HIMACHAL PRADESH UNIVERSITY

BACHELOR OF COMPUTER APPLICATIONS (BCA)
As per the amendments on 14.8.15 by the Executive Council of H.P. University, Shimla and effective from session 2015-16 onwards
Duration: 3 Years (6 Semesters)

1. **About the Course**

    Bachelor of Computer Applications (BCA) is three years under graduate course spread over six semesters under self financing scheme.

2. **Eligibility**

    Candidates who have passed 10+2 examination from H.P. Board/CBSE/ICSE or any other examination considered equivalent to 10+2, by the Himachal Pradesh University, Shimla05, with 40% Marks (35% marks for SC/ST category), shall be eligible.

    Maximum age limit for admission to BCA course is 21 years for general category, 24 years for SC/ST category and 23 years for girls candidates, as on the 1st July of the year concerned. The Vice0Chancellor may permit age relaxation up to maximum of three months.

3. **Mode of Selection**

    The admission to BCA course will be made on the basis of merit of the qualifying examination.

    As per H.P. University rules 75% seats will be filled out of the candidates who have passed their 10+2 examination from the school situated in Himachal Pradesh irrespective of the Board. Remaining 25% seats will be filled on all India basis. Other reservation rules of H.P. University shall be applicable.

4. Scheme of Examination
The pass percentage in each subject will be 40%.

i) Theory Papers:

   For Regular students each paper will be of 100 marks (70 marks for End Semester Examination and 30 marks for Continuous Comprehensive Assessment) and duration of each paper will be 3 hours.

   For ICDEOL students each theory paper will be of 100 marks and of 3 hours duration.

   In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5 to 10 parts, out of the entire syllabus. In all, five questions are to be attempted.

i) Continuous Comprehensive Assessment (CCA) accounting for 30% of the final grade that a student gets in a course; and

ii) End-Semester Examination (ESE) accounting for the remaining 70% of the final grade that the student gets in a course.

Note:
1. A student will have to pass both the components (i.e. CCA and ESE) separately to become eligible to be declared successful in a course.
2. The ratio of Continuous Comprehensive Assessment (CCA) and End-Semester Examination (ESE) would remain unchanged (i.e. 50:50) for the students of the academic sessions admitted in 2013 and 2014.

Mid-Term (Minor) Test – There will be one mid-term test, to be conducted when approximately 2/3 of the syllabus has been covered. This mid-term test will be for 15 marks. Mid-term test will be conducted by the college in consultation with the teacher.

Note:
Mid-term (Minor) Test will be of 30 marks for the students of the academic sessions admitted in 2013 and 2014 respectively.

Seminar/Assignment/Term Paper–The remaining 10 marks of the CCA will be awarded on the basis of seminar/assignment/term paper etc. that the course teacher might give to the students.

Note:
Seminar/Assignment/Term Paper will be of 15 marks for the students of the academic sessions admitted in 2013 and 2014.

End-Semester Examination (ESE): The remaining 70% of the final grade of the student in a course will be on the basis of an end-semester examination (ESE) that will be for three hours duration and will be covering the whole syllabus of the course.

Note:
1. Only those students will be allowed to appear in the ESE who have been successful in the CCA.
2. The remaining 50% of the final grade for the students of the academic sessions 2013 and 2014 in a course will be on the basis of an end-semester examination (ESE) that will be for three hours duration and will be covering the whole syllabus of the course.

A student, who fulfills all the requirements for appearing in a semester examination, is unable to appear in the examination or to complete it on account of his/her own serious illness, accident, or on account of the death of near relative (mother, father, brother and sister), or the dates of state or national level examinations falls on dates of the semester exams may be allowed to appear in the semester exam in the next academic year when examination for that semester is due. Permission to sit in the examination will be permitted by college Principal/Director on the production of a valid certificate/document

from the competent authority. The college will send the name of the student to the Registration and Migration Cell for information.

The question paper for the ESE may have any one of the following patterns:

Part A
Fifteen objective type questions (MCQ / True or False / fill in the blanks etc.) for 1 mark each.   15 × 1= 15 marks
Part B
Ten short answer (25 words) type questions for 2 marks each.
                                                           10 × 2 = 20 marks

Part C
Ten questions of Medium Length Answer type (50 words) for 4 marks each of which five will have to be answered.
                                                           5× 4 = 20 marks
Part D
Three questions of long answer (400 words) type, of which one is to be attempted for 15 marks.
                                                           15 × 1 = 15 marks

Total marks (A + B + C + D)   15+ 20 + 20 +15 = 70 marks.

OR (PREFRABLY)

Part A (Compulsory)
Compulsory of 30 marks consisting of 10 objective type questions of 1 mark each (in MCQ/True False/Fill in the blanks or such type), and five short answer questions (25 to 50 words) of 4 marks each covering whole of the syllabus.

Part B (UNIT I)
One question out of two questions each of 10 marks. Each of these questions may contain sub parts and will be long type.

Part C (UNIT II)
One question out of two questions each of 10 marks. Each of these questions may contain sub parts and will be long type.

Part D (UNIT III)
One question out of two questions each of 10 marks. Each of these questions may contain sub parts and will be long type

Part E (UNIT IV)
One question out of two questions each of 10 marks. Each of these questions may contain sub parts and will be of long type.

Total marks (A + B + C + D + E)   30+10+10+10+10 = 70 marks.

The result would be declared by the Controller of Examination of the Himachal Pradesh University and the degree (or certificate or diploma as the case may be) conferred. A candidate shall be eligible for the conferment of the Bachelor's degree only if he / she has earned the minimum required credits for the programme prescribed in the regulations (i.e. (a) For a bachelors degree with major (honours): 120 credits in total and minimum of 9 credits in Compulsory Courses; 56 credits in Core Courses; a minimum of 40 credits in Elective Courses (minimum 20 credits in each of the minor subjects, or (b) For a bachelors degree: 106 credits with 48 credits in Core Courses; 48 credits in Elective Courses (24 credits in each of the two subjects studied) and minimum of 9 credits in Compulsory Courses); and a minimum of 1 credit of GI and H.

ii) Practical Examination
Max. Marks: 50

      CCA (Continuous Comprehensive Assessment):   **35**
      ESE (End Semester Examination):   **15**

Duration: 3 hours.

      Practical exam will be conducted by the external examiner from the panel submitted to The Chairman, Computer Science Department, Himachal Pradesh University and duly approved by the competent authority of the university, Himachal Pradesh University, Shimla.

iii) Project Work
Max. Marks: 50

      CCA (Continuous Comprehensive Assessment):   **35**
      ESE (End Semester Examination):   **15**

      In the 6th semester the student has to develop one project, which will be evaluated by the external examiner from the panel submitted to The Chairman, Computer Science Department, Himachal Pradesh University, and duly approved by the university authority/evaluation branch, Himachal Pradesh University, Shimla on the following basis:

    1. Project Report   10 Marks (To be evaluated externally)
    2. Seminar   15 Marks (To be evaluated internally)
    3. Viva Voce   25 Marks (To be evaluated externally)

5. Medium of Instruction
      English will be the medium of instruction as well as examination

6. Promotion Rule
      As per the University norms.

HIMACHAL PRADESH UNIVERSITY
BACHELOR OF COMPUTER APPLICATIONS (BCA)
Effective from 2012 onwards

First Year (1st Semester)

