



UNIVERSITY OF ENGINEERING & MANAGEMENT, KOLKATA

Computer Organisation & Architecture

Code: MCAN101

Contacts: 3L + 1 T

Credits: 3

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

Computer Programming with C

Code: MCAN102

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.

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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, O'Quilline, 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

Data Structures with C

Code: MCAN103

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.

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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

Discrete Mathematical Structure

Code: MCAN104

Contacts: 3L + 1 T

Credits: 3

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

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11. Invitation to Graph Theory, Arumugam, Scitech
12. Discrete Structure and Graph Theory, S.K.S Rathore, EPH

Business English and Communication

Code: MCAN105

Contacts: 3L + 1 T

Credits: 3

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: MCAN(GS)101

Contacts: 3L + 1T

Credits: 2

Module-1

HISTORY - 1 (Protestant 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

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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

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2. Our Constitution- Subhash.C. Kashyap

Micro Programming & Architecture Laboratory

Code: MCAN191

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).

C Programming Laboratory

Code: MCAN192

Contacts: 3P

Credits: 3

Lab to complement MCAN102

Data Structures with C Laboratory

Code: MCAN193

CONTACTS: 3P

CREDITS: 3

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

Skill Development for Professionals - I

Code: MCAN(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.

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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 Sense 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 Base Management System

Code: MCAN201

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

Singled valued functional dependencies.

Database design, conceptual, logical and physical models, ER diagram and model, normal forms (1,2,3,BCNF). Multivalued dependencies, theory of normalisation-4NF, 5NF, 6NF, DKNF

Storage structure- Sequential, Indexed Sequential.

B+ tree – creation, insertion & deletion.

Indexing- Primary, Secondary, Multi Level.

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.

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 Java

Code: MCAN202

Contacts: 3L + 1 T

Credits: 4

OOPs Concept and Introduction to JAVA

An overview of Java

Data Types - variables and arrays

Operators, Control statements

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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, EXCELBOOKS
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

Data Communication & Computer Networks

Code: MCAN203

Contacts: 3L + 1 T

Credits: 3

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. 5, 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).

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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

Graphics & Multimedia

CODE: MCAN204

CONTACTS: 3L + 1 T

CREDITS: 3

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

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8. Computer Graphics, Bhandari & Joshi, EPH

Statistics and Numerical Techniques

Code: MCAN205

Contacts: 3L + 1 T

Credits: 3

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. Scarborough
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

Essential Studies for Professionals - II

Code: MCAN(GS)201

Contacts: 3L + 1T

Credits: 2

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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 Divisions of India

1. The Himalayas: Greater Himalayas, Middle Himalayas, Shiwaliks
2. Northern Plains: Punjab plains, Ganga Brahmaputra plain
3. Deccan plateau
4. Coastal plains and islands: Western coastal plains, Eastern coastal plains, Lakshadweep 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, opportunity 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 rights, different writs & scopes
- 2) DPSP- Classification of directive principle, sanctioned of directive principle, criticism, Distinction between fundamental rights & directive principle
- 3) Fundamental Duties, criticism, significance
- 4) Union Legislature, President, Vice President, Lok Sabha, Rajya Sabha, P.M., Speaker of Lok Sabha
- 5) State Legislature, CM & Governor. Legislative assembly and Legislative Council

Books:

History:

1. India's Ancient Past (Ancient History) : R.S. Sharma
2. History of medieval India (Medieval History): Satish Chandra History of Modern India

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(Modern History): Bipin Chandra

3. India's struggle for Independence (Modern History): Bipin Chandra

Geography:

1. India- Khullar

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

Database Management System Laboratory

Code: MCAN291

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 with Java Laboratory

Code: MCAN292

CONTACTS: 3P

CREDITS: 3

Lab to complement MCAN202

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.

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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.

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: MCAN301

Contacts: 3L + 1 T

Credits: 3

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, Dhamdhare, 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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Data Science and Data Analytics

Code: MCAN302

Contacts: 3L + 1T

Credits: 4

Introduction to Data Management:

Brief idea about Data Warehousing, Architecture and Data Flows, Data pre-processing before analysis, Data preparation, OLAP & OLTP, Case study.

