

**MAHAMAYA TECHNICAL UNIVERSITY,**

**NOIDA**



**SYLLABUS  
FOR  
FIRST YEAR  
OF  
MASTER OF COMPUTER APPLICATIONS  
(DUAL DEGREE COURSE)**

(Effective from the session :2013-14)

## Evaluation Scheme of MCA Dual Degree Course Semester-I (Effective from the session: 2013-14)

S. No	Code	Subject	Periods			Evaluation Scheme						Total	Credit
			L	T	P	Sessional Semester				End			
						CT	TA	TOT	P	Th	P		
1.	BC 101	Mathematics -I	3	1	0	30	20	50	-	100	-	150	4
2.	BC 102	Computer Fundamentals	3	1	0	30	20	50	-	100	-	150	4
3.	BC 103	Digital Electronics	3	1	0	30	20	50	-	100	-	150	4
4.	BC 104	Oral and Written Communication	2	0	0	-	-	-	-	50	-	50	2
5.	BC 105	Computer Concepts and Programming in C	3	1	3	30	20	50	50	100	50	250	6
6.	BC 106	Office Automation	3	1	3	30	20	50	50	100	50	250	6
<b>TOTAL Marks:</b>			<b>17</b>	<b>5</b>	<b>6</b>							<b>1000</b>	<b>26</b>

*L: Lecture    T: Tutorial    P: Practical/Project    CT: Class Test    TA: Teacher's Assessment  
Th: Theory    TOT: Total*

*TA=20 (10 for Teachers assessment plus 10 for attendance)*

*P=50 (15 marks for practical exam, 15 marks viva. 10 marks for lab records and 10 marks for quiz)*

## Evaluation Scheme of MCA Dual Degree Course Semester –II (Effective from the session: 2013-14)

S. No	Code	Subject	Periods			Evaluation Scheme				Total	Credit		
			L	T	P	Sessional						End Semester	
						CT	TA	TOT	P	Th	P		
1.	BC 201	Mathematics -II	3	1	0	30	20	50	-	100	-	150	4
2.	BC 202	Programming in C	3	1	3	30	20	50	50	100	50	250	6
3.	BC 203	Operating System	3	1	0	30	20	50	-	100	-	150	4
4.	BC 204	Computer Organization	3	1	0	30	20	50	-	100	-	150	4
5.	BC 205	Professional Communication	3	1	3	30	20	50	50	100	50	250	6
6.	BC 206	Principles of Management	2	0	0	-	-	-	-	50	-	50	2
<b>TOTAL Marks:</b>			<b>17</b>	<b>5</b>	<b>6</b>							<b>1000</b>	<b>26</b>

*L: Lecture    T: Tutorial    P: Practical/Project    CT: Class Test    TA: Teacher's Assessment  
Th: Theory    TOT: Total*

*TA=20 (10 for Teachers assessment plus 10 for attendance)*

*P=50 (15 marks for practical exam, 15 marks viva. 10 marks for lab records and 10 marks for quiz)*

# Semester I

## BC 101 MATHEMATICS-I Course Contents

### Unit I: Differential Calculus - I

Leibnitz's theorem, Partial derivatives, Euler's theorem for homogeneous functions, Total derivatives, Change of variables, Curve tracing: Cartesian and Polar coordinates.

### Unit II: Differential Calculus - II

Taylor's and Maclaurin's Theorems, Expansion of function of several variables, Jacobian, Approximation of errors, Extrema of functions of several variables, Lagrange's method of multipliers ( Simple applications).

### Unit III: Linear Algebra

Inverse of a matrix by elementary transformations, Rank of a matrix ( Echelon & Normal form), Linear dependence, Consistency of linear system of equations and their solution, Characteristic equation, Eigen values and eigen vectors, Cayley-Hamilton Theorem, A brief introduction to Vector Spaces, Subspaces. Rank & Nullity. Linear transformations.

