA501C
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

Elective – II :

System Administration and Linux
Code: MCA502A
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
Code: MCA502B
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

Elective – III :

Object Oriented Programming with Java
Code: MCA503A
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

Advanced Unix Programming
Code: MCA503B
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.

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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

Elective – IV :

Compiler Design
Code: MCA504A
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

E-Commerce
Code: MCA504B
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

Essential Studies for Professionals - V
Code: MCA(GS)501
Contacts: 2L+1T
Credits: 2

Module-1
GEOGRAPHY

- India's political divisons and its relation with neighboring countries
- India's Advanced physiology
- India's Advanced Drainage
- Economic geography of India
- Transportation network of India

MODULE 2
CONSTITUTION AND INDIAN POLITY
INTERNATIONAL RELATIONSHIP :
 Relationship of India and China, political and economical,
 Relationship of india and nepal, political and economical,
 Relationship of india and bangladesh, political and economical,
Relationship of India and Srilanka, political and economical,
 Relationship of India and Pakistan, political and economical,

Module 3
 History
1. Important Personalities: DadabhaiNAroji, S.N Banerjee, W.C Banerjee, Ram Mohan Roy, Sir Syed Ahmed Khan, R.C dutta, J.L Nehru

2. Role of Gandhi in INC: Champaran, Satyagrapha, Khedagraha, Ahmedabad Satyagrapha, Non cooperation movement, civil disobedience movement, Quit India movement

MODULE 4
ECONOMICS
1.Special Economic Zone
2. New Economic Policies (L.P.G. Model)
3.Indian Agriculture
4.Industrial Reforms

Books:
History:
India's Ancient Past (Ancient History) : R.S. Sharma
History of medieval India (Medieval History): Satish Chandra
History of Modern India (Modern History): Bipin Chandra
India's struggle for Independence (Modern History): Bipin Chandra
Geography: Savindra Singh, R.D Dixit
Economics:
Indian Economy- TATA Mc Graw Hill/Ramesh Singh
Indian Economy – Arihant
Constitution:
Indian Constitution- D.D. Basu
Our Constitution- Subhash.C. Kashyap

Minor project and seminar
Code :MCA591
Contacts: 12P
Credits: 9

Students are supposed to submit a minor Research based project under the guidance of the faculty members.

System Administration & Linux Lab
Code: MCA592A
Contact: 3P
Credits: 3
Lab complement to MCA502A

Windows Programming Lab
Code: MCA592B
Contact: 3P

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Credits: 3
Lab complement to MCA502B

Skill Development for Professionals - V
Code: MCA(GS)581
Contacts: 2L+1T
Credits: 1

Module-1   Verbal English
1. Basic concept on Active And Passive Voice.
2. Application based on voice change.
3. Essay or Paragraph writing
4. Email / Letter writing.

Module-2
10 PRACTICE SET ON APTITUDE TEST.

Module-3
10 MISCELLANEOUS SET PAPER.

Module-4
Computer Proficiency: C, C++, Basics on JAVA.

Books
Essay& Report writing- P.C.DAS/ P.K.DE SARKAR

Essential Studies for Professionals - VI
Code: MCA(GS)601
Contacts: 2L+1T
Credits: 2

Module-1

INDIAN POLITY AND GOVERNANCE
INTERNATIONAL ORGANISATION AND INDIA.
UNO, international court, security council, general assembly, secretariats, social and economic council of UNO.
International summits and political economical relationship
Diplomacy powers of Indian leaders
Developed, underdeveloped and developing countries and policies of world bank and IMF

Module-2
HISTORY
1. Governor generals and viceroys of India: Lord William
Bentick, Lord Cornwallis, Lord Dalhousie, Lord Warrern Hastings, Lord Canning, Lord Mayo, Lord Lytton, , Lord Ripon
2.Important books and authors:
3. Important newspapers and its editors
4. Various acts during British era: 1773 regulating act, 1784 Pitt's India act, Charter act (1793,1813,1833,1853), Indian council act, Government of India act 1858, Government of India act 1935
5. Educational Commission: Sir CharleswoodDespatch, Hunter Commission, Raleigh Commission, Saddler Commission

Module-3
GEOGRAPHY

- World Geography: Grasslands of the world, Natural regions of the world
- Important facts about the developed nations: USA, Canada, Russia, Japan, Western Europe
- Important facts about the developing nations: S.E countries, S.W nations

MODULE 4
ECONOMICS
Insurance   Sector In India
Co Operatives Society Of India
Poverty And Unemployment
Census Of India

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Books:
History:
India's Ancient Past (Ancient History) : R.S. Sharma
History of medieval India (Medieval History): Satish Chandra
History of Modern India (Modern History): Bipin Chandra
India's struggle for Independence (Modern History): Bipin Chandra
Geography: Savindra Singh, R.D Dixit
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Indian Economy – Arihant
Constitution:
Indian Constitution- D.D. Basu
Our Constitution- Subhash.C. Kashyap

Skill Development for Professionals - VI
Code: BCA(GS)681
Contacts: 2L+1T
Credits: 1

Module-1
Verbal English
1. Blank Fillers (Double Blanks)
2. Rearrangement of Sentences.
3. Basic concept on Direct & Indirect Speech.
4. Application based on Direct & Indirect Speech.
5. Precis Writing.

Module-2
           MISCELLANEOUS SET BASED ON ALL COMPETATIVE EXAM .
Module-3
Computer Proficiency Miscellaneous set based problems solving.

Books:

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ARIHANT FAST TRACK ARITHMETIC.
ARIHANT GENERAL ENGLISH .

Major project and seminar
Code: MCA691
Contacts: 36P
Credits: 29

Students are supposed to submit a Research based project under the guidance of the faculty members.