Paper Code	Paper Title	Credit	ESE	CCA	Max. Marks	Exam Duration Hours
BCA0101	Mathematics-I	4	70	30	100	3
BCA0102	Applied English	4	70	30	100	3
BCA0103	Computer Fundamentals	4	70	30	100	3
BCA0104	C Programming	4	70	30	100	3
BCA0105	Office Automation Tools	4	70	30	100	3
BCA0104(P)	C Programming Lab-I	3	35	15	50	3
BCA0105(P)	Office Automation Tools Lab-II	3	35	15	50	3
Total					**600**	

First Year (2nd Semester)

Paper Code	Paper Title	Credit	ESE	CCA	Max. Marks	Exam Duration Hours
BCA0201	Mathematics-II	4	70	30	100	3
BCA0202	Communicative English	4	70	30	100	3
BCA0203	Digital Electronics	4	70	30	100	3
BCA0204	Data Structures	4	70	30	100	3
BCA0205	Data Base Management System	4	70	30	100	3
BCA0204(P)	Data Structures Lab-III	3	35	15	50	3
BCA0205(P)	Data Base Management System Lab-IV	3	35	15	50	3
Total					**600**	

Second Year (3rd Semester)

Paper Code	Paper Title	Credit	ESE	CCA	Max. Marks	Exam Duration Hours
BCA0301	Mathematics-III	4	70	30	100	3
BCA0302	Business Practices and Management	4	70	30	100	3
BCA0303	Computer Organization	4	70	30	100	3
BCA0304	Object Oriented Programming with C++	4	70	30	100	3
BCA0305	Desktop Publishing and Designing	4	70	30	100	3
BCA0304(P)	Object Oriented Programming with C++ Lab-V	3	35	15	50	3
BCA0305(P)	Desktop Publishing and Designing Lab-VI	3	35	15	50	3
Total					**600**	

Second Year (4th Semester)

Paper Code	Paper Title	Credit	ESE	CCA	Max. Marks	Exam Duration Hours
BCA0401	Personnel Management	4	70	30	100	3
BCA0402	Accounting	4	70	30	100	3
BCA0403	System Analysis and Design	4	70	30	100	3
BCA0404	Internet Technology & Web Page Design	4	70	30	100	3
BCA0405	Programming in Visual Basic	4	70	30	100	3
BCA0404(P)	Internet Technology & Web Page Design Lab-VII	3	35	15	50	3
BCA0405(P)	Programming in Visual Basic Lab-VIII	3	35	15	50	3
Total					**600**	

Third Year (5th Semester)

Paper Code	Paper Title	Credit	ESE	CCA	Max. Marks	Exam Duration Hours
BCA0501	Operating System	4	70	30	100	3
BCA0502	eCommerce	4	70	30	100	3
BCA0503	Management Information System	4	70	30	100	3
BCA0504	ASP.net Technologies	4	70	30	100	3
BCA0505	Computer Oriented Statistical Methods	4	70	30	100	3
BCA0504(P)	ASP.net Technologies Lab-IX	3	35	15	50	3
BCA0505(P)	Computer Oriented Statistical Methods Lab-X	3	35	15	50	3
Total					**600**	

Third Year (6th Semester)

Paper Code	Paper Title	Credit	ESE	CCA	Max. Marks	Exam Duration Hours
BCA0601	Computer Networks	4	70	30	100	3
BCA0602	Numerical Methods	4	70	30	100	3
BCA0603	Multimedia Technology	4	70	30	100	3
BCA0604	Computer Graphics	4	70	30	100	3
BCA0605	Software Engineering	4	70	30	100	3
BCA0604(P)	Computer Graphics Lab-XI	3	35	15	50	3
BCA0606	Major Project	3	35	15	50	
Total					**600**	

BCA0101 Mathematics-I

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UNIT-I

Set theory, Relations, quadratic equations, sequence & series, binomial theorems, determinants, matrices.

UNIT-II

Rectangular co-ordinates, length of a line segment, section ratio, area of a triangle, equations of a straight line circles.

UNIT-III

Trigonometric functions, trigonometrical ratios of negative and associated angles, trigonometrical ratios of compound angles, multiple and sub multiple angles, Heights and distances.

UNIT-IV

Functions, limits and continuity, Derivative of functions, Maxima & Minima, Indefinite integrals and definite integrals.

Text & Reference Books:

1. L.R. Dhanda, G.K. Saini and Suranjan Saha, "Systematic Modern Mathematics- Part-I & Part-II", Kalyani Publishers.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0102   Applied English

UNIT- I

Comprehension : One unseen passages of 250-300 words in length with a variety of comprehension questions including 05 marks for word0attack skills such as word formation and inferring meaning, finding opposites etc. The passage can be a factual passage (e.g., instruction, description, report etc.) or a literary passage (e.g., extract from fiction, drama, poetry, essay or biography), or a discursive passage involving opinion, (argumentative, persuasive or interpretative text).

UNIT- II

Vocabulary: Change the Number, Change the Gender, Words commonly mis0spelt, Antonyms, Synonyms, Fill up using correct determinant.

UNIT-III

Filling up the correct form types of the tense in the sentence: present/ past /future tense with simple/continuous/perfect/ perfect continuous forms, Reordering word groups in the sentence to make a meaningfull sentence, Writing meaning of given word and using in the sentence.
Conversion among various types of sentences: affirmative, interrogative sentences, negation, exclamations.

UNIT-IV

Composition: Composition on a given topic/title based on any current social, environment, health issues.
Formal Letter Writing (invitation, accepting/rejecting an invitation, apology, welcome, thanking complements),

Text & Reference Books:

1. W. Standard Allen, " Living English Structure ", (Orient Longman)
2. Wilford D. Best, " The Student's Companion" , (Rupa)

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0103 Computers Fundamentals

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UNIT-I

Introduction: Characteristics of Computers, Evolution of computers, Capabilities and limitations of computers, Generations of computers, Types of computers(micro, mini, main frame, supercomputers), Block diagram of computer, Basic components of a computer system0 Input unit, output unit, Arithmetic logic Unit, Control unit, central processing unit, Instruction set, registers, processor speed, type of processors.

UNIT-II

Memory: main memory organization, main memory capacity, RAM, ROM, EPROM, PROM, cache memory, PCs specifications.
Secondary Storage Devices- Magnetic Tape, Magnetic Disks0Internal Hard Disk, External Hard Drives, Floppy Disks, Optical Disks-CD, VCD, CD-R, CD-RW, DVD, Solid State Storage0Flash Memory, USB Drives.

UNIT-III

Input devices: Keyboard, Pointing Devices0mouse, Touch Screens, Joystick, Electronic pen, Trackball, Scanning Devices-Optical Scanners, OCR, OMR, Bar Code Readers, MICR, Digitizer, Electronic card reader, Image Capturing Devices-Digital Cameras.
Output devices- Monitors0 CRT, LCD/TFT, Printers- Dot matrix, Inkjet, Laser, Plotters- Drum, Flatbed, Screen image projector.