### Unit IV: Multiple Integrals

Double and triple integrals, Change of order of integration, Change of variables, Application of integration to lengths, Volumes and Surface areas – Cartesian and Polar coordinates. Beta and Gamma functions, Dirichlet's integral and applications.

### Unit V: Vector Calculus

Point function, Gradient, Divergence and Curl and their physical interpretations, Vector identities, Directional derivatives. Line, Surface and Volume integrals, Applications of Green's, Stoke's and Gauss divergence theorems (without proofs),

### Reference Books:

1. E. Kreyszig :Advanced Engineering Mathematics-Volume-I, John Wiley & Sons
2. B. V. Ramana, Higher Engineering Mathematics, Tata Mc Graw- Hill Publishing Company Ltd.
3. R.K.Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
5. Peter V. O' Neil, Advanced Engineering Mathematics, Thomas ( Cengage) Learning.
6. Thomas & Finley, Calculus, Narosa Publishing House

## **BC 102 COMPUTER FUNDAMENTALS**

### **Course Contents**

#### **Unit I:**

What is computer, characteristics of computer, generation of computers, classification of computers. Hardware: (a) Input devices -keyboard, printing devices, voice speech devices, scanner, MICR, OMR, Bar code reader, digital camera etc. (b) Output devices -Visual Display Unit, printers, plotters etc.(c) Software: Introduction; Types of software with examples; Introduction to languages, compiler, interpreter and assembler.

#### **Unit II:**

Memory unit : Primary memory-RAM, ROM, PROM, EPROM, EEPROM, Secondary memory, Cache memory, Virtual memory. Storage Devices –Magnetic disk, Magnetic tape, Optical disks-CD, DVD, Pen drive, Hard disk, Floppy disk, Flash Memory etc.

#### **Unit III:**

Operating System: Definition, Functions, Types and Classification, Elements of GUI based operating system- Windows- Use of menus, tools and commands of windows operating system. Computer Network : Overview of Computer Network, Types of computer networks (LAN, WAN and MAN), Network topologies.

#### **Unit IV:**

Internet: Overview of Internet, Architecture & Functioning of Internet, Basic services over Internet like WWW, FTP, Telnet, Gopher etc., IP addresses, ISPs, URL, Domain names, Web Browsers, Internet Protocols, Search engines, e-mail, Web browsing, searching, downloading & uploading from Internet. Applications of Information Technology.

#### **Unit V:**

Problem solving concept: Problem solving techniques (Trail & Error, Brain Storming, Divide & Conquer) Steps in problem solving (Define Problem, Analyze Problem, Explore Solution) Algorithms and Flowcharts (Definitions, Symbols), Characteristics of an algorithm Conditions in pseudo-code, Loops in pseudo code. Time complexity: Big-Oh notation, efficiency. Simple Examples: Algorithms and flowcharts.

#### **Reference Books:**

1. Computer Fundamentals By P K Sinha Forth Edition

2. Computer Fundamentals By V. Rajaraman
3. Computer Today By Suresh Basandra
4. Shrivastava- Fundamental of Computer& Information Systems (Wiley Dreamtech)
5. Leon A and Leon M -Introduction to Computers (Vikas, 1st Edition).
6. Introduction to Computers, Norton P.(TATA McGraw Hill)
7. Leon -Fundamentals of Information Technology, (Vikas)
8. Peter Norton's Introduction to Computers – Tata MGHill

## **BC 103 DIGITAL ELECTRONICS**

### **Course Contents**

#### **Unit I:**

Digital computers and Digital systems, Number systems : Binary number system, Octal & Hexa-decimal number system, Conversion of Number System, Complements: r's and (r-1)'s complement, Signed Binary numbers, Binary codes, Arithmetic operations on Binary numbers.

#### **Unit II:**

Logic Gates: AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates. Boolean Algebra: Law's, Postulates and theorems, Universal building blocks, logic diagrams, Converting circuits to universal logic, Minimization techniques: K -Map, Sum of Product & Product of Sum, Tabulation method.

