

B.C.A..Part-I & II(Sem-I to IV) Prospectus No. 20121221
Exam.-2011-12

संत गाडगे बाबा अमरावती विद्यापीठ
SANT GADGE BABA AMRAVATI UNIVERSITY

विज्ञान विद्याशाखा
(FACULTY OF SCIENCE)

PROSPECTUS
OF
B.C.A.PART-I & II(SEMESTER-I to IV)
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SANT GADGE BABA AMRAVATI UNIVERSITY

SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

(1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects, papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.

(2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc. refer the University Ordinance Booklet the various conditions/provisions pertaining to examinations as prescribed in the following Ordinances-

Ordinance No. 1	:	Enrolment of Students.
Ordinance No.2	:	Admission of Students
Ordinance No. 4	:	National Cadet Corps
Ordinance No. 6	:	Examination in General (relevant extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Improvement of Division (Higher Class) and getting Distinction in the subject and condonation of deficiency of marks in a subject in all the faculties prescribed by the Statute NO.18, Ordinance 2001.
Ordinance No.9	:	Conduct of Examinations (Relevant extracts)
Ordinance No.10	:	Providing for Exemptions and Compartments
Ordinance No. 19	:	Admission Candidates to Degrees
Ordinance No.109	:	Recording of a change of name of a University Student in the records of the University

Ordinance No.19/2001 : An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Dineshkumar Joshi

Registrar

Sant Gadge Baba Amravati University

PATTERN OF QUESTION PAPER ON THE UNIT SYSTEM

The pattern of question paper as per unit system will be broadly based on the following pattern.

- (1) Syllabus has been divided into units equal to the number of question to be answered in the paper. On each unit there will be a question either a long answer type or a short answer type.
- (2) Number of question will be in accordance with the unit prescribed in the syllabi for each paper i.e. there will be one question on each unit.
- (3) For every question long answer type or short answer type there will be an alternative choice from the same unit. However, there will be no internal choice in a question.
- (4) Division of marks between long answer and short answer type question will be in the ratio of 40 and 60.
- (5) Each short answer type question shall contain 4 to 8 short sub question with no internal choice.

**SYLLABUS PRESCRIBED FOR
B.C.A.PART-I
(Implemented from Winter-2010 Examination)
SEMESTER-I**

1ST1- Computer Fundamentals

UNIT-I : Introduction to computer : History characteristics, classification of computer, block diagram of computer, Generations of computer, types of computer : Micro, mini, main and super.

UNIT-II : Input/Output Devices :

Input Devices : Keyboard, MICR, OCR, Bar coding, mouse.
Output Devices : Printers, types of printers, dot matrix printer, laser printer, inkjet printer, VDU (CRT,LCD).

UNIT-III : Memory : Memory cell, primary memory, secondary memory.
Primary Memories : RAM, Cache, ROM family;
Secondary Memories : CD, DVD, Flash Memory.

UNIT-IV : Number System :

Introduction : Types of number system, decimal, binary, octal & hexadecimal and their inter conversions code : BCD code, ASCII code, EBCDIC code, fixed point & floating point representation of number.

UNIT-V : Programming Concept : Algorithm, flowchart, programming languages, assembler, interpreter, compiler.
Programming process : Program design, coding, compilation, execution, testing, debugging, documentation, Structured programming, Features and approaches.

BOOKS:

- 1) Computer Fundamental : B.Ram, Nas Age Publi.
- 2) Fundamentals of Computer : V.Rajaraman, PHI Publi.
- 3) Computer Fundamentals : Preeti Sinha, BPB Publi.
- 4) Computer Fundamentals and C. Program : Dhamdhare.

Practicals :-

Minimum 8 practicals based on MS-Word, MS-Excel, MS-Power Point.

1ST2- C-Programming

UNIT-I : Introduction to C : Brief history of C Language, structure of C Program, C tokens : Character set, keywords, Identifiers, constant, variables, basic data types, data type modifiers, enumerated data type, symbolic constant.

UNIT-II : Operators and Expressions in C : Arithmetic, Relational, logical, assignment, compound, increment, decrement, conditional operator, comma operator, bitwise operators.

Precedence and the associativity of operators. Type conversion and type cast operator.

UNIT-III : I/O Operations in C :

Formatted I/O : Printf(), scanf()

Unformatted I/O : getchar(), putchar(), gets(), puts(), getch(), putch(), getche(), putche().

UNIT-IV : Controlled structures in C :

if, if—else, elseif ladder, nested if, switch, goto label, for, while, do—while, nesting of loops, break, continue.

UNIT-V : Arrays : Declaration and initialization of one and two dimensional arrays.

Pointers : Declaration and initialization, pointer arithmetic, pointer comparison, array of pointers.

