MCA Syllabus

MCA-I Year I Semester

Theory

- Discrete Mathematics
- Probability and Statistics
- Computer Programming and Problem Solving
- Elements of Information Technology
- Modern Economic Analysis

Practical

- Programming Lab- I (C & C++ Programming)
- Programming Lab- II (EIT Lab)

CS 601

DISCRETE MATHEMATICS

UNIT –I

Fundamentals of logic: basic connectives and truth tables, logical equivalence, logical implication, use of quantifiers, definitions and the proof of theorems.

Boolean algebra: switching functions, logic gates, don't care condition.

Set theory: sets and subsets, set operations and the laws of set theory, counting and venn diagrams.

UNIT –II

Properties of Integers: the well ordering principle, Recursive definitions, the division algorithm, Euclidean algorithm, fundamental theorem of arithmetic.

Functions: Cartesian product, functions, onto functions, special functions, pigeonhole principle, Composition and inverse functions, computational complexity.

Relations: partial order relations, lattices, equivalence relations and partitions

UNIT-III

Principle of Inclusion and Exclusion: Principle of inclusion and exclusion, Generalization of principle, Derangements, Rooks polynomials, Arrangements with forbidden positions.

Generating Functions: Introductory examples, definitions and examples, partition of integers, exponential generating functions, summation operator.

UNIT-IV

Recurrence Relations: First – order linear recurrence relation, Second – order linear homogeneous recurrence relations with constant coefficients, Non-Homogenous recurrence relation, Divide-and-conquer algorithms.

Algebraic structures: Definition, Examples and properties.

Groups: Definition, Examples and elementary properties, Homomorphism, Isomorphism and cyclic groups.

UNIT-V

Graph Theory: Definitions and examples, Sub graphs, Complements and Graph isomorphism, vertex degree, Planner graphs: Hamiltonian paths and cycles, Graph coloring.

Trees: Definitions, Properties and examples, Rooted Trees, spanning trees and minimum spanning trees.

Suggested Readings:-

1. Ralph P.Grimaldi "Discrete and Combinatorial mathematics", Person Education, 4th Edition, 2003.

References:

1. Kenneth H.Rosen "Discrete mathematics and its Applications", Tata McGraw Hill,6th Edition,2007.
2. J.p.Trembly & R.Manohar, "Discrete Mathematical structures with applications to computer science", Mc graw Hill, 1987.
3. Joe L.Moth, A.Kandal & T.P.Baker, "discrete mathematics for computer scientist & Mathematicans", prentice hall n.j., 1986.
4. Kevin Ferland, "Discrete Mathematics", Houghton Mifflin Company, 2009.

MAT 602
PROBABILITY AND STATISTICS

UNIT-I

Data Validation and information abstraction: Methods of collecting data efficiently, gathering information from data charting.

UNIT-II

Probability: Laws of Probability, Probability distributions, Discrete, equiprobable binomial, Poisson.

UNIT-III

Continuous distributions: Rectangular, normal, gamma and beta.

UNIT-IV

Statistical methods: Frequency distributions, mathematical expectation, moments, skew ness and kurtosis.

UNIT-V

Correlation and regression, Introduction to tests of significance, u, t, x tests

Suggested Readings

1. S.C. Gupta and V.K. Kapoor, "Fundamentals of Mathematical Statistics", 1989.
2. William Mendenhall, Robert J. Beaver, Barbara M. Beaver, "Introduction to Probability and Statistics", Thomson Brooks/Cole, Eleventh Edition, 2003.

3. Richard A. Johnson, "Probability and Statistics for engineers", Prentice Hall India, Seventh Edition, 2005

CS 603
COMPUTER PROGRAMMING AND PROBLEM SOLVING

The First Three Units (I,II and III) are for 'c' Programming and the Last Two units (IVand V) are for c++

UNIT-I

Introduction to Computers: Computer systems, Computing Environments, Computer Languages, Creating and Running programs, System development.

Introduction to C Languages: C Programs, identifiers, types, variables, constants, operators, input/output, Expressions:-Precedence and associatively, evaluating expression, type conversion, statements, selection:- Making decisions(Conditional statements), repetition(Control statements).

UNIT-II

Functions: Designing structured programs, functions in C, user-defined function, inter-functions communication (Parameter passing mechanism), standard functions, scope, and recursion.