Introduction to Data Mining:

Brief idea about Data Mining, It's goals and techniques, Architecture and KDD Process, Knowledge representation methods.

Statistics and Analytics:

Data Visualization, Summarize and describe data sets using a measures such as Central tendency and variability, Learn probability, Central Limit Theorem and much more to draw inferences, Case study based on R Programming.

Introduction to Big Data Analytics:

Understand the basic concepts of Big Data and Hadoop as processing platforms for Big Data, Managing Big Data - Learn and Use Hadoop Ecosystem tools for data ingestion, extraction and management.

Introduction to Hive.

Cloud Computing:

Introduction to Cloud Computing, types, services, applications, Security & research scope.

Internet of Things:

Introduction to IOT and WSN, Basic concepts of Robotics Using Arduino & Raspberry Pi Programming.

Introduction to NLP & AI:

Introduction to artificial intelligence, Brief idea about Natural Language Processing.

Basic concepts of Machine Learning:

To implement linear regression, Data classification, Data clustering - To learn how to create segments based on similarities using K-Means and Hierarchical clustering, Case study using Python.

Basic concepts of Machine Learning:

To implement linear regression, Data classification, Data clustering - To learn how to create segments based on similarities using K-Means and Hierarchical clustering, Case study using Python.

Applications of Machine Learning:

Time series, Decision trees, Support Vector Machine, Neural Networks, Case Study Using MATLAB.

Books:

1. "Data Mining : Concepts and Techniques" by Jiawei Han and Micheline Kamber
2. "Artificial Intelligence and Soft Computing: Behavioral and Cognitive Modeling of the Human Brain" by Amit KonarLogic & Prolog Programming, Saroj Kaushik, New Age International
3. "Big Data" by Anil Maheshwari

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4. "Wireless Sensor Networks" by Ian F. Akyildiz & Mehmet Can Vuran
5. "Wireless Ad Hoc and Sensor Networks : Theory and Applications" by Xian Yang Li
6. "Mastering Cloud Computing : Foundations and Applications Programming" by Rajkumar Buyya
7. "Fundamentals of Neural Networks: Architectures, Algorithms and Applications" by L. Fausett

Unix and Shell Programming

Code: MCAN303

Contacts: 3L + 1 T

Credits: 3

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

Software Engineering & TQM

Code: MCAN304

Contacts: 3L + 1T

Credits: 4

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

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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

Values and Ethics

Code: MCAN305

Contacts: 2L

Credits: 1

Science, Technology and Engineering as Knowledge and as Social and Professional Activities

Effects of Technological Growth:

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

Energy Crisis; Renewable Energy Resources

Environmental degradation and pollution. Eco-friendly Technologies.

Environmental Regulations. Environmental Ethics

Appropriate Technology Movement of Schumacher: later developments

Technology and developing nations. Problems of Technology transfer.

Technology assessment, impact analysis

Human Operator in Engineering projects and industries. Problems of man machine interaction.

Impact of assembly line and automation.

Human centered Technology

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.

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Whistle blowing and beyond. Case studies.

Profession and Human Values:

Value Crisis in contemporary society

Nature of values: Value Spectrum of a 'good' life

Psychological values: Integrated personality; mental health

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

Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity

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

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

Essential Studies for Professionals - III

Code: MCAN(GS)301

Contacts: 3L + 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, Administrative 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

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- 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 & Proportional tax.
- 3) RBI & Banking- Traditional Functions of RBI, CRR, SLR, REPO, Reverse repo, MSF, LAF 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:



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Indian Constitution- D.D. Basu

Our Constitution- Subhash.C. Kashyap

Minor Project

Code :MCAN391

Contacts: 12P

Credits: 6

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

Data Science and Data Analytics Laboratory

Code: MCAN392

Contacts: 3P

Credits: 3

Lab complement to MCAN302

Unix Laboratory

Code: MCAN393

Contacts: 3P

Credits: 3

Lab complement to MCAN303

Software Project Management Laboratory

Code: MCAN394

Contacts: 3P

Credits: 3

Lab to complement MCAN304.