UNIT-IV

Computer Software: Software and its Need, Types of software0System software, Application software, System software0operating system, utility program, programming languages, assemblers, compilers and interpreter, introduction to operation system for PCs-DOS, windows, linux, file allocation table (FAT & FAT32), files & directory structure and its naming rules, programming languages0machine, assembly, high level, 4GL, their merits and demerits, application software and its types – word0processing, spreadsheet, presentation graphics

Text & Reference books:

1. Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals". BPB Publications.
2. Rajaraman, V., "Fundamental of Computers". Prentice Hall India, New Delhi.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0104   **C Programming**

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UNIT-I

Introductory Concepts: Types of programming languages, Introduction to C, some simple C programs, Desirable program characteristics.
C Fundamentals: C character Set, Identifiers and keywords, data types, constants, variables and arrays, Declarations, expressions, statements, Symbolic constants.

UNIT –II

Operators and expressions: Arithmetic operators, unary operator, Relational and logical operators, assignment operators, conditional operators, Library Functions.
Data Input and Output: Preliminaries, singe character input, singe character output, Entering input data, writing output data, the gets() and puts() function.

UNIT-III

Control Statements: Preliminaries, Branching, Looping, Nested control statements, switch statement, break statement, The continue statement, The goto statement, The comma operator.
Arrays: Defining an array, processing an array, passing arrays to functions, Multidimensional arrays, Arrays and strings.

UNIT-IV

Functions: A brief overview, Defining a function, accessing a function, function prototypes, passing arguments to a function, recursion.
Pointers: Fundamentals, Pointer declarations, Passing pointers to the functions, pointers and one dimensional array, dynamic memory allocation, Operations on pointers, arrays of pointers.

Text & Reference Books:

1. Byron Gottfried, "Programming with C", Schaum's Outlines, Tata McGraw Hill.
2. Mullis Cooper, "Spirit of C": Jacob Publications.
3. Yashwant Kanetkar, "Let us C": BPB.
4. Kerninghan B.W. & Ritchie D. M., "The C Programming Language": PHI.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0105   **Office Automation Tools**

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4 0 3

UNIT -I

DOS commands: (internal (DIR, DATE, TIME, CLS, CD, RD, MD, PATH, TYPE, DEL, ECHO, COPY, REN, PROMPT, VOL, VER), external (ATTRIB, CHKDSK, DISKCOPY, DISKCOMP, XCOPY, TREE, DELTREE, DOSKEY, FORMAT, FIND, SORT, FDISK, MORE, SYS)), Concept of files & directories, Wild card characters, Redirection operators.
Windows 2007: Definition, Benefits, Features & uses of Windows 2007, Control panel, Accessories, Task bar, My computer uses, Recycle bin.

UNIT -II

Common Office 2007: Elements, Introduction to Office 2007, Customizing the Office Environment, Managing Files in Office, Text Tools, Drawing and Graphics Tools.
Word Processing: Definition, Benefits, Features & uses of Word 2007, Menus, Toolbars, Cursor control keys, Short cut keys, Hot keys, Editing Text, Document Formatting, Reusable formatting with Styles and Templates, File handling (opening, creating, saving, printing, editing), Formatting text, Find and replace, Tables and Columns, Advanced Page Layout in Word, Automating Information with Fields, Managing Long Documents, Spell check, Thesaurus, File protection, Mail Merge, Labels, and Envelopes, Macros.

UNIT –III

Spreadsheets: Definition, Benefits, Features & Uses of MS Excel 2007, Menus, Toolbars, Worksheets, Formatting Worksheets and Restricting Data, Calculating with Formulas and Functions, Ranges, Auto fill, Data (sort, filter, validation, subtotal), Viewing and Manipulating Data with charts and PivotTables, Print, Goal seek, Scenario, Macros, Creating Excel Databases.

UNIT –IV

Presentations: Definition, Benefits, Features & Uses of PowerPoint, Menus, Toolbars, Creating and Editing Slides, Adding graphics, Multimedia, and Special Effects to Slides, Insert (picture, slide, text), Master slide, Views, Animation, Action buttons, Macros.

Text & Reference Books:

1. Jennifer Ackerman Kettell, Guy Hart0Davis, Curt Simmons, "Microsoft Office 2003: The Complete Reference", Tata McGraw Hill.
2. Biswaroop Roy Choudhary, "Computer course", Fusion Books.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0201   Mathematics-II

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UNIT-I

Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem, their geometrical significance and applications. Successive differentiation and Leibnitz Theorem.

UNIT-II

Number system: division algorithm, greatest common divisor, Least common multiple, congruence relation, Integer arithmetic, Modular arithmetic.

UNIT-III

Group: definition of Group, Groups of numbers, groups of residues, groups of matrices, Groups of functions, Groups of subsets of a set, Properties of Groups, characterization of Groups, cyclic Groups.

UNIT-IV

Ring: commutative ring, ring with unity, Ring of Polynomials, ring of functions, Elementary properties of ring. Fields.

Text & Reference Books:

1. J.C. Burkill, "A First Course in Mathematical Analysis", Vikas Publishing House.
2. Sharma,R.K.,Shah,S.K. and Shnkar A.G. Algebra I ; Pearson, 2012.
3. Buston, D.M., elementary Number Theory; Tata McGram0Hill.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0202   **Communicative English**

UNIT –I

Vocabulary: Fill up using correct form of verb, Usage of the adverb, adjective etc, Write Antonym of the given word and use both the given word and its antonym in the single sentence clarifying meaning and usage, Give different meanings to Synonyms and use them in sentences , Give meaning and make sentences using idioms.

Grammar: Conversion among various types of the tenses in the sentence: present/ past /future tense with simple/continuous/perfect forms , Conversion between Direct/Indirect speech , Conversion between active/passive voice , Conversion among various types of sentences: affirmative, interrogative sentences, negation, exclamations .

UNIT –II

Skills in Writing: letters, official/business correspondence. CV's, Tech. Reports/types, Precis, comprehension, Paragraph writing (200 word) on current topics, writing notices, agenda, circulars.

UNIT –III

Secretarial Skills: Effective communication, listening and feedback skills, telephone handling, Attending meeting, preparing of agenda, writing of minutes, summaries. Handling problem situations. Control of voice and proper use of phonetics.

UNIT –IV

Presentation and Discussion Skills: Types of communication. Barriers to Communication. Effective use of kinesics, Planning interviews and making presentations. Taking initiatives, especially in group discussions, overcoming nervousness, making audience analyses and establishing leadership.

Text & Reference Books:

1. K.K. Sinha, "Business Communication".
2. Varinder Pal, "Business Communication".
3. T. M. Farhatullah, "Communication Skills for Technical Students".
4. Shiv K. Khera, "You can Win".

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0203   **Digital Electronics**

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UNIT-I

Fundamentals of semiconductor physics: Energy bands in solids0 pn0junction diode depletion region, forward and reverse bias, diode as switch; Bipolar Junction Transistor, transistor configurations, bipolar junction transistor (CE configuration) as switch, Saturated and non0saturated logic, Integrated Circuits, characteristics of digital logic families0TTL, ECL, CMOS.

UNIT-II

Logic gates: AND, OR, NOT Gates and their Truth Tables, NOR, NAND & XOR gates, Boolean algebra, Basic Boolean Law's, Demorgan's theorem, Boolean function and their truth tables.

UNIT-III

MAP simplification: Minimization techniques, K-Map, Sum of Product & Product of Sum, Venn diagram. Combinational circuit.

UNIT-IV

Sequential circuits: Half adder & Full adder, BCD adder, Full Subtractor, Flip-flops-RS, D, JK, T & Master-Slave flip-flops, Shift registers, Multiplexer, Encoder, Decoder.