#### **Unit III:**

Combinational circuits: Adders, Subtractors, Binary parallel adders, Adder/Subtractor, Decimal adder, Code conversion, Magnitude comparator, Multiplexers, Demultiplexers, Decoders & Encoders.

#### **Unit IV:**

Flip-flops: Types of Flip Flop: R-S, D, J-K, T, Master Slave, Triggering of flip-flops, state reduction and assignment, Conversion of flip-flops and State Realization of one Flip Flop Using Other Flip Flop.

#### **Unit V:**

Registers and Counters: Shift Registers, Types of registers, Universal Shift Register with parallel load, Bi-directional Shift register, Ripple counters, synchronous counters, Ring counters, Johnson counter, Mod counters.

## Reference Books:

1. Morris Mano, *Digital Logic and Computer Design*, Prentice Hall of India.
2. Morris Mano, *Digital Design*, Prentice Hall of India.
3. R.K. Gaur, *Digital Electronics and Microcomputer*, Dhanpat Rai Publication
4. R.P. Jain, *Modern Digital Electronics*, Tata McGraw-Hill
5. Malvino & Leach, *Digital Principles and Applications*, Tata McGraw-Hill.
6. Rajaraman & Radhakrishanan, *An introduction to Digital Computer Design*, Prentice Hall of India.

## BC 104 ORAL AND WRITTEN COMMUNICATION

### Course Contents:

#### Unit I:

Basic Applied Grammar and Usage The Sentences; Kinds of Sentences; Kinds of Phrases; Parts of Speech: Noun: Kinds, Gender; Case; Usage: Rules for Singular Nouns, Nouns in Plural form but Singular in sense etc. Nouns ending in - ics. Nouns ending in - es etc; Pronoun: Definition, Kinds; Number, Gender, Person, Usage. Adjectives and Determiners: kinds, Position; Comparatives and Superlatives, Conversion of Adjectives as Nouns, as adverbs, as Verbs. Determiners- Kinds. Usage of Adjectives and Determiners. Articles: Kinds, Articles and Number System, Articles and Gender System, Omission of Articles, Repetition of Articles. Adverbs: Kinds; Formation, Position of Adverbs, Degree of Comparison, Usage. Preposition: Kinds, Prepositions and Adverbial Participles, Position; correct Usage, Meaning & Usage. Verbs: Kinds; Auxiliaries; Principal Auxiliaries: Usage; Be, Have, Do, Modal auxiliaries: Usage- Can/Could, May/Might; Must; Shall/Should; Will/Would; Ought to, Semi-Modals- Need; Dare; Used to. Non-Finite Verbs: Kinds of Non-Finite: Infinitives, Gerund; Participle. Concord: Of Numbers, Of Person. Exceptions to Grammatical; Concord; Concord System. Conjunction: Coordinating Conjunction; Subordinating Conjunction. Interjection: Definition, Types. Mood: Indicative, Imperative, Subjunctive. Active and Passive Voice. Conditional Sentences.

#### Unit II:

The Structure of Sentences/Clauses Adverb Clause; Adjective Clause; Noun Clause. Sentences: Simple, Double, Multiple and Complex. Transformation of Sentences: Simple to complex and vice versa; Transformation of Degree; Simple to Compound and vice versa; Interrogative into Assertive; Affirmative into Negative and vice versa: Transformation of Statement into Exclamation. Sequence of Tenses: Usage.

**Unit III:**

Paragraph Writing Structure of Paragraph; Construction of Paragraph; Techniques of Paragraph Writing, Unity; Coherence; Emphasis. Expansion: Definition, Method of Expansion; Making of Expansion. Paraphrasing : Use of Paraphrasing; Exercises.

**Unit IV:**

Comprehension & Precis Writing Role of Listening; Ear Training, Reading Comprehension; Reasons for poor Comprehension; Improving Comprehension Skills; Developing Skills of Comprehension; Exercises. Precis Writing: Difference from Comprehension; Techniques of Precis Writing; Topic Sentences and its Arrangement. Short Essay Writing Definition of Essay; Types of Essay, Relevant Essay Writing for Engineers/Professionals; Use of Essay Writing, Dimensions of Essay Writing : Literary, Scientific, Sociological: Contemporary Problem Solving Essays. Horizons of Essay Writing: Narrative Essays; Descriptive Essays; Reflective Essays; Expository Essays; Argumentative and Imaginative Essays. Exercise.

