

**DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY**

**LUCKNOW**



**Study & Evaluation Scheme with Syllabus**

**for**

**First Year MCA (Integrated)**

**On**

**Choice Based Credit System**

**(Effective from the Session: 2017-18)**

**1<sup>st</sup> Year I-SEMESTER**

S. No.	Subject Code	Subject Name	L-T-P	ESE Marks	Sessional		Total	Credit
					CT	TA		
1.	RAS107	Mathematics for MBA	3-1-0	70	20	10	100	4
2.	RCAI101	Programming in C	3-1-0	70	20	10	100	4
3.	RCAI102	Office Automation	3-1-0	70	20	10	100	4
4.	RCAI103	Fundamentals of Computer	3-1-0	70	20	10	100	4
5.	RCAI104	Business Communication	3-1-0	70	20	10	100	4
6.	RCAI151	Programming in C Lab	0-0-3	50	30	20	100	2
7.	RCAI 152	Office Automation Lab	0-0-3	50	30	20	100	2
Total							700	24

CT: Class Test

TA: Teacher Assessment

L/T/P: Lecture/ Tutorial/ Practical

**1<sup>st</sup> Year II-SEMESTER**

S. No.	Subject Code	Subject Name	L-T-P	ESE Marks	Sessional		Total	Credit
					CT	TA		
1.	RAS204	Professional Communication	3-0-0	70	20	10	100	3
2.	RAS207	Discrete Mathematics for MBA	3-1-0	70	20	10	100	4
3.	REC202	Digital Electronics	3-1-0	70	20	10	100	4
4.	RCAI201	Advance Programming in C	3-1-0	70	20	10	100	4
5.	RCAI202	Computer Organization	3-1-0	70	20	10	100	4
6.	RAS254	Professional Communication Lab	0-0-2	50	30	20	100	1
7.	RCAI251	Advance Programming in C Lab	0-0-3	50	30	20	100	2
Total							1000	22

CT: Class Test

TA: Teacher Assessment

L/T/P: Lecture/ Tutorial/ Practical

## RAS107: MATHEMATICS FOR MBA

### UNIT-I

**Linear Algebra: Determinants**- Definition, Minors, Cofactors, Properties of Determinants.

**Matrices**- Definition, Algebra of matrices, Types of matrices, 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.

### UNIT-II

**Differential Calculus**: Introduction,  $n^{\text{th}}$  derivative of some elementary functions, Successive differentiation and Leibnitz's theorem, Partial derivatives, function of two variable, Homogeneous functions, Euler's theorem for homogeneous functions, Total derivatives, Change of variables, Jacobian Method.

### UNIT-III

**Differential Equations** : Linear differential equations of  $n^{\text{th}}$  order with constant coefficients, Complementary functions and particular integrals, Simultaneous linear differential equations, Linear partial differential equations with constant coefficients of  $2^{\text{nd}}$  order and their classification- parabolic, elliptic and hyperbolic with illustrative examples.

### UNIT-IV

**Laplace Transform**: Introduction, Existence theorem, Laplace transform of derivatives and integrals. First shifting and second shifting theorems, Unit step function, Convolution theorem and Laplace transform of periodic functions.

### UNIT-V

**Inverse Laplace Transform**: Introduction, Inverse Laplace Transform of derivatives and integrals. First shifting and second shifting theorems, Inverse Laplace Transform by Convolution theorem, Heaviside inverse formula and solution of simple linear and simultaneous differential equations.

### References:

1. Dass HK and Verma R., "Higher Engineering Mathematics", S. Chand Publications.
2. Jain MK and Iyengar SRK, "Computational methods for Partial Differential Equations", New Age International Publishers.
3. Sharma GS and Sharma IJS, "Engineering Mathematics", CBS Publishers.
4. Dhama HS, "Differential Calculus", New Age International Publishers.
5. Dass HK and Verma R., "Introduction to Engineering Mathematics- Volume I", S. Chand Publishing.
6. Dass HK and Verma R., "Introduction to Engineering Mathematics- Volume II", S. Chand Publishing.
7. Bali NP and Goyal M., "A Textbook of Engineering Mathematics Semester I", University Science Press.
8. Bali NP and Goyal M., "A Textbook of Engineering Mathematics Semester II", University Science Press.