Text & Reference Books:

1. Rajaraman V. & Radhakrishnan, "An Introduction To Digital Computer Design", PHI.
2. Malvino & Leach, "Digital Principles & Applications", TMH Publications.
3. Jain R.P. , "Modren Digital Electronics". TMH Publications.
4. Malvino, "Digital Computer Electronics". TMH Publications.
5. Bartee T.C., "Digital Computer Fundamentals". THM Publications.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0204   Data Structures

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UNIT-I

Preliminaries: Concept & notation, common operation on data structures, algorithm complexity, time-space trade off between algorithm, physical & logical representation of different data structures.

Arrays: Arrays defined, representing arrays in memory, Various operation (traversal, insertion, deletion), Multidimensional arrays, Sequential allocation, Address calculation.

UNIT-II

Linked List: Definition, type (linear, circular, doubly linked, inverted), representing linked lists in memory, advantages of using linked list over arrays, various operations on Linked list (traversal, insertion, deletion).

UNIT-III

Stacks: Definition & concepts of stack structure, Implementation of stacks, Operation on stacks (push & pop), Application of stacks (converting arithmetic expression from infix notation to polish and their subsequent evaluation), quick sort technique to sort an array, recursion).

Queue: Definition & concept of queues, implementation of queue, operation on queues (insert & delete), circular queue.

UNIT-IV

Trees Structures: Tree, Binary Trees, Tree Traversal Algorithms (Pre-Order, In-Order, Post-Order), Threaded Trees, Binary Search Trees.

Sorting & Searching: Selection sort, Bubble sort, Merge sort, Radix sort, Quick sort, Sequential search, Linear search and their complexity.

Text & Reference Books:
1. Jean Paul Tremblay & Paul G. Sorenson, " An Introduction to Data Structures with Applications", Tata McGraw Hill.
2. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein, " Data Structures using C", PHI.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0205   **Database Management System**

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UNIT-I

Introduction To Database Concepts: Data Modeling for a Database, Fields, Records and Files, Abstraction and Data Integration, Database Architecture, Users, Structure of DBMS, Advantages and Disadvantages of DBMS.
Data Models: Entity, Attribute, Relationship, Data Model Classifications, File based, Traditional, Semantic, Entity0Relationship Model.

UNIT-II

File Organization: Operation on files, Sequential Files, Index-Sequential Files, Types of Indexes, Implicit, limit, multilevel, Direct Files, Indexing using B-Tree Structure.
Relational Model: Relational Database, Relational Algebra, Relational Calculus.

UNIT-III

Relational Database Design: Relational Scheme and Relational Design, Functional Dependency, Normal forms (First, Second, Third, Boyce Code), Decomposition and dependency preservation, Multi0valued dependency.

UNIT-IV

Ms Access: Tables (Creation/Design structure, Data Entry), Primary keys, Foreign Keys Master-Detail Table, Query (Select, Make-Table, Update, Append, Delete) Form (Modal, Modeless), Relationships Report (Creation of a simple report from a table and from a query).

Text & Reference Books:
1. Elmasri And Navathe, "Fundamentals of Database Systems", Benjamin/Cummings Publishing Co. Inc.
2. Bipin C. Desai, "An Introduction to Database Management System".
3. Users Reference Manuals Of Ms Access.
4. Date, C.J., "An Introduction to Database system", Narosa Publishing House.
Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0301 Mathematics-III

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UNIT-I

Order, degree, solution and formation of a differential equation. Standard techniques of solving linear differential equations with constant coefficients, Cauchy's and Legendres.

UNIT-II

Complex numbers and their representation in a plane. Argand diagram, algebra of complex numbers, modulus and arguments of a complex number, square root of a complex number and cube roots of unity, triangle inequality, De-Moivre's theorem, roots of complex numbers.

UNIT-III

Primes, Primarily testing, Factorization, Chinese Remainder Theorem, Quadratic congruence, Exponentiation and Algorithm

UNIT-IV

Finite fields, $GF(p)$ fields, $GF(p^n)$ fields, Polynomials and their operations over $GF(2)$ and $GF(2^n)$

Text & Reference Books:

1. Dummit, D. and Foote, R. Abstract Algebra. Hoboken, NJ: John Wiley & Sons, 2004.
2. Durbin, J. Modern Algebra, Hoboken, NJ: John Wiley & Sons, 2005.
3. Shepley L. Ross, "Differential Equations", John Wilay & Sons.
4. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publisher.
5. J.P. Tremblay and R. Manohar, "Discrete Mathematical structures with applications to Computer Science", Tata McGraw Hill.

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BCA0302   Business Practice and Management

L T P
4 0 0

UNIT-I

Concepts of Business: Commerce and Industry, Business Environment, Macro and Micro Environment, Business System, Forms of Business Organization.

UNIT-II

Management: Meaning, definition and importance, Management concept, functions, Principles of management and Management Process.

UNIT-III

Planning: concepts and its types, Decision making concept, Management by objectives (M.B.O.). Motivation0Concepts and theories, Leadership0 Concepts and styles.

UNIT-IV

Organizing: Concepts, Nature and Significance, Authority and responsibility, Centralization and Decentralization, Communication0 Nature, Process and types of communication networks. Managerial control 0 concepts and Process, Techniques of control.

Text & Reference Books:

1. Sharma Sudhir and Bansal, "Principles of Management", Anamika Publishers.
2. Sharma, R. K. and Gupta, S. K., "Business Organisation and Management", Kalyani Publishers.
3. Sharma, N. K., "Current issues in Management", Indus Valley Publication.
4. Singh, U.K. and Dewan J.M., "Business Management", Management Executives Handbook Series.
5. Michael A. Hitt, Black, J. Stewart, "Management", Pearson Education.

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BCA0303   Computer Organization

L T P
4 0 0

UNIT 1

Data representation: number systems, decimal to binary, octal and hexadecimal conversion and vice versa, binary coded decimal numbers, hamming code for error detection, alphanumeric codes, arithmetic operations, binary addition and subtraction, addition/subtraction of numbers in 1's and 2's complement notation for binary numbers and 9's and 10's complement notation for decimal numbers, binary multiplication and division, BCD arithmetic, floating point addition and subtraction.

UNIT II

Register Transfer Language: Register transfer, Bus and Memory transfer (three-stage bus buffers, memory transfer), arithmetic micro-operations (Binary Adder, Binary-adder-Substractor, binary incrementer, arithmetic circuit), Logic micro-operation (list op logic micro0operations, hardware implementation), shift micro0operations (hardware implementation), arithmetic logic shift unit.

UNIT III

Instruction codes: (stored program organization, indirect address), computer registers (common bus register), computer instructions (instruction set completeness), timing and control, instruction cycle (fetch and decode, types of instruction, register-reference instructions), Micro programmed control, control memory, addressing sequencing (conditional branching, mapping of instructions, subroutine)

UNIT IV

Central Processing Unit: Introduction, general register organization (control word, examples of micro-operations), stack organization (register stack, memory stack, reverse polish notation, evaluation of arithmetic expressions), instruction formats (three-address instructions, two address instructions, one0address instructions), addressing modes, data transfer and manipulation (data transfer instructions, data manipulation instructions, arithmetic instructions, logical and bit manipulation instructions, shift instructions), Program control (status bit conditions, conditional branch instructions, program interrupt, types of interrupt).