Exercises in using commercial CASE tool for software engineering practice. Using project management software using MS Project.

Skill Development for Professionals - III

Code: MCAN(GS)381

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.

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- 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

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



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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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Elective – I :

Distributed database management

Code: MCAN401A

CONTACTS: 3L + 1 T

CREDITS: 3

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, Alexander Pachev, Wiley Dreamtech

Image Processing

Code: MCAN401B

CONTACTS: 3L + 1 T

CREDITS: 3

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.

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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: MCAN401C

CONTACTS: 3L + 1 T

CREDITS: 3

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

Cloud Computing

Code: MCAN401D

CONTACTS: 3L + 1 T

CREDITS: 3

Introduction: Cloud computing definition, reference model, Characteristics, Benefits, Challenges, Distributed Systems, Virtualization, Service-oriented computing,

Utility-oriented computing, Overview on computing platforms & technologies – AWS, Google AppEngine, MS Azure, Hadoop, Salesforce.com, Manjrasoft Aneka

Parallel & Distributed Computing: Parallel vs. Distributed computing, Elements of parallel computing, Parallel processing - hardware architecture & approaches, Concept & Component of Distributed Computing, RPC, Service-oriented computing

Virtualization: Cloud reference model – IaaS, PaaS, SaaS, Types of clouds – Public, Private, Hybrid, Community, Cloud interoperability & standards, scalability & fault tolerance, Security, trust & privacy

Concurrent Computing, High-throughput Computing and Data-Intensive Computing:



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Programming applications with Threads, Thread API, Parallel computation with Threads, Task computing, Frameworks for Task computing, Task-based application model, Data-intensive computing, characteristics, technology

Cloud Platforms and Applications: Overview on Amazon Web Services, Google AppEngine and Microsoft Azure, Cloud applications in scientific, business and consumer domain

Books:

1. Buyya, Vecciola and Selvi, Mastering Cloud Computing: Foundations and Applications Programming, Tata McGraw Hill
2. Rittinghouse and Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press
3. Aravind Doss, Cloud Computing, Tata McGraw Hill
4. Kris Jamsa, Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More, Jones & Bartlett Learning

Elective – II :

Compiler Design

Code: MCAN402A

CONTACTS: 3L + 1 T

CREDITS: 3

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

Mobile Computing

Code: MCAN402B

CONTACTS: 3L + 1 T

CREDITS: 3

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Introduction and Application of Mobile Computing

Wireless Transmission: Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems, Medium Access Control:

Motivation for a specialized MAC: Hidden and Exposed terminals. Near and Far terminals; SOMA, FOMA; TOMA: Fixed TOM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, PRMA packet reservation multiple access, reservation TOMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access

CDMA: Spread Aloha multiple access

Telecommunication Systems: GSM: Mobile Services, System Architecture, radio interface, Protocols, Localization and Calling, Handover, Security, New Data Services,

DECT, Systems Architecture

Protocol Architecture:

TETRA I, UMTS and IMT-2000, UMTS Basic Architecture, UTRA FDD mode, UTRA TDD mode

Satellite Systems: History, Applications, Basics: GEO, LEO, MEO, Routing, Localization. Handover

Examples: Broadcast Systems: Overview, Cyclic Repetition, Digital Audio; broadcasting:

Multimedia object transfer Protocol; Digital Video broadcasting

Wireless LAN: Infrared vs. Radio Transmission, Infrastructure and Ad Hoc networks,

IEEE 802.11: System Architecture, Protocol Architecture, Physical Layer, Medium

Access Control Layer, MAC management, Future development; HIPERLAN: Protocol architecture, Physical Layer Channel access control. Sublayer, Medium Access control sublayer, Information bases and networking;

Bluetooth: User Scenarios, Physical Layer, MAC layer, Networking, Security, Link management.