Books Recommended :-

- (1) Programming in C – E. Balguruswamy, TMH Publications.
- (2) Programming in C – Ravichandran
- (3) Programming with C – Venugopal and Prasad, TMH Publications.
- (4) C Programming – Holzner, PHI Publication.
- (5) Let us C – Yashvant Kanetkar, BPB Publication.

Practicals :- Minimum 08 practicals based on Unit-I to Unit-V.

1ST3 – Digital Techniques-I

UNIT-I : Number System :

Binary, Octal, Hexadecimal, Decimal to binary, decimal to octal, decimal to hexadecimal, binary to decimal, octal to decimal, hexadecimal to decimal, binary to hexadecimal, binary to octal, hexadecimal to binary and octal to binary conversions. Addition and subtraction in binary, octal and hexadecimal 1's and 2's compliment method of binary subtraction.

Logic operators and logic gates :

OR, AND, NOT, NAND and EX-OR operators. OR, AND, NOT NAND, NOR, EX-OR and EX-NOR gates.

UNIT-II : Logic Families :

Classification of Logic families, characteristics (Fan-in, Fan-out, Noise immunity, propagation delay, power dissipation) construction and working of DTL, TTL, ECL, & CMOS Logic.

UNIT-III : Boolean algebra :

Boolean laws, Boolean identities, Demorgans theorems.

Implementation of Boolean equations :

SOP, POS, Simplification of Boolean equation using Boolean

laws & theorems, simplification of boolean equation using K-map (Upto 4 variable K map).

UNIT-IV : Arithmetic Logic Unit :

Half adder, Half subtractor, Full adder, Full subtractor, 4-bit binary parallel adder, subtraction using 1's & 2's complement method, Controlled 4-bit parallel adder/subtractor (1's & 2's Complement), study of ALU IC-74181.

UNIT-V : Combinational Logic Circuit :

Basics of decoder, 2:4 decoder, 3:8 decoder, 4:16 decoder, extension of decoder to demultiplexer, Basics of Multiplexer, 2:1 mux, 4:1 mux, and 16:1 multiplexer.

TEXT BOOKS :

1. Digital Electronics and Microcomputer - R.K.Gaur-Dhanpati publications.
2. Digital fundamentals - Floyd - Universal Book stall, Delhi.

1ST4- Numerical Methods

UNIT-I : Introduction :

A simple mathematical model, Numerical data, Analog and digital computing, process of numerical computing, characteristics of numerical computing, new trends in numerical computing.

UNIT-II : Rounding off Errors :

Errors in Computing, significant digits, Inherent errors, numerical errors, modelling errors, errors definition, round off errors. Error propagation, total numerical error.

UNIT-III : Routs of Equation :

Bracketing Methods – Graphical methods, Bisection method, false position method, numerical problems.

UNIT-IV : Open Methods – Simple fixed point method, Newton-Raphson method & its limitations, the secant method.

UNIT-V : Solution of Linear Equations :

Existence of solution, solution by elimination, Basic Gauss elimination method, Gauss elimination with pivoting, Gauss-Jordan method.

Note : Minimum 16 experiments should be performed based on Unit-I to Unit-V.

Reference Books :-

- (1) Numerical Methods for Engineers : Stevenc Chapra & Raymond P. Canale. Publication-Tata Mc-Graw Hill.
- (2) Numerical Methods : E.Balguruswamy. Publication-Tata Mc-Graw Hill.

- (3) Fundamentals of Mathematical Statistics : S.C.Gupta & V.K.Kapoor. Publication – Sultan Chand & Sons.
- (4) Numerical Analysis by S.S.Shastri.

1ST5-

MATHEMATICS

DISCRETE MATHEMATICS

UNIT-I: Functions and Relations

- (i) Elementary counting principle.
- (ii) Function and counting.
- (iii) Combinatorial argument.
- (iv) Principle of inclusion and exclusion.
- (v) Infinite sets and countability.
- (vi) Properties of countable sets.

UNIT-II: Generating Functions

- (i) Ordinary and Exponential generating functions.
- (ii) Basic properties of generating functions.
- (iii) Enumerators.
- (iv) Azilication to partitions, Ferrer's Graph, dual partitions.
- (v) Probability generating functions.
- (vi) Application to solving recurrence relation.

UNIT-III: Recurrence Relation

- (i) Introduction
- (ii) Linear recurrent relation with constant coefficient.
- (iii) Homogeneous solution and total solutions.
- (iv) Particular solution and total solutions.

UNIT – IV: Boolean Algebra - I

- (i) Logic
- (ii) Partial Order relations.
- (iii) Lattices – definition and elementary properties.
- (iv) Principle of duality.
- (v) Lattices as algebraic systems.

UNIT – V: Boolean Algebra - II

- (i) Distributive and complemented lattices.
- (ii) Boolean lattices and Boolean algebras.
- (iii) Uniqueness of finite Boolean algebra.
- (iv) Boolean functions and Boolean expressions.