# RCAI101: PROGRAMMING IN C

## UNIT-I

**Introduction of computers:** Characteristics, Classification, Components, Software and their types, Types of computer languages- low-level, middle-level and high-level; Concept of assembler, compiler, loader and linker.

**Basics of programming:** Approaches to problem solving, Use of high level programming language for the systematic development of programs, Concepts of algorithms and flowcharts, Structured programming.

## UNIT-II

**Fundamentals of C:** Introduction, History, Basic structure of a program, Character set, Tokens, Keywords, Identifiers, Constants, Variables, Instructions, Standard Input/Output.

**Data types:** Introduction, Types - character, integer, short, long, unsigned, single and double-precision floating point.

## UNIT-III

**Operators and Expressions:** Arithmetic operators, Relational operators, Logical operators, Mixed operands, Type conversion, Operator precedence and associativity.

**Basic Input Output:** Introduction, Single character input-output, String input-output, General input output, Types of characters in format strings.

## UNIT-IV

**Conditional Program Execution:** if, if-else, and nested if-else statements, Switch statements, Restrictions on switch values, Use of break and default with switch, Comparison of switch and if-else.

**Loops and Iteration:** for, while and do-while loops, Multiple loop variables, Nested loops, Assignment operators, break and continue statement.

## UNIT-V

**Functions:** Introduction, Types, Need, Advantages, Elements of User-defined functions, Function calls, Defining functions, Return values and their types, Writing multifunction program, Calling function by value, Local and external variables, Recursive functions.

**Storage classes:** Introduction, Types- automatic, register, static and external.

## References:

1. Kanetkar Y., "Let Us C", BPB Publications.
2. Hanly J. R. and Koffman E. B., "Problem Solving and Program Design in C", Pearson Education.
3. Gottfried B., "Schaum's Outlines- Programming in C", Tata McGraw-Hill Publications.
4. Yadav D. S. and Khanna R., "Computer System and Programming in C", New Age International Publishers.
5. Ravichandran D., "Programming in C", New Age International Publishers.
6. Goyal K. K., Thapaliyal M. P. and Sharma M. K., "Computer Concept & C Programming", University Science Press.
7. Patel R.B., "Go Through C", BPB Publications.
8. Dey P. and Ghosh M., "Computer Fundamentals and Programming in C", Oxford University Press.

## **RCAI102: OFFICE AUTOMATION**

### **UNIT-I**

**MS-Office :** Introduction, Overview of the office components, MS-Office files and folders, Opening, and saving files, Notepad, WordPad, Paint, 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.

### **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.

### **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.

### **References:**

1. Courter G. and Marquis A., “MS-Office 2000 – No Experience Required”, BPB Publications.
2. Mansfield R., “Working in Microsoft Office”, Tata McGraw Hill Edition.
3. Perry G., “Teach Yourself Microsoft Office 2000”, Techmedia.
4. Srivastava SS, “MS Office”, Firewall Media.

# RCAI103: FUNDAMENTALS OF COMPUTER

## UNIT-I

**Introduction:** Definition of 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. 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, 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).

## UNIT-IV

**Problem solving concept:** 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.

## UNIT-V

**Internet & Multimedia:** Overview of Internet, Architecture and Functioning of Internet, Basic services over Internet like WWW, FTP, Telnet, Gopher etc., Search engines, E-mail, Web Browsers, Uses of Internet, Overview of multimedia, Multimedia components and Multimedia applications.

## References:

1. Sinha PK and Sinha P., “Computer Fundamentals”, BPB Publications.
2. Rajaraman V., “Fundamentals of Computers”, Prentice-Hall of India.
3. Leon A. and Leon M., “Introduction to Computers”, Vikas Publishing House.
4. Norton P., “Introduction to Computers”, McGraw Hill Education.
5. Goel A., “Computer Fundamentals”, Pearson.
6. Arora A., “Foundation of Computer Science”, Firewall Media.
7. Nagpal DP, “Computer Fundamentals”, S. Chand Publishing.