Text and reference books:

1. M.Morris Mano, "Computer System Architecture" 3rd edition, PHI.
2. V. Rajaraman, T. Radhakrishanan, "An Introduction to Digital Design", PHI
3. J.P.Hays, "Computer Organization and Architecture", McGraw Hill.

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BCA0304   Object Oriented Programming with C++

L T P
4 0 3

UNIT-I
Object oriented programming: Need for OOP, object oriented approach, characteristics of OOP language- objects, classes, Inheritance, Reusability, Polymorphism, overloading advantage of OOP, relationship between C and C++.
Programming Basic: Basic program construction, output using cout, preprocessor directive, comments, integer variables, character variables, input with cin, Type bool, setw Manipulator, type float, type conversion, arithmetic operators, relational operators, logical operators.

UNIT-II
Loops and decision control statements: loop- for, while, do, decision-if, if- else, switch, conditional operator, other control statements- break, continue, goto.
Structures and functions: structures, Accessing structure members, structure within a structure, Enumerated Data type, simple functions, passing arguments to functions, Returning values from functions, reference arguments, overloaded functions, storage classes, scope resolution operator.

UNIT-III
Objects and classes: A simple class, classes and objects, specifying a class, using a class, C++ objects as physical objects, C++ objects as data types, Constructors, objects as function arguments, returning objects from functions.
Arrays: Array fundamental0defining array, array elements, Accessing array elements, Initializing arrays, multidimensional arrays, passing arrays to functions, array of objects, strings-string variables, Avoiding Buffer overflow, string constants, array of strings string as class members, Standard C++ string Class.

UNIT-IV

Operator overloading: Overloading unary operators- the operator keyword, operator arguments, operator return values nameless temporary objects, limitation of increment operators, overloading Binary operators, data conversion, Pitfalls of operator overloading and conversion.
Inheritance: Derived class and base class, specifying the derived class, accessing base class, members, derived class constructors, overriding member functions, class hierarchies, public and private Inheritance, levels of inheritance, multiple inheritance, Ambiguity in Multiple Inheritance, Aggregation- Classes Within Classes.

Text & Reference Books:

1. Robert Lafore, "Object-Oriented Programming in C++", Galgotia Publications.
2. B. Chandra, "Object-Oriented Programming using C++", Narosa Publications.

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BCA0305   Desktop Publishing and Designing

L T P
4 0 3

UNIT-I

D.T.P For Publications: Introductions to Printing , Types of Printing, Offset Printing, Working of offset Printing, Transparent Printout, Negative & Positives for Plate were making, Use of Desk Top Publishing in Publications, Importance of D.T.P in Publication, Advantage of D.T.P in Publication, Mixing of graphics & Image in a single page production, Laser printers Use, Types, Advantage of lager printer in publication.

UNIT-II

Page Layout: Different page format / Layouts, News paper page format, Page orientations, Columns & Gutters, Printing in reduced sizes.
Page Maker: Introductions To Page Maker Icon and help, Tool Box, Styles, Menus etc., Different screen Views, Importing text/Pictures, Auto Flow, Columns, Master Pages and Stories, Story Editor, Menu Commands and short0cut commands, Spell check, Find & Replace, Import Export etc., Fonts, Points Sizes, Spacing etc., Installing Printers, Scaling (Percentages), Printer setup.

UNIT-III

Use Of D.T.P: Use of D.T.P. in Advertisements, Books & Magazines, News Paper, Table Editor.
Adobe Photoshop: Introduction to Photoshop & Flash, Documents, Various Graphic Files

UNIT-IV

Extensions Vector Image and Raster Images, Various Colour Modes and Models. Introduction to Screen and Work Area, Photoshop Tools & Palettes ,Use of Layers & Filters Working with Images.

Text & Reference Books:

1. Page maker 4.0 & 5.0 by b.p.o. publications.
2. Prakhar complete course for dtp (coreldraw, pagemaker, photoshop)

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BCA0401   Personnel Management

L T P
4 0 0

UNIT-I

Introduction to Personnel Management : Nature, Scope, functions and significance, Personnel Policies, classification and organization of Personnel Department.

UNIT-II

Human Resource Planning: Meaning, objectives and importance of HRM, Job Analysis and Design, Recruitment, selection, Terms of Employment, Induction and Briefing, Orientation and Placement.

UNIT-III

Human resources Development: Training and Development and Promotion and incentives, retirement benefits.

UNIT-IV

Performance Appraisal and Job Evaluation, Employee remuneration and various incentive plans.

Text & Reference Books:

1. Ashwathappa, K, "Human Resource and Personnel Management", Tata McGraw Hill.
2. De Cenzo, D. A. Robbins. S, "Personnel and Human Resource Management", Prentice Hall of India.
3. Mamoria, C.B., "Personnel Management", Himalaya Publishing House.
4. Deardwell, Ian, "Human Resource Management", Prentice Hall India.
5. Grobler, P. A., "Human Resource Management", Anamika Publishers.

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BCA0402   Accounting

L T P
4 0 0

UNIT-I

Accounting : Meaning, Definition and objects of Accounting, Accounting Principles, Accounting concepts and Conventions, Principle of Double Entry System, Journal Entry, Ledger, Cash Book and Subsidiary books, Trial Balance and rectification of errors.

UNIT-II

Final Account: Manufacturing Account, Trading Account, Profit and Loss Account and Balance Sheet.

UNIT-III

Cost Accounting: Nature and scope of Cost Accounting, Cost Concept and classification, Cost Sheet, Marginal Costing (BEP and Cost Volume Profit analysis).

UNIT-IV

Management Accounting: Meaning, importance and Scope of Management Accounting Brief introduction to the tools of financial statements, Analysis (Ratio, Fund Flow and Cash Flow Analysis).

Text & Reference Books:

1. Maheswari, S. N., "Fundamental Accounting", Vikas Publishing House.
2. Anthony, R.H. and Roece, J. S., "Accounting Principles", Homewood Illinois.
3. Hongren, Charles J. and Faster, "Cost Accounting: A managerial Emphasis", Prentice Hall International.
4. Gupta, R. L., "Advanced Financial Accounting", Sultan Chand and Company.
5. Pandey, I. M., "Management Accounting", Vikas Publishing House.
6. A.T. Kinson, "Management Accounting", Pearson Education.

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BCA0403   System Analysis and Design

L T P
4 0 0

UNIT -I

Overview of System Analysis and Design: Business System concepts, System development life cycle, Project Selection, Feasibility Analysis, Design, Limitation, testing and evaluation.
Initial Investigation: Sources of Requests, User / Analyst interaction, Qualities of a System Analyst.

UNIT –II

Feasibility studies: Technical, Operational, Behavioral and economic feasibilities, cost and benefit analysis.

UNIT –III

System requirement specification and analysis: Fact finding techniques, Data Flow Diagrams, Data Dictionaries, process organization and interaction, Decision Analysis, Decision Trees and Tables. Top down and bottom up variance, Audit trails.

UNIT –IV

Detail Design: Modularization, module specification, file design, system development involving databases.
System control and quality assurance: Design objectives reliability and maintenance, software design and documentation tools, unit and integration testing, testing practice and plans, system control.

Text & Reference Books:

1. Awad, "System Analysis Design", Galgotia Publishing, Delhi.
2. Jamas, A.S., "Analysis and design of information systems", Mc Graw Hill.
3. Luteberg, M.,Golkuhl, G and Hilsson, A, "Information System Development a Systematic Approach", PHI.
4. Leeson N., "System Analysis and Design", Science Research Associates, 1985.
5. Samprive, P.C., "System analysis: Definition Process and Design".

