

Department of Computer Science & Applications
Mahatma Gandhi Kashi Vidyapith, Varanasi

Master of Computer Application/Post Graduate Diploma in Computer Application

Semester Syllabus (w.e.f. 2013-14)

M.C.A. Ist Semester

Paper Code	Name of Paper	Marks
MCA 101:	Fundamentals of Computers	100
MCA 102:	Introduction to Digital Logic	100
MCA 103:	Business Data Processing	100
MCA 104:	Design Methods and Analysis of Algorithms	100
MCP 105	Practical Examination(Based on Theory Papers)	100
	Total	500

P.G.D.C.A. Ist Semester

Paper Code	Name of Paper	Marks
PGDCA 101:	Fundamentals of Computers	100
PGDCA 102:	Introduction to Digital Logic	100
PGDCA 103:	Business Data Processing	100
PGDCA 104:	PC Software Tools	100
PGDCAP 105:	Practical Examination(Based on Theory Papers)	100
	Total	500

MCA 101/ PGDCA 101: Fundamentals of Computers

UNIT-1

Computer Organization: Simple model of. Computer to explain how it executes algorithms, CPU, Memory, I/O Units: VDU, magnetic disk: floppy & hard disk, Optical Disk. Construction of drives and their specifications, Discussion of impact/non- impact types of printer, Graphics I/O devices.

UNIT-2

CPU Structure, Machine Instruction, Operation Codes and Operand Location, Instruction Counter, Fetch and Execute Cycles in a Computer, Arithmetic Operations, Memory Locations, Address and Contents, Read and write Operations. Data Representation: Integers, Real Numbers, Binary, Octal, Hexadecimal and their interconversions, Binary Arithmetic.

UNIT-3

Elementary Systems Programming Concepts: Elementary idea of Operating Systems- Batch Processing, Multiprogramming, Time Sharing and real time systems. HLL & LLL. Language Translators: -Assemblers, Compilers, Interpreters. Differences between compiler and interpreter. Phases of Compilation.

UNIT-4

Algorithm Development: Problem Analysis, Flow Chart, Decision table. Fields, Vectors and files, Searching : linear & binary search. Hashing algorithms and resolution of collisions, typical hashing functions.

Internal Sorting Algorithms: discussion of algorithm with example for Straight selection sort, Bubble sort, Radix Sort, Quick sort, Heap sort, External Sorting Algorithms: Merge sort. Basic Data Structures: Arrays, Linked Lists, Stack, Queue, Dequeue, Tree.

Text Books:

Fundamentals of Computers –V Rajaraman

Computers and Commonsense- Hunt & Shelley

An Introduction to Data Structures and Algorithms- Tremblay &Sorenson

MCA 102/ PGDCA 102: Introduction to Digital Logic

UNIT -1

Brief overview of Semiconductor Devices. Logic gates, Transistor – Transistor Logic, emitter-coupled logic, MOSFET logic, CMOS logic.

UNIT -2

Logic Components, Truth Table, Basic Gates, Design of Combinational circuits with AND, OR, NOT, NAND, NOR Gates, Boolean Algebra, K-Maps, Don't Care Condition in K-Maps.

UNIT -3

Flip-Flop, Registers, Counters, Adders Subtractors, Encoders and Decoders (with concept of MUX & DEMUX), ALU, Control, Memory and I/O.

UNIT-4

Introduction to Microprocessor: General structure of a Microprocessor- Timing and external control- Instruction set- Addressing Modes. Arithmetic operation with fixed point and floating point data, Introduction to microprocessor Programming.

Text Books:

- An Introduction to Digital Logic-Morris Mano
- An Introduction to Microprocessors- Aditya Mathur
- Integrated Electronics- Millman & Halkias.
- An Introduction to Microprocessors- Gaonkar

MCA 103 /PGDCA 103: Business Data Processing

UNIT-1

Introduction to business organization: The business as a system, brief idea of various business subsystems: marketing, accounting, production, purchasing, personnel and inventory control. The role of a Management Services department.

UNIT-2

System analysis and design: The system life cycle, system planning- feasibility study, system investigation- establishing term of reference, fact finding and fact recording- the system flowchart.

UNIT-3

Physical design of the system: design of files, databases, input and output, procedures, design of dialogue, forms, codes. System implementation and documentation.