## **RCAI104: BUSINESS COMMUNICATION**

### **UNIT-I**

**Means of Communication:** Meaning and Definition, Process, Functions, Objectives, Importance, Essentials of good communication, Communication barriers, 7C's of communication.

### **UNIT-II**

**Oral Communication:** Meaning, nature and scope, Principle of effective oral communication, Techniques of effective speech, Media of oral communication - Face-to-face conversation, Teleconferences, Press Conference, Demonstration, Radio Recording, Dictaphone, Meetings, Rumour, Demonstration and Dramatisation, Public address system, Grapevine, Group Discussion, Oral report, Closed circuit TV. The art of listening and Principles of good listening.

### **UNIT-III**

**Written Communication:** Purpose of writing, Clarity in Writing, Principle of Effective writing, Writing Techniques, Electronic Writing Process.

### **UNIT-IV**

**Business Letters & Reports:** Need and functions of business letters, Planning & layout of business letter, Kinds of business letters, Essentials of effective correspondence, Purpose, Types and objective of Reports, Writing Reports.

### **UNIT-V**

**Drafting of Business Letters:** Enquiries and replies, Placing and fulfilling orders, Complaints and follow-up Sales letters, Circular letters Application for employment and resume.

### **References:**

1. Sharma RC and Mohan K., "Business Correspondence and Report Writing", Tata McGraw Hill.
2. Chaturvedi PD and Chaturvedi M., "Business Communication- Concepts, Cases and Applications", Pearson.
3. Chhabra TN, "Business Communication- Concept and Skills", Sun India Publications.
4. Mohan K. and Banerji M., "Developing Communication Skills", MacMillan Publishers India.

## RCAI151: PROGRAMMING IN C LAB

1. Write a program to perform addition, subtraction, multiplication and division operation on operands.
2. Write a program to calculate area and perimeter of a square, rectangle and circle.
3. Write a program to find maximum of three numbers.
4. Write a program to calculate simple interest and compound interest.
5. Write a program to convert temperature from Centigrade to Fahrenheit and vice-versa.
6. Write a program to calculate gross salary of an employee
7. Write a program to calculate sum of digits of a number.
8. Write a program to print reverse of a number.
9. Write a program to find roots of a quadratic equation.
10. Write a program to check whether a given year is a leap or not.
11. Write a program to find whether a given number is prime or not.
12. Write a program to print sum of numbers from 1 to 10.
13. Write a program to convert binary number into decimal number and vice-versa.
14. Write a program to find division of a student. (I div if percentage  $\geq 60\%$ , II div if percentage  $\geq 45\%$  & less than  $60\%$ , III div  $\geq 33\%$  & less than  $45\%$  and else fail)
15. Write a program to print Fibonacci series up to n numbers.
16. Write a program to print first n prime numbers.
17. Write a program to interchange the contents of two numbers using function (call by value).
18. Write a program to find factorial of a given number using recursion.
19. Write a menu-driven program using switch-case statement.
20. Write a program to print patterns as shown below:

(a) 1	(b) 5 4 3 2 1	(c) 1 2 3 4 5 4 3 2 1
1 2	5 4 3 2	1 2 3 4 4 3 2 1
1 2 3	5 4 3	1 2 3 3 2 1
1 2 3 4	5 4	1 2 2 1
1 2 3 4 5	5	1 1