**Reference Books:**

1. A Remedial Course in English for Colleges Books 1-3 by B.K. Das & A. David, Oxford Univ. Press, New Delhi.
2. Current English Grammar and Usage with composition by R.P. Sinha, Oxford Univ. Press, New Delhi.
3. English Grammar, Composition and Usage by J.C. Nesfield, Macmillan India Ltd. Delhi.
4. Oxford Practice Grammar by John Eastwood, Oxford Univ. Press, New Delhi.
5. Fowler's Modern English Usage by R.W. Burchfield, O.U.P. New Delhi.
6. English Grammar & Composition by P.C. Wren & Martin, S. Chand & Co. Ltd., New Delhi.

**BC 105 COMPUTER CONCEPTS AND PROGRAMMING IN C  
Course Contents****UNIT I:**

Introduction to any Operating System [Unix, Linux, Windows], Programming Environment, Write and execute the first program, Introduction to the Digital Computer; Concept of an algorithm; Termination and correctness. Algorithms to programs: Specification, top-down development and stepwise refinement. Introduction to Programming, Use of high level programming language for the systematic development of programs. Introduction to the design and implementation of correct, Efficient and maintainable programs, Structured



Programming, Trace an algorithm to depict the logic, Number Systems and conversion methods

## **UNIT II:**

Standard I/O in “C”, Fundamental Data Types and Storage Classes: Character types, Integer, short, long, unsigned, single and double-precision floating point, storage classes, automatic, register, static and external, Operators and Expressions: Using numeric and relational operators, mixed operands and type conversion, Logical operators, Bit operations, Operator precedence and associativity,

## **UNIT III:**

Conditional Program Execution: Applying if and switch statements, nesting if and else, restrictions on switch values, use of break and default with switch, Program Loops and Iteration: Uses of while, do and for loops, multiple loop variables, assignment operators, using break and continue, Modular Programming: Passing arguments by value, scope rules and global variables, separate compilation, and linkage, building your own modules.

## **UNIT IV:**

Arrays: Array notation and representation, manipulating array elements, using multidimensional arrays, arrays of unknown or varying size, Structures: Purpose and usage of structures, declaring structures, assigning of structures, Pointers to Objects: Pointer and address arithmetic, pointer operations and declarations, using pointers as function arguments, Dynamic memory allocation, defining and using stacks and linked lists.

## **UNIT V:**

Sequential search, Sorting arrays, Strings, Text files, The Standard C Preprocessor: Defining and calling macros, utilizing conditional compilation, passing values to the compiler, The Standard C Library: Input/Output : fopen, fread, etc, string handling functions, Math functions : log, sine, like Other Standard C functions.

## **Reference Books:**

1. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
2. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition [India Edition], 2007.

# **BC 106 OFFICE AUTOMATION**

## **Course Contents**

### **Unit I:**

Introduction to Microsoft office, Overview of the office component, MS-Office files and Folders, Opening, and saving files, Notepad, WordPad, Paint. MS-Office Shortcut Bar, Windows Task Bar.

### **Unit II:**

MS-WORD - Starting MS WORD, Creating and Formatting a document, Changing fonts and point size, Table Creation and operations, Autocorrect, Auto-text, Spell Check, Word Art, Working with Header, Footers, and Footnotes, Working with Graphics, Inserting objects, Page setup, Page Preview, Printing a document, Mail Merge, Outline, Find, and Automatic features, Creating Macros and Customizing word.

### **Unit III:**

MS-Excel - Starting Excel, Worksheet, Rearranging Worksheet and Cell, Inserting Data into Rows/Columns, Alignment, Text wrapping, Sorting data, Excel formatting tips and Techniques, Generating graphs, Organizing large project. Introduction to Functions, Excels chart features, Excels command macros, using worksheet as Database.