Arrays: Concepts, using arrays in C, inter-function communication (passing arrays to functions), two dimensional arrays, Multidimensional arrays. Application:- Selection, bubble and insertion sort.

Pointers: Introduction, pointer for inter-function communications, pointers to pointers, compatibility, arrays and pointers (w.r.t arithmetic, passing array to function), memory allocation functions.

Strings: String concepts, c string, string input/output functions, array of strings, string manipulation functions.

UNIT-III

Enumerated, structure, and Union types: The type Definition (typedef), Enumerated types, structures, Unions, Enumerations, Unions, and Pre-Processor Directives.

Text Input/output files in C: Files, Streams, Standard Library input/output functions, Formatting input/output functions, Character input/output functions, **Binary input/output:** Text versus Binary streams, Standard Library functions in files, Converting file type.

UNIT-IV

Introduction to C++: Introduction and Basic elements of C++.

Functions in C++: User-defined functions, Types of functions, parameter passing mechanism, Overloading, inline functions, Function Templates.

UNIT-V

Classes: Introduction to classes, inheritance, operator overloading, dynamic polymorphism using virtual functions, abstract classes.
Templates and Exceptional Handling.

Suggested Readings:

1. Behrouz A.Forouzan, Richard F Grilberg, "Computer Science-A structured Approach using C", 3rd Edition, cengage Learning 2007. (For unit I, II and III)
2. D.S.Malik, "C++ programming language", cengage learning, 2009. (For Units IV and V).

References:

1. Harry.H.cheng, "C/C++ for Engineers and scientist-An Interpretive Approach", Mcgraw-Hill, International Edition, 2009.
2. Owen L.astrachan, "Programming with C++", Tata Megraw hill, 2007.
3. Bjarne stroustruop, "the C++ programming language", 3rd Edition, Addison- Wesley 1998.

CS 604
ELEMENTS OF INFORMATION TECHNOLOGY

UNIT- I

Digital Age: Digital basis of computers, Data/ Information, Hardware Input, output, memory, communication hardware, software, application software, system software communications, five kinds of computers, development in communication technology, connectivity and interactivity, five generations of programming languages, programming languages used today, Object Oriented & Visual Programming.

Operating Systems: Booting, managing storage, resources, files, tasks, common operating systems, Windows 95/98, DOS, Windows NT.

UNIT- II

Processors: the CPU and the main memory, Data representation, Micro computer system unit, input & output devices, keyboard, pointing devices, source data entry devices, Diskettes, Hard-disks, Optical disks, flash memory, Magnetic tape, compression and decompression.

UNIT- III

Telecommunications: Voice, Video/voice communication, the Internet, The World Wide Web, new Internet technologies. Communication channels, networks, local networks, factors affecting communication among devices.

UNIT- IV

Files & Databases: Data storage hierarchy, file management, files management systems, type of database organization and features of a DBMS.

Application Software: Common features of software, word processing, HTML, XML, XML & ActiveX.

UNIT- V

Information systems: Organisations, departments, tasks, management levels, management information systems, six phases of system analysis and design.
Software development: Programming as a five step procedures.
Security Issues: Threats to computers & communication systems. Safe guarding computers and communications.

Suggested Readings:
1.Williams B.K.Sawyer et.al., "Using Information Technology" , Sixth Edition. Tata McGraw-Hills,2006.

References:

1. 1.Askoy & DeNardis "Introduction to Information Technology", Cengage Learning, 2006.
2. 2.Dennis P.Curtin & Kim Folley et.al., "Information Technology, The breaking wave", Mc Graw Hill, 1998.
3. 3.ITL Edn Solutions Ltd "Introduction to Information Technology" Pearson education 2005.

CS 605
MODERN ECONOMIC ANALYSIS

UNIT-I
The Nature and scope of managerial economics, Fundamental concepts of managerial economics

UNIT-II
Demand analysis, concepts of demand, demand elasticities.

UNIT-III
Production and cost analysis and principles: Production function, single output isoquantum, average cost curve-laws of returns-laws of supply. Price determination under different competitive situations.

UNIT-IV
National income: concepts, measurement and determinants.
Planning: The machinery for planning in India, salient features of indis, five-year plans.

UNIT-V
Indian financial systems, functions and role of reserve bank of India. Conventional banks and industria; finance. Term-lending financial institutions-role and functions.