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BCA0404   Internet Technology & Web Page Design

L T P
4 0 3

UNIT-I
Internet: Evolution of Internet, Internet Application, Network requirements, Bandwidth, Internet features (Electronic Mail, Newsgroups, FTP Archive, Real Time Activity, Video, Audio, Search Engine).

UNIT–II
World Wide Web: Definition, WWW Browsers, WWW Servers, Dial-Up SLIP, PPP Access, Dedicated line, ISDN.TCP/IP Connectivity- DNS Servers, Domain Names Registration process, IP addressing, Routing with TCP/IP Basics

UNIT-III
HTML: Text formatting, Data, Tables, Table layout, Images, HTML Interactivity, URLs, HTTP, NNTP, Hyperlinks, Menus & Image Maps, HTML Form, Embedded objects in HTML, Web Typography, Approaching Web Typography, Graphics and Type, Families and Faces, Type forms, Color and Type, Adding Graphics, Adding Graphics with the Image Element, Using images as links, Creating Image Maps, Working with Image Files, Layout Technology, Standard HTML Formatting, Tables, Frames,

UNIT-IV
CSS: Formatting your site with Cascading Style Sheets, Seeing Style Sheets in Action, Understanding CSSI's Advantages and Limitations, Making HTML and CSSI's, Making HTML and CSSI work together, Learning How CSSI Works, Using CSSI Properties.   XML,   XML Language, SMGL, Linking in XML.

Text & Reference Books:

1. Internet Get Started: BPB Publications.
2. Loren Buhle, "Webmaster Professional Reference", New Riders Publishing.
3. Rick Darnell "HTML 4", Techmedia.
4. Tauber, "Mastering Front Page 2000" BPB.
5. James Jaworski, "Making Java Script and JSCRIPT", BPB Publications.
6. HTML Complete: BPB Publisher.

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BCA0405 Programming in Visual Basic

L T P
4 0 3

UNIT –I

Introduction to Visual Studio: Features of Visual basic, Visual Basic applications, compile, run, Difference between Visual Basic and .NET languages.

Open, close existing project, possible menu variations, use the Form Designer, Code Editor, Solution Explorer, work with Visual Studio's windows.

Design a form: Add controls to a form, Set properties, common properties for forms and controls, add navigation features, property settings, use Document Outline view, name and save files of a project, Design and property settings for the form, Refer to properties, methods, events, Add code to a form, create an event handler for the default event of a form or control, code with a readable style, code comments, detect and correct syntax errors.

Use the toolbar buttons, collapse or expand code, print source code, code snippets, Smart Compile Auto Correction feature, My feature and debug a project.

UNIT –II

Work with numeric and string data: Work with the built-in value types- Declare and initialize variables, declare and initialize constants, code arithmetic expressions, code assignment statements, work with the order of precedence, use casting, change the type semantics, work with strings, declare and initialize a string, join and append strings.

Data types, use Visual Basic functions to convert data types, use methods to convert data types, formatting functions, use methods to convert numbers to formatted strings,

Code control structures: Code Boolean expressions, relational operators, logical operators, conditional statements, If statements, Select Case statements, loops, For loops, Do loops, use Exit and Continue statements, Debugging techniques for programs with loops.

UNIT –III

Code procedures and event handlers: Code and call procedures- Sub procedures, call Sub procedures, pass arguments by reference and by value, code and call Function procedures, work with events, start an event handler for any event, handle multiple events with one event handler, use the Code Editor to start an event handler, add and remove event writing.

The Function procedure, event handlers, Message box

Handle exceptions and validate data: Introduction to data validation and exception handling, use the IsNumeric function, display a dialog box for error messages, exception handling works, Use structured

exception handling, catch an exception, properties and methods of an exception, throw an exception, application with exception handling.

Validate data: Validate a single entry, use generic procedures to validate an entry, validate multiple entries, application with data validation, dialog boxes, code, Difference between Validating event and masked text box.

UNIT IV

Arrays and collections: one-dimensional arrays, create an array, assign values to the elements of an array, use For loops to work with arrays, use For Each loops to work with arrays, work with rectangular arrays, create a rectangular array, assign values to a rectangular array, work with rectangular arrays, create a jagged array, assign values to a jagged array, work with jagged arrays, use the Array class, refer to and copy arrays, code procedures that work with arrays, Work with list, sorted list, queues, stacks, array list.

Dates and strings: create a DateTime value, get the current date & time, format DateTime values, perform operations on dates and times, work with strings, procedures for validating user entries, Format numbers, dates, and times, Format numbers.

Types of controls, combo boxes, list boxes, check boxes, radio buttons, group boxes, use Tab Order view to set the tab order.

Multi0form projects: Add a form to a project, rename a form, change the startup form for a project, display a form as a dialog box, pass data between a form and a custom dialog box, Use the MessageBox0 Display a dialog box and get the user response, use the FormClosing event.

Debug an application: set the debugging options, break mode, use the Edit Continue feature, breakpoints, debugging windows, Locals window to monitor variables, use the Autos window to monitor variables, Watch windows to monitor expressions, Call Stack window to monitor called procedures, Output window to get build or debugging information.

Text & Reference Books:

1. Anne Boehm, Mike Murach and Associates "Murach's Visual Basic 2008", Publisher of Professional Programming.
2. Steven Holzner Visual Basic 6 programming, Black Book, Dream tech press

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BCA0501   Operating System

L T P
4 0 0

UNIT –I

Operating System Concepts: Operating System Classification- Simple Monitor, Multi Programming, Time Sharing, Real Time Systems, Multiprocessor Systems, Batch Processing, Simple User, Multi User, Operating System Functions And Characteristics.

UNIT –II

Processor Management: Process Overview, Process States, Process State Transitions, Process Control Block, Operations On Processes, Suspend And Resume, Interrupt Processing, Scheduling Algorithms, Multiple Processor Scheduling.
Deadlock: Deadlock Problem, Deadlock, Deadlock Characterization, Necessary Conditions, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock.

UNIT –III

Memory Management: Partition, Paging, Segmentation, Types Of Memory Management Scheme , Bare Machine, Resident Monitor, Swapping, Multiple Partition, Virtual Memory, Demand Paging.

UNIT –IV

File Management: File Types, Operation On Files, File Support, Access Methods, Sequential Access, Direct Access, Index, Allocation Method (Free Space Management, Contiguous, Linked, Indexed), Directory System Single-Level, Two-Level, Tree-Structured, File Protection.

Text & Reference Books:
1. James L. Peterson And Abraham Silberschatz, "Operating System Concepts", Addison Wesley Publishing Company.
2. H.M.Deitel, "Operating Systems", Addison Wesley Publishing Company.
3. A.M.Lister, "Fundamentals Of Operating Systems", Macmillan Publishers Ltd.

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BCA0502   e-Commerce

L T P
4 0 0

UNIT-I

e-Commerce: Definition, Framework, Architecture, benefits and Impact of e-Commerce, The Anatomy of e-Commerce application, e-Commerce Consumer applications, e-Commerce Organization Application, e-commerce in India, Prospects of e-Commerce.