### **Unit IV:**

MS-Power Point - Starting MS–Power Point, Creating a presentation using Auto-content Wizard, Blank Presentation, Creating, Saving and Printing a presentation, Adding a slide to presentation, Navigating through a presentation, Slide-sorter, Slide-show, Editing slides, Working with Graphics and Multimedia in PowerPoint (Inserting Photo, Video & Sound).

### **Unit V:**

MS-Access-Introduction to Access, Creating Tables and Database, Data Type and Properties, Adding & Deleting Field in Table, Primary Key Fields, Queries, Forms: The Forms wizard saving forms, Modifying forms, Pages, Macro, Module, Reports, Printing Report, Forms, Letter, Relation Database, Graphics in Database, Linking Importing and Exporting Records. Internet-Use of Internet (Mailing, Browsing, Surfing)

### **Reference Books:**

1. MS-Office 2000(For Windows) – By Gini Courter, Annette Marquis, BPB Publishing.
2. Working in Microsoft Office – Ron Mansfield, Tata McGraw Hill Publishing.
3. MS-Office 2000(For Windows) – By Steve Sagman.

4. Bill Bruck., The Essentials Office 2000 Book, BPB Publishing.
5. Joyce Cox & Polly Urban, Microsoft Office, Galgotia Publishing

## **BC 105P COMPUTER CONCEPTS AND PROGRAMMING IN C LAB**

### **Course Contents**

Suggested Assignments to be conducted on a 3-hour slot. It will be conducted in tandem with the theory course so the topics for problems given in the lab are already initiated in the theory class. The topics taught in the theory course should be appropriately be sequenced for synchronization with the laboratory. A sample sequence of topics and lab classes for the topic are given below:

1. Familiarization of a computer and the environment and execution of sample programs
2. Expression evaluation
3. Conditionals and branching
4. Iteration
5. Functions
6. Recursion
7. Arrays
8. Structures
9. Linked lists
10. Data structures

## **BC 106P OFFICE AUTOMATION LAB**

### **Course Contents**

MS-WORD: Creating, Editing, Formatting: Font name, size, color, alignment, changing, paragraph settings, change case, Mail Marge, Creating Tables, editing tables, alignment settings in tables.

MS-EXCEL: Creating, Editing, Formatting: font name, size, color, alignment, changing, entering data, Sorting Data, Inserting, renaming and deleting Sheet, Inserting row, column, cell, picture, background, graph, symbol, hyperlink ,object, diagram.

MS-POWERPOINT: Creating, Editing, Formatting: font name, size, color, alignment, changing, Inserting table, picture, background, graph, symbol, hyperlink, object, diagram.

MS-ACCESS: Creating database and editing data base.

# Semester II

## BC 201 MATHEMATICS-II Course Contents

### Unit I:

Differential Equations: Linear differential equations of  $n$ th order with constant coefficients, Complementary functions and particular integrals, Simultaneous linear differential equations, Solution of second order differential equation by changing dependent and independent variables, Method of variation of parameters, Applications to engineering problems (without derivation).

### Unit II:

Series Solution and Special Functions: Series solution of ordinary differential equations of  $2^{\text{nd}}$  order with variable coefficients (Frobenius Method), Bessel and Legendre equations and their series solutions, Properties of Bessel functions and Legendre polynomials.

### Unit III:

Laplace Transform: Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step function, Dirac delta function, Laplace transform of periodic functions, Convolution theorem, Application to solve simple linear and simultaneous differential equations.

### Unit IV:

Fourier Series and Partial Differential Equations: Periodic functions, Trigonometric series, Fourier series of period  $2\pi$ , Euler's formulae, Functions having arbitrary period, Change of interval, Even and odd functions, Half range sine and cosine series, Harmonic analysis. Solution of first order Lagrange's linear partial differential equations, Linear partial differential equations with constant coefficients of  $2^{\text{nd}}$  order and their classifications - parabolic, elliptic and hyperbolic with illustrative examples.