Suggested Readings:

1. Dhiraj bhatacharya & Pranab chakraborti, "Fundamentals of Business economics", A.H.wheeler & co.(p) ltd., 1986.
2. Barry keating , j.Holton Wilson, "Managerial Economics", Biztantra, second Edition, 2003.
3. Dominick Salvatore, "Managerial Economics", thomoson, fourth edition, 2001.

PRACTICAL

PROGRAMMING LAB –I (CS 631)
(C & C++ PROGRAMMING LAB)

C- Programs:

1. Program to calculate simple formulas like area of Circle, Rectangle etc.
2. Program to find Maximum, Minimum and Sum of given set of numbers.
3. Program to find whether the number is Prime or not.
4. Program to find Sine(X) and Cosine(X) using series expansion.
5. Program to demonstrate Call-by –Reference parameter passing mechanism.
6. Program to implement Linear and Binary Search mechanisms.
7. Program to implement Selection and Bubble sort.
8. Program to implement Matrix multiplication using pointers.
9. Program to find the number of letters, words and sentences in a given string.
10. Program to do string manipulation without using in-built library functions.
11. Program to generate address labels using structures.
12. Program to demonstrate Sequential File Access.
13. Program to demonstrate Random File Access.

C++-Programs:

14. Recursive functions (Generates common divisor, Tower of Hanoi, Fibonacci ets).
15. Classes for Bank Account, Student Information, Library Catalogue, Employee.
16. Creation of complex, vector classes using operator overloadind.
17. Template functions for Min(), & Max() for finding minimum and maximum in a list.
18. Program on class Templates.
19. Creation of inheritance hierarchy (bank account, person)
20. Programs demonstrating virtual, pure virtual functions using abstract base class "Shape".
21. Program to demonstrate multiple inheritances and exception handling.
22. Programs demonstrating Stream and File I/O using student and employee classes.

PRACTICAL
PROGRAMMING LAB-II (CS 632)
(EIT LAB)

1. Identify and describe the relationships and role of the components of the "logical" diagram of the computer.(e.g processor, RAM, ROM, BIOS, input, output, storage.)
2. Relate the "logical" diagram of a computer system to the "physical" system by identifying the physical components of a computer and describing their purpose. (e.g

processor, memory chips, motherboard, disk drives, and controller cards such as AGP board, net work cards, sound cards, as well as parallel and serial ports etc.)

3. Assemble the computer, which they will use and load the OS with partions for Windows and Linux , configure for network connection.
4. Troubleshoot his/her PC from time to time.
5. Install/Uninstall SW/HW on his/her PC from time to time.
6. Identify and distinguish between various types of applications software, by describing and using them. (e.g word processor, spreadsheet, database, browser, mailers etc.)
7. **MS Word:** create documents with standard formatting commands, single/multi column, insert pictures/objects, drawings, hyperlinks, Header/footer, tables. No macros.
8. **MS Excel:** creating worksheets with various kinds of data, making charts, conditional formatting, awareness of the various functions-statistical, data/time, math/trig, etc, ability to explore & use these functions if need to be, demonstration through some common functions like sum, average, standard deviation, logical and information.
9. **MS Power point:** create presentations with present animations using different layouts, backgrounds, slide master, insert pictures,/objects, drawings, hyper links, header/footer, tales.
10. **HTML:** Should be able to create their web-page(little, text, frames, hyperlinks to some sites, pictures, lists, tables, fonts and color) without using any web authoring tools.
11. Distinguish between various commercially available systems by relating the cost to features available on each system
12. **MS Access:** Create database for student information, library information and inventory. Generation of queries, reports and transaction processing.
13. Be able to use the following list of commands in Linux:

Alias	cp	ftp	man	talk
Banner	date	gv	mkdir	telnet
Bc	diff	gunzip	more	unzip
Bg	dir	head	mv	vi
Cal	display	history	passwd	vim
Cat	df	id	pine	vimtutor
Cc	du	indent	ps	wall
Cd	echo	kill	pwd	wait
Chgrp	exit	last	reboot	whereis
Chmod	fg	login	rm	who
Clear	file	logname	rmdir	whami
Chfn	finger	in	shutdown	write
Chown	find	logout	tail	zip
cmp	gzip	is	tar	ands
		mail		