UNIT-II

Consumer0oriented E-Commerce: Consumer0oriented applications, mercantile Process Models, consumer's perspective, Merchant's perspective. Advertising and marketing on the Internet: The new age information based marketing, Advertising on the Internet Active or push0based advertising models, Passive or pull based advertising models. Guidelines for Internet advertising. Online marketing process.

UNIT-III

Types of Electronic Payment System: Digital token0based electronic payment systems, smart cards and electronic payment systems, credit card0based electronic payment systems, Risk and electronic payment systems. Electronic data Interchange and its applications in business.

UNIT-IV

Securing the Business on Internet: security Policy, Procedures and Practices, transaction security, CRM, what is e-CRM, it's applications, The e-CRM marketing in India, Major Trends, Global Scenario for e-CRM, CRM utility in India.

Text & Reference Books:
1. Jeffrey F.Rayport & Bernard Jaworski: Introduction to E-commerce, TMH, 2003.
2. Kalakota & Winston: Frontiers of E-commerce, Pearson Education, Mumbai, 2002.
3. David Whiteley: E-Commerce- Strategy technologies and Applications, Tata Mac-Graw Hill, New Delhi, 2000.
4. C.S.V.Murthy: E-Commerce-Concepts, Models & Strategies, Himalaya Publishing house, Mumbai, 2003.
5. Kamalesh K Bajaj & Debjani Nag: E-Commerce, the Cutting Edge of Business- Tata McGraw-Hill, New Delhi, 2002.
6. Bharat Bhaskar: Electronic Commerce, Tata Mc-Graw-Hill, New Delhi, 2003.
7. Perry: E-Commerce, Thomson Publications, New Delhi,2003.
8. Elias M.Awad: Electronic Commerce, Prentice-Hall India, New Delhi, 2002.

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BCA0503   Management Information System

L T P
4 0 0

UNIT –I

Management Information System: Definition, Meaning and Role of Management Information System Introduction, Definition, System's Approach, Pitfalls in Management Information Systems.
Development of Organizational Theory: Management & Organizational Behaviour, Management, Information & System Approach.

UNIT –II

Data Processing: Operation of Manual Information System, Components of Computer System, Conversion of Manual to Computer Based Systems, Data Bank Concept, Types of Computer Based Applications.
Information System for Decision Making: Evolution of Information System, Decision Making & Management Information System.

UNIT –II

Strategic & Project Planning for Management Information System: Business Planning, Management Information System Responses, Management Information System Planning0 General & Details.
Conceptual System Design: Define Problem, Set System Objective, Establish System Constraints, Determine Information Needs & Sources, Develop Alternative Conceptual Design & Documentation, Prepare the Design Report.

UNIT –IV

Detailed System Design: Aim, Project Management, Define Subsystem, Input, Output & Process Design, System Testing, Software & Hardware selection, Documentation of Detailed Design.

Text & Reference Books:

1. Robert G. Murdick, Joel E. Ross, James R. Claggett, "Information System for Modern Management".
2. Surendra Basandra, "Computers Today".

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BCA0504   ASP.Net Technologies

L T P
4 0 3

UNIT – I

Introducing .NET: Microsoft web development, Move from workstation to distributed computing, Internet factor, importance of.net platform0 OS neutral environment, device independence, wide language support, internet based component services.

.NET framework: Common language runtime(CLR), code management and execution, security support, error handling and garbage collection,.net framework class libraries0System classes, data and XML classes, windows form and drawing classes, web classes.

Features of .NET framework: ASP.NET web forms and web services0 Web page authoring & server controls, ASP.NET infrastructure.

UNIT – II

VB.NET : Introduction, statement, lines, comments, operators, procedures, variables0 implicit, explicit, constants, parameters, arrays, branching, looping, objects, classes, inheritance, accessibility of inherited properties and methods, overriding methods.

System class, working with numbers, manipulating strings, DateTime arithmetic, converting values, formatting values, managing arrays.

Namespace and assemblies, Relating namespaces and DLL assemblies, creating assemblies, importing assemblies, using imported assemblies, compiling with imported namespace.

UNIT – III

ASP.NET Web Forms: Web forms code model, In-page vs. Code0behind format, web form object life cycle, handling client side events on the server, web form event handling, define and respond web form control events, AutoPostBack property, automatic state management with web forms.

HTML sever control: definition, RunAt sever attribute, HTML control class, General controls-Anchor, image, form, division, span, Table control, Input Control.

Web server Control: Web Control class, General control- Hyperlink, link button, image, label, Panel, Form Controls, Table controls.

UNIT – IV

Web form List Control: Simple List controls, Template List controls.

Validation Controls: Definition, properties and methods of validation controls, validation controls 0 RequiredFieldValidator, CompareValidator, RangeValidator, RegularExpressionValidator, CustomValidator, ValidationSummary.

User Controls: Definition, Markup0Only User Control, Custom properties, handling events and loading user controls dynamically.

Text & Reference Books:

1. Michael Amundsen, Paul Litwin, "ASP.NET for developers", SAMS Publishing.
2. Bill Evjen, Scott Hanselman, Devin Rader, Farhan Muhammad, S. Srinivas Sivakumar, "Professional ASP.Net 2.0", Wiley India Edition.
3. Joe Duffy, "Professional .Net Framework 2.0", Wiley India Edition.

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BCA0505   Computer Oriented Statistical Methods

L T P
4 0 3

UNIT-I

Frequency distribution, Histogram, Frequency Polygram, Arithmetic Mean, Median, mode, geometric Mean, Harmonic Mean, Dispersion, Measures of Dispersion, Coefficients of Dispersion.

UNIT-II

Probability, Addition and multiplication Theorems of Probability, Conditional Probability, Independent events Pointwise independent events.

UNIT-III

Mathematical expectation, Expected value of function of a random variable, Properties of expectation, Properties of variance, Covariance.

UNIT-IV

Correlation, Karl Pearson's Coefficient of correlation calculation of the correlation, coefficient for a biovariate frequency distribution, rank correlation.

Text & Reference Books:

1. Gupta, S.C. & Kapoor, V.K., Fundamental of Mathematical statistics, Sultan Chand & Sons.
2. Kapur, J.N. & Sarema, H.C., Mathematical Statistics, S. Chand & Company Ltd.

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BCA0601   Computer Networks

L T P
4 0 0

UNIT-I

Introduction to Communication Network: Computer Networks, (Need, uses, and Advantages of Computer Network), Network Models (Peer0to0Peer0Network, Server0based Network, Client0Server Network), Network components, Network Topology (Star, Ring, Bus, Mesh, Tree, Hybrid, Advantage and Disadvantage of each types.), Types of Networks (LAN, MAN, WAN), Internet (Brief History, Internet Today, Protocol and Standard .

UNIT-II

Error Detection and Correction: Types of errors (Single–bit0error, Burst0Error), Error Detection (Redundancy, Parity check, CRC, Checksum), Error correction (FEC, Hamming code, Burst error corrections) Data Communication Channel and Media, Conductive Media (Twisted-pair cable, Coaxial cable), Fiber optics (Characteristic of light, Types of Fiber optics), Wireless Transmission, (Microwaves, Infrared, Radio waves).

UNIT-III

OSI0Reference Model: OSI Model, OSI Physical Layer Concepts, DLL, Network Layer, TL, SL, PL and AL Concepts. Internet model / TCP/IP Model and Protocols, Modem, DSL, Cable Modem, ISDN, Real world network (Ethernet, Ethernet operation, frame format, Ethernet characteristic, cabling and components) Token Ring and Token Bus networking Technology. Network Connectivity, Repeater, Hub-(Active, Passive and Intelligent), Bridge0(Local, Remote and wireless), Routers (Static and Dynamic), switches and types of switches, Brouter and Gateways.