### Unit V:

Applications of Partial Differential Equations: Method of separation of variables for solving partial differential equations, Wave equation up to two-dimensions, Laplace equation in two-dimensions, Heat conduction equations up to two-dimensions, Equations of transmission lines.

## Reference Books:

1. B.V.Ramana, Higher Engineering Mathematics, Tata Mc Graw-Hill Publishing Company Ltd., 2008.
2. R.K.Jain & S.R.K.Iyenger, Advance Engineering Mathematics, Narosa Publishing House, 2002.
3. B.S.Grewal, Engineering Mathematics, Khanna Publishers, 2004.
4. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
5. E.Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
6. C.Ray Wylie & Louis C. Barrett, Advanced Engineering Mathematics, Tata Mc Graw-Hill Publishing Company Ltd. 2003.
7. Peter V. O'Neil, Advanced Engineering Mathematics, Thomson (Cengage) Learning, 2007.
8. G.F.Simmons, Differential Equations, Tata Mc Graw-Hill Publishing Company Ltd. 1981.
9. Chandrika Prasad, Advanced Mathematic for Engineers, Prasad Mudranalaya, 1996.

## BC 202 DATA STRUCTURES USING 'C' Course Contents

### Unit I:

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices, and Vectors. Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion. Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

### Unit II:

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque, and Priority Queue, Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array,

Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

### **Unit III:**

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary trees, Huffman algorithm. Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

### **Unit IV:**

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting. Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

### **Unit V:**

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees. File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

### **Reference Books:**

1. Y. Langsam, M. Augenstin and A. Tannenbaum, Data Structures using C and C++, Pearson Education Asia, 2nd Edition, 2002.
2. Ellis Horowitz, S. Sahni, D. Mehta Fundamentals of Data Structures in C++, Galgotia Book Source, New Delhi.
3. S. Lipschutz, Data Structures Mc-Graw Hill International Editions, 1986.
4. Jean-Paul Tremblay, Paul. G. Soresan, An introduction to data structures with Applications, Tata Mc-Graw Hill International Editions, 2nd edition 1984.
5. A. Michael Berman, Data structures via C++, Oxford University Press, 2002.
6. M. Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education, 2002, 2nd edition.

# **BC 203 OPERATING SYSTEMS**

## **Course Contents**

### **Unit I:**

Introduction: Definition and types of operating systems, Batch Systems, multi programming, time-sharing parallel, distributed and real-time systems, Operating system structure, Operating system components and services, System calls, system programs, Virtual machines.

### **Unit II:**

Process Management: Process concept, Process scheduling, Cooperating processes, Threads, Interprocess communication, CPU scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real-time scheduling and Algorithm evaluation.

### **Unit III:**

Process Synchronization and Deadlocks: The Critical-Section problem, synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, Monitors, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling.

### **Unit IV:**

Storage management: Memory Management-Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging in MULTICS and Intel 386, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrashing, Page Size and other considerations, Demand segmentation, File systems, secondary Storage Structure, File concept, access methods, directory implementation, Efficiency and performance, recovery, Disk structure, Disk scheduling methods, Disk management, Recovery, Disk structure, disk scheduling methods, Disk management, Swap-Space management, Disk reliability.

### **Unit V:**

Security & Case Study: Protection and Security-Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, language based protection, The Security problem, Authentication, One Time passwords, Program threats, System threats, Threat Monitoring, Encryption. Windows NT-Design principles, System components, Environmental subsystems, File system, Networking and program interface, Linux system-design principles, Kernel Modules, Process Management, Scheduling,

Memory management, File Systems, Input and Output, Interprocess communication, Network structure, security

### **Reference Books:**

1. Abraham Siberschatz and Peter Baer Galvin, "Operating System Concepts", Fifth Edition, Addison-Wesley
2. Milan Milankovic, "Operating Systems, Concepts and Design", McGraw-Hill.
3. Harvey M Deital, "Operating Systems", Addison Wesley
4. Richard Peterson, "Linux: The Complete Reference", Osborne McGraw-Hill

## **BC 204 COMPUTER ORGANIZATION Course Contents**

### **Unit I:**

Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Arithmetic Logic, Shift Microoperation, Arithmetic Logic Shift Unit, Design of Fast adders, Arithmetic Algorithms (addition, subtraction, Booth Multiplication).