UNIT-4

Introduction, Definition, Objectives, Advantages and disadvantages of E-Commerce, Growth and Importance of E-Commerce.

E-Commerce Models: Business to consumer, Business to Business, Consumer to Consumer, other models.

Electronic Payment Systems: Special features required in payment systems, Types of E-payment systems, E-Cash, E-cheque, Credit card, Smart Card, Electronic Purses.

Security Issues in E-Commerce: Security risk of E-Commerce, Types of threats, Security tools. Cyber laws.

Suggested Readings:

Induction to Systems Analysis & Design: Lee, Galgotia Publications

Bharat Bhaskar, Electronic Commerce – Framework Technologies and Applications, Tata McGrawHill.

Ravi Kalakota & A.B. Whinston, Frontiers of Electronic Commerce, Pearson Education.

MCA 104: Design Methods and Analysis of Algorithms

UNIT-1

Simple Algorithms. Analyzing Algorithms, Asymptotic Notation, Recurrence relations.
Design Methods: General Consideration, Algorithm design paradigms and representative Problems.
Divide and Conquer (Binary search, Merge Sort, Quick Sort, Arithmetic with Large integers)

Unit – II

Greedy Method (Minimal Spanning Tree, Shortest Paths, Knapsack, etc.),
Dynamic Programming (Chained Matrix Multiplication, Optimal Storage on Tapes, Shortest Paths, Optimal Search Trees),

Unit – III

Backtracking (8-queens problem, Graph Colouring, Hamiltonian Cycles, etc.), Branch and Bound (0/1Knapsack problem, Travelling Salesperson), Approximation (Graph Colouring, Task Scheduling)

Unit – IV

Probabilistic Algorithms (Numerical Integration, Primality Testing).
Graph Algorithms: BFS, DFS and its applications.
Intractable Problems : Basic Concepts, Nondeterministic Algorithms, NP Completeness, Cook's Theorem, Examples of NP-Hard and NP-Complete problems. Problem Reduction.
Lower Bound Techniques.

Suggested Readings:

1. A. Aho, V. Alfred, J. Hopcroft and J. D. Ullman, The Design and Analysis of Computer Algorithms, Addison Wesley.
2. E. Horowitz and S. Sahani, Fundamentals of Computer Algorithms, Galgotia, New Delhi.
3. S.E. Goodman and S.T. Hedetniemi, Introduction to the Design and Analysis of Algorithms, McGraw Hill.
4. G. Brassard and P. Bratley, Algorithmics, PHI.

PGDCA 104: PC Software Tools

UNIT-1

MS DOS: Basic Operating System concept, CUI, concept of files and directories, Booting of the system, Internal and External DOS commands, Partition of disk, Limitation of DOS.

MS Windows: Basic multiprogramming concept, GUI, Folders, Concept of login and logout, My Documents, My computer, My Network, Recycle Bin, Start Button, Task Bar, Date and Time setting, Calculator, Word Pad, System tools.

UNIT-II

MS Word: Opening, Creating, Saving a document, Editing, Finding and Replacing Text, Using the Interface (Toolbars and Menus).

MS-Word basics, Entering, Moving, Selecting and Copying text. Applying fonts and font styles, use of Numbering and Bullets. Finding and Replacing text. Spelling, Grammar and Thesaurus. Page formatting, print previewing and printing text. Creating headers and footers. Constructing tables in MS-Word. MS-Word Mail Merge, use of templates.

UNIT-III

MS Excel: Concept of Work book, Opening, Creating, Saving a work book and or organization of worksheets in a workbook, Data entry in cell, Selecting/Copying/Moving data in a worksheet. Introductory MS-Excel skills. Entering and Editing cell entries. Working with numbers. Changing the worksheet layout. Formatting Texts, Borders, and Colour, Printing in MS-Excel. Using functions and references. Naming ranges. Charting in MS-Excel. Creating Charts. Editing and Formatting Charts,

UNIT-IV

Advanced Excel. Ms- Excel Financial and Statistical functions. Sorting and creating an MS-Excel database. Creating subtotals in MS-Excel. Using a dataform. Creating Pivot tables. Using and creating MS-Excel templates. Linking Workbooks. Formulas between worksheets.

MS Power Point: Business presentation and their advantages, Opening, Creating, saving a presentation in MS-Power Point.

Books:

- 1- PC Software Made Simple : Taxali
- 2- Sanjay Saxena : A First Course in Computers