Wireless ATM: Motivation for WATM, Wireless ATM working group, WATM services,

Reference model: Example configurations, Generic reference model;

Handover: Handover reference model, Handover requirements, Types of handover,

Handover scenarios, Backward handover, Forward handover; Location management: Requirements for location management, Procedures and Entities; Addressing, Mobile quality of service, Access point control protocol.

Mobile Network Layer: Mobile IP: Goals, assumptions and requirements, Entities and Terminology, IP packet delivery, Agent advertisement and discovery, Registration,

Tunneling and Encapsulation, Optimizations, Reverse tunneling, Ipv6; Dynamic host configuration protocol, Ad hoc networks: Routing, Destination sequence distance vector, Dynamic source routing, Hierarchical algorithms, Alternative metrics.

Mobile Transport Layer: Traditional TCP: Congestion control, Slow start, Fast retransmit/fast recovery, Implications on mobility; Indirect TCP, Snooping TCP, Mobile rcp, Fast retransmit/fast recovery, Transmission/time- out freezing, Selective retransmission, Transaction oriented TCP.

Support for Mobility:

File systems: Consistency, Examples; World Wide Web: Hypertext transfer protocol, Hypertext markup language, Some approaches that might help wireless access, System architectures;

Wireless application protocol: Architecture, Wireless datagram protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language; WML script, Wireless telephony application, Examples "Stacks with WAP, Mobile databases, Mobile agents. Security and privacy aspects of Mobile

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Computing

Books:

1. Jochen Schiller, Mobile Communications, 2nd Edition, Pearson
2. William Stallings, Wireless Communications and Networks, PHI
3. Rappaport, Wireless Communications Principles and Practices , PHI
4. YI Bing Un , Wireless and Mobile Network Architectures, John Wiley

Embedded Systems

Code: MCAN402C

CONTACTS: 3L + 1 T

CREDITS: 3

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification of Embedded Systems, Relation between Microcontroller and Embedded System, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems

Embedded processors: Types of Embedded Processors, Microprocessors, Microcontrollers, DSP, Embedded Processors from Future Electronics, Applications for embedded processors, Choosing the Right Embedded Processor.

Embedded Systems- Application- and Domain- Specific: Washing Machine-Application Specific Example of Embedded System, Automotive- Domain Specific Example of Embedded System.

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Embedded Memories: Scratchpad Memories, Cache Memories, Flash Memories, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators.

Communication Interface: Onboard and External Communication Interfaces.

Embedded Firmware: Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

RTOS Based Embedded System Design: Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

Trends in Embedded Industry: Processor Trends in Embedded System, Embedded OS Trends, Development Language Trends

Books:

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.
2. Embedded Systems - Raj Kamal, TMH.
3. Introduction to Embedded Systems - Shibu K V, TMH
4. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
5. Embedded Systems – Lyla, Pearson, 2013
6. An Embedded Software Primer - David E. Simon, Pearson Education.

Operation Research & Optimisation Techniques

Code: MCAN403



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CONTACTS: 3L + 1 T

CREDITS: 3

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: MCAN404

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, Sithampanathan, Scitech

Management and Accounting

Code: MCAN405

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

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. 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

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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
9. Management Accounting, Khan & Jain, TMH
10. Management Accounting, M.E. Thukaram Rao, New Age International
11. Financial Accounting for Business Managers, Bhattacharyya, PHI
12. Management Accounting, I.M. Pande, VIKAS
13. Accounting and Financial management for MCA & MBA Students, Ramachandran, Scitech
14. Management Accounting for non-specialists, Atrill, PHI
15. Management Accounting, A.P. Rao, EPH

Essential Studies for Professional - IV

Paper Code: MCAN(GS)401

Contacts: 3L + 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

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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:

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

Major Project

Code: MCAN491

Contacts: 30P

Credits: 15

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

Skill Development for Professionals - IV

Code: MCAN(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, poisson & normal Distributions.
- 3) Geometry- Concept of different shapes like triangle, quadrilateral, rectangle, square, circle etc. different theorems & their applications.



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- 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

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:

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