### **Unit II:**

Control Design: Hardwired & Micro Programmed (Control Unit): Fundamental Concepts (Register Transfers, Performing of arithmetic or logical operations, Fetching a word from memory, storing a word in memory), Execution of a complete instruction, Multiple-Bus organization, Hardwired Control, Micro programmed control(Microinstruction, Microprogram sequencing, Wide-Branch addressing, Microinstruction with Next-address field, Prefetching Microinstruction).

### **Unit III:**

Processor Design: Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer.

### **Unit IV:**

Input-Output Organization: I/O Interface, Modes of transfer, Interrupts & Interrupt handling, Direct Memory access, Input-Output processor, Serial Communication.



## **Unit V:**

Memory Organization: Memory Hierarchy, Main Memory (RAM and ROM Chips), Auxiliary memory, Cache memory, Virtual Memory, Memory management hardware.

## **Reference Books:**

1. Computer System Architecture, M. Mano (PHI)
2. Computer Organization, Vravice, Zaky & Hamacher (TMH Publication)
3. Structured Computer Organization, Tannenbaum (PHI)
4. Computer Organization, Stallings (PHI)
5. Computer Organization, John P. Hayes (McGraw Hill)

## **BC 205 PROFESSIONAL COMMUNICATION**

### **Course Contents**

#### **Unit I:**

Basics of Technical Communication Technical Communication: features; Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communication; The flow of communication: Downward, Upward, Lateral or Horizontal (Peer group); Importance of technical communication; Barriers to Communication.

#### **Unit II:**

Constituents of Technical Written Communication Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; Requisites of Sentence Construction: Paragraph Development: Techniques and Methods - Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation- various steps.

#### **Unit III:**

Forms of Technical Communication Business Letters: Sales and Credit letters; Letter of Enquiry; Letter of Quotation, Order, Claim and Adjustment Letters; Job application and Resumes. Official Letters: D.O. Letters; Govt. Letters, Letters to Authorities etc. Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts; Types; Writing of Proposal; Significance. Technical Paper, Project. Dissertation and Thesis Writing: Features, Methods & Writing.

**Unit IV:**

Presentation Strategies Defining Purpose; Audience & Locale; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Space; Setting Nuances of Voice Dynamics; Time- Dimension.

**Unit V:**

Value- Based Text Readings Following essays form the suggested text book with emphasis on Mechanics of writing,

- (i) The Aims of Science and the Humanities by M.E. Prior
- (ii) The Language of Literature and Science by A.Huxley
- (iii) Man and Nature by J.Bronowski
- (iv) The Mother of the Sciences by A.J. Bahm
- (v) Science and Survival by Barry Commoner
- (vi) Humanistic and Scientific Approaches to Human Activity by Moody E. Prior
- (vii) The Effect of Scientific Temper on Man by Bertrand Russell.

**Reference Books:**

1. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, New Delhi .

**BC 206 PRINCIPLES OF MANAGEMENT****Course Contents****Unit I:**

Management: Concept, Nature, Importance; Management : Art and Science, Management As a Profession, Management Vs. Administration, Management Skills, Levels of Management, Characteristics of Quality Managers. Evolution of Management: Early contributions, Taylor and Scientific Management, Fayol's Administrative Management, Bureaucracy, Hawthorne Experiments and Human Relations, Social System Approach, Decision Theory Approach. Business Ethics and Social Responsibility: Concept, Shift to Ethics, Tools of Ethics.

**Unit II:**

Introduction to Functions of Management Planning: Nature, Scope, Objectives and Significance of Planning, Types of Planning, Process of Planning, Barriers to Effective Planning, Planning Premises and Forecasting, Key to Planning, Decision Making. Organizing: Concept, Organisation Theories, Forms of Organisational Structure, Combining Jobs:

Departmentation, Span of Control, Delegation of Authority, Authority & Responsibility, Organisational Design.