UNIT-IV

TCP/IP Protocol: Ptortocol Suite, Internet Architecture Board, TCP/IP Protocol (TCP,UDP,IP,ARD), concept of Physical Addressing, and logical Addressing, Different Classes of IP addressing, Special IP Addressing, Classful Addressing, Sub netting, Super netting, Classless addressing, TCP/IP Service Protocol (FTP,SMTP, TELNET, DNS).

Text & Reference Books:

1. Andrew S. Tahanbaum, Computer Network, PHI.
2. Behrowz A. Forouzan , Data Communication and Networking, Tata MacGraw Hill.
3. Ata Elahi, Mehran Elahi, "Data, Network and Internal communication Technology", Cengage Learning India

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BCA0602   Numerical Methods

L T P
4 0 0

UNIT-I

Representation of numbers: Decimal to Binary conversion, Floating point representation of numbers, Integer and real/floating point arithmetic, different types of errors, error in the approximation of a function, error in series approximation.

UNIT-II

Solution of algebraic and transcendental equation using Bisection method, Regula-Falsi method, Newton-Raphson method.
Solution of simultaneous linear equations using Gauss Elimination method, Gauss-Jordon method, Jacobi's iterative method, Gauss-Seidel iterative method.

UNIT-III

Interpolation, Finite difference and operators, Newton Forward, Newton Backward, Games forward, Games backward.

UNIT-IV

Numerical differentiation: Differentiating a Graphical function, Differentiating a Tabulated function- Equal and Un-equal intervals, Numerical integration, Newton-Cotes formula, Trapezoidal rule, Simpson's $01/3^{rd}$ and $3/8^{th}$ rule, Weddle's rule.

Text & Reference Books:

1. B.S. Grewal, Numerical Methods in Engg & Science, Khanna Book Publishing Co., New0Delhi.
2. R.S. Salaria, Computer Oriented Numerical Methods, Khanna Book Publishing Co., New0Delhi.
3. V. Rajaraman, Computer Oriented Numerical Methods, PHI.
4. S.S. Sastry, Numerical Method, PHI.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0603   **Multimedia Technology**

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4 0 3

UNIT-I

Introduction to Multimedia **:**   Needs and areas of use, Development platforms for multimedia, Identifying Multimedia elements Text, Images, Sound, Animation and Video, Making simple Multimedia with PowerPoint. Concepts of plain & formatted text, RTF & HTML texts, Object Linking and Embedding concept.

UNIT-II

Sound: Sound and it Attributes, Mono V/S Stereo Sound, Sound Channels, Sound and Its Effect In Multimedia, Analog V/S Digital Sound, Overview Of Various Sound File Formats On PC WAV, MP3.

UNIT-III

Graphics: Importance of Graphics in Multimedia, Vector and Raster Graphics, Image Capturing Methods Scanner, Digital Camera Etc. Various Attributes of Images Size, Color, Depth , Resolution etc, Various Image File Format BMP, DIB, EPS, PIC, and TIF Format Their Features and imitations, Basics of animation, Software Tools for animation.

UNIT-IV

Video: Basics of Video Analog and Digital Video, How to use video on PC. Introduction to graphics accelerator cards, Brief note on various video standards NTSC, HDTV, Introduction to video capturing Media & instrument Videodisk.   Virtual Reality Terminology Head Mounts Display (HMD), Boom, Cave, Input Devices and Sensual Technology

Text & Reference Books:

1. Multimedia: Making it work (4th edition), Tay vaughan, Tata McGraw Hills.
2. Multimedia in action, James E Shuman, Vikas Publishing House.
3. Multimedia basics volume / technology, Andreas hoi zinger, firewall media (Laxmi Publications Pvt. Ltd) New Delhi.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0604   Computer Graphics

UNIT – I

Introduction: Definition Of Computer Graphics And Its Applications, Video Display Devices, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays. Input Devices: Keyboard, Mouse, Trackball and Spaceball, Joysticks, Digitizers, Image Scanners, Touch Panels, Light Pens, Voice Systems.

UNIT – II

Output Primitives: Line Drawing Algorithms (DDA, Bresenhaum's), Circle Generating Algorithm(Midpoint Circle Drawing Algorithm), Ellipse Generating Algorithm, Midpoint Ellipse Generating Algorithm, Character Generation.

UNIT – III

2D Transformations: Translation, Rotation, Scaling, Reflection, Shear, Composite Transformation0Translation, Rotations, Scaling. Two Dimensional Viewing: Window-To-Viewport Coordinate Transformation

UNIT – IV

Clipping: Introduction, Clipping Operations, Point Clipping, Line Clipping(Cohen-Sutherland Line Clipping, Liang-Barsky Line Clipping, Nicholl-Lee-Nicholl Line Clipping), Polygon Clipping(Sutherland-Hodgeman Polygon Clipping, Weiler-Atherton Polygon Clipping), Curve Clipping, Text Clipping.

Text & Reference Books:

1. Donald Hearn & M. Pauline Baker, "Computer Graphics." Prentice Hall India.
2. F. S. Hill Jr., "Computer Graphics", Macmillan Publishing Company.
3. David F. Rogers, "Procedural Elements for Computer Graphics", Tata MacGraw Hill.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

BCA0605   Software Engineering

UNIT – I

Software engineering: Evolving Role of Software, Software Engineering, Changing nature of Software, Software Myths, Terminologies, Role of management in software development Software Process and desired Characteristics.
Software Life Cycle Models: Build & Fix Model, Water Fall Model, Incremental Process Model, Evolutionary Process Models, Unified Process, Comparison of Models, Other Software Processes, Selection of a Model.

UNIT – II

Software Requirements Analysis & Specifications: Requirements Engineering, Types of Requirements, Feasibility Studies, Requirements Elicitation, Requirements Analysis Documentation, Validation and Management.
Software Architecture: Its Role, Views, Component & Connector View and its architecture style, Architecture Vs Design, Deployment View & Performance Analysis, Documentation, Evaluation.

UNIT – III

Function Oriented Design: Design principles, Module level Concepts, Notation & Specification, Structured Design Methodology, Verification Object0Oriented Design: OO Analysis & Design, OO Concepts, Design Concepts, UML – Class Diagram, Sequence & Collaboration Diagram, Other diagrams & Capabilities, Design Methodology , Dynamic and Functional Modeling, Internal Classes & Operations.

UNIT – IV

Detailed Design: PDL, Logic/Algorithm Design, State Modeling of Classes, Verification: Design Walkthroughs, Critical Design Review, Consistency Checkers.
Coding: Programming Principles & Guidelines, Coding Process, Refactoring, Verification.

Text & Reference Books:

1. Pankaj Jalote, "An Integrated Approach to Software Engineering", 3rd Edition, Narosa Publishing House, 2005.
2. K.K. Aggrawal and Yogesh Singh, "Software Engineering", 3rd Edition, New Age International (P) Ltd, 2008.
3. Pressman, R.S., "Software Engineering – A Practitioner's Approach", 3rd Edition, McGraw Hills, 2008.
4. Mall Rajib, "Fundamentals of Software Engineering", PHI, New Delhi, 2005.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.