## **RCAI152: OFFICE AUTOMATION LAB**

1. Create a painting or sketch using Paint Tool.
2. Create a resume using MS-Word.
3. Create a letterhead for any company or organization using MS-Word.
4. Create an advertisement for a company or society using MS-Word.
5. Create pamphlets for any company using MS-Word.
6. Create a Student list and Sort it using MS-Excel.
7. Create an excel sheet to show the use of following formulae- SUM, AVERAGE, DATE
8. Create an excel sheet to show the use of following logical formulae- OR, AND, TRUE
9. Create an excel worksheet to show the use of two Auto Sum and Financial formulae.
10. Create an excel worksheet to show the use of – Maximum, Count Numbers,Product.
11. Create a Salary table and apply conditional formatting to calculate gross salary using MS-Excel.
12. Create a Bar Chart for Newspaper sales in a month using MS-Excel.
13. Create a Pie Chart for comparison of Literacy for male and female population in a given state using MS-Excel.
14. Create a spreadsheet to Track bank accountactivity.
15. Create a presentation to discuss software description.
16. Create a presentation to present a paper in a conference.
17. Create a presentation by using various animation features.
18. Create a Table Structure in a MS-Access.
19. Create a Table for student to insert a record in MS-Access.
20. Create a Table for Library records and find out the how many books are available in a particular subject in MS-Access.

## **RAS207: DISCRETE MATHEMATICS FOR MBA**

### **UNIT-I**

**Set Theory:** Definition of sets, Venn Diagrams, proofs of some general identities on sets.

**Relation:** Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, partial ordering relation.

**Function:** Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions.

### **UNIT-II**

**Mathematical Induction:** Piano's axioms, Mathematical Induction Discrete Numeric Functions and Generating functions, Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients.

### **UNIT-III**

**Algebraic Structures:** Properties, Semi group, Monoid, Group, Abelian group, Properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups

### **UNIT-IV**

**Propositional Logic:** Proposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers,

### **UNIT-V**

**Posets, Hasse Diagram and Lattices:** Introduction, Ordered set, Hasse diagram of partially ordered set, Isomorphic ordered set, Well ordered set, Properties of Lattices and complemented lattices.

### **References:**

1. Tremblay JP and Manohar R., "Discrete Mathematical Structures with Application to Computer Science", Tata McGraw Hill.
2. Lipschutz S. and Lipson M., "Discrete Mathematics", Tata McGraw Hill.
3. Rosen KH, "Discrete Mathematics and its Applications", Tata McGraw Hill.
4. Sarkar SK, "A Textbook of Discrete Mathematics", S. Chand Publishing.
5. Sharma JK, "Discrete Mathematics", Trinity Press.
6. Gupta S. B., "Discrete Mathematics and Structures", University Science Press.

## REC202: DIGITAL ELECTRONICS

### UNIT-I

**Binary Systems:** Digital computers and Digital systems, Binary Numbers, Number Base conversion, Octal & Hexa-decimal numbers, Complements, Binary codes.

### UNIT-II

**Boolean Algebra and Logic Gates:** Basic definitions, Axiomatic definition, Basic theorems and Properties, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates.

### UNIT-III

**Simplification of Boolean Functions:** The Map method, two, three, four, five and six variable maps, Product of Sums and Sum of Products simplification, NAND and NOR implementation, Other two-level implementations, Don't-Care conditions, The Tabulation method, Determination and selection of Prime-Implicants.

### UNIT-IV

**Combinational Logic:** Design procedure, Adders, Subtractors, Code conversion, Analysis procedure, Multilevel NAND and NOR circuits, Exclusive-or and Equivalence Functions, Binary Parallel Adder, Decimal Adder, Magnitude comparator, Decoders, Multiplexers.

### UNIT-V

**Sequential Logic, Registers and Counters:** Flip-Flops, Triggering of Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design procedure, Design of Counters, Design with State Equations, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences.

### References:

1. Mano M., "Digital Logic and Computer Design", Pearson.
2. Mano M., "Digital Design", Prentice-Hall of India.
3. Gaur RK, "Digital Electronics and Micro-computers", Dhanpat Rai Publications.
4. Jain RP, "Modern Digital Electronics", McGraw-Hill Education.
5. Malvino AP and Leach DP, "Digital Principles and Applications", McGraw-Hill Education.
6. Rajaraman V. and Radhakrishanan T., "An Introduction to Digital Computer Design", Prentice-Hall India Pvt. Ltd.
7. Gill NS and Dixit JB, "Digital Design & Computer Organization", University Science Press.