### **Unit III:**

Staffing: Concept, System Approach, Manpower Planning, Job Design, Recruitment & Selection, Training & Development, Performance Appraisal Directing: Concept, Direction and Supervision Motivation: Concept, Motivation and Performance, Theories Of Motivation, Approaches for Improving Motivation, Pay and Job Performance, Quality of Work Life, Morale Building.

### **Unit IV:**

Leadership: The Core of Leadership: Influence, Functions of Leaders, Leadership Style, Leadership Development. Communication: Communication Process, Importance of Communication, Communication Channels, Barriers to Communication. Controlling: Concept, Types of Control, Methods: Pre-control: Concurrent Control: Post-control, An Integrated Control System, The Quality Concept Factors affecting Quality, Developing a Quality Control System, Total Quality Control, Pre-control of Inputs, Concurrent Control of Operations. Post Control of Outputs. Change and Development: Model for Managing Change, Forces for Change, Need for Change, Alternative Change Techniques, New Trends in Organisational Change.

### **Reference Books:**

1. Stoner, Freeman & Gilbert Jr-Management (Prentice Hall of India, 6<sup>th</sup> Edition).
2. Koontz -Principles of Management (Tata Mc Graw Hill, 1st Edition 2008).
3. Robbins & Coulter - Management (Prentice Hall of India, 8<sup>th</sup> Edition).
4. Robbins S.P. and Decenzo David A. - Fundamentals of Management: Essential Concepts and Applications (Pearson Education, 5<sup>th</sup> Edition).
5. Hillier Frederick S. and Hillier Mark S. - Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets (Tata Mc Graw Hill, 2<sup>nd</sup> Edition 2008).
6. Wehrich Heinz and Koontz Harold - Management: A Global and Entrepreneurial Perspective (Mc Graw Hill, 12<sup>th</sup> Edition 2008).

## **BC 202P DATA STRUCTURES USING 'C' LAB**

### **Course Contents**

Write Program in C for following:

- Sorting programs: Bubble sort, Merge sort, Insertion sort, Selection sort, and Quick sort.
- Searching programs: Linear Search, Binary Search.
- Array implementation of Stack, Queue, Circular Queue, Linked List.
- Implementation of Stack, Queue, Circular Queue, Linked List using dynamic memory allocation.
- Implementation of Binary tree.
- Program for Tree Traversals (preorder, inorder, postorder).
- Program for graph traversal (BFS, DFS).
- Program for minimum cost spanning tree, shortest path.

## **BC 205P PROFESSIONAL COMMUNICATION LAB**

### **Course Contents**

Interactive and Communicative Practical with emphasis on Oral Presentation/Spoken Communication based on International Phonetic Alphabets (I.P.A.)

### **LIST OF PRACTICALS**

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.
2. Conversational Skills for Interviews under suitable Professional Communication Lab conditions with emphasis on Kinesics.
3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistics/Kinesics.
4. Presentation Skills for Technical Paper/Project Reports/ Professional Reports based on proper Stress and Intonation Mechanics.
5. Official/Public Speaking based on suitable Rhythmic Patterns.
6. Theme- Presentation/ Key-Note Presentation based on correct argumentation methodologies.
7. Individual Speech Delivery/Conferences with skills to defend Interjections/Quizzes.
8. Argumentative Skills/Role Play Presentation with Stress and Intonation.
9. Comprehension Skills based on Reading and Listening Practicals on a model Audio-Visual Usage.

**Reference Books:**

1. Sethi & Dhamija: A Course in Phonetics and Spoken English, Prentice Hall, New Delhi.
2. L.U.B.Pandey & R.P.Singh, A Manual of Practical Communication, A.I.T.B.S. Pub. India Ltd. Krishan Nagar, Delhi.
3. Joans Daniel, English Pronouncing Dictionary, Cambridge Univ. Press.