## RCAI201: ADVANCE PROGRAMMING IN C

### UNIT-I

**Arrays:** Array notation and representation, Declaring one-dimensional array, Initializing arrays, Accessing array elements, Manipulating array elements, Arrays of unknown or varying size, Passing arrays to functions, Two-dimensional arrays, Multidimensional arrays.

**Strings:** Introduction, Initializing strings, Accessing string elements, Array of strings, Passing strings to functions, String functions.

### UNIT-II

**Pointers:** Fundamentals, Pointer declaration, \* and & operators. void pointer, Pointer to pointer, Operations on pointers, Pointers to functions, Pointers and array, Array of pointers, Pointers and strings,

**Dynamic Memory Allocation:** Introduction, Library functions – malloc, calloc, realloc and free, Dynamic multi-dimensional arrays.

### UNIT-III

**Structure:** Introduction, Initializing, defining and declaring structure, Accessing members, Operations on individual members, Operations on structures, Structure within structure, Array of structure, Array within structure, Nested structure, Passing arguments, Returning structure for functions, Pointers to structure.

**Union:** Introduction, Declaring union, Usage of unions, Operations on union. Enumerated data type.

### UNIT-IV

**File Handling:** Basics, File types, File operations, File pointer, File opening modes, File handling functions, File handling through command line argument, Record I/O in files.

**Bit-wise Programming:** Bit numbering and conversion, Bit operations- right shift, left shift, bitwise AND, bitwise OR, bitwise XOR, Bitwise compound assignment operator.

### UNIT-V

**The C Preprocessor:** Preprocessor directives, Macro expansions, Conditional compilation, Multi-way command.

**Graphics:** Detection, Initialization and loading of graphics driver for the programs, Constant, Data types and global variables used in graphics, Library functions used in drawing, GUI interaction within the program.

### References:

1. Kanetkar Y., "Programming in C", BPB Publications.
2. Venugopal K.R. and Prasad S. R., "Mastering C", McGraw Hill Education.
3. Schildt H., "C- The Complete Reference", TataMcGraw-Hill.
4. Goyal K. K. and Pandey H., "Trouble free C", University Science Press.
5. Balagurusamy E., "Programming in ANSI C", McGraw-Hill Publications.
6. Salaria R.S., "Application Programming in C", Khanna Book Publishing Company.
7. Rajaraman V., "Computer Programming in C", Prentice-Hall of India.
8. Kanetkar Y., "Graphics Under C", BPB Publications.

## **RCAI202: COMPUTER ORGANIZATION**

### **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.

### **References:**

1. Mano M., "Computer System Architecture", Pearson.
2. Hamacher C., Vranesic Z. and Zaky S., "Computer Organization", Tata McGraw Hill.
3. Tanenbaum A. S., "Structured Computer Organization", Pearson Education.
4. Stallings W., "Computer Organization and Architecture", Pearson Education.

## **RCAI251: ADVANCE PROGRAMMING IN C LAB**

1. Write a program to perform addition of two matrices.
2. Write a program to perform multiplication of two matrices.
3. Write a program to find the transpose of a given matrix.
4. Write a program to print upper (or lower) triangular elements of a matrix.
5. Write a program to find whether a given string is palindrome or not.
6. Write a program to copy a string to another.
7. Write a program to concatenate two strings.
8. Write a program to convert a string to lowercase (or uppercase).
9. Write a program to count the number of alphabets, vowels, consonants, numbers and whitespaces in a given line of text.
10. Write a program to print a string backwards (from last character to the first).
11. Write a program for the Towers of Hanoi problem.
12. Write a program to perform pointer arithmetic operations. .
13. Write a program to swap the contents of two variables using pointers.
14. Write a program to access a string using pointer.
15. Write a program to display bit pattern corresponding to the given signed decimal number.
16. Write a program to demonstrate the use of bitwise shift operators.
17. Write a program to demonstrate the use of bitwise AND, bitwise OR and bitwise XOR operators.
18. Write a program to access employee data using structures.
19. Write a program to create, open access and update a data file containing student records.
20. Write a program to demonstrate the use of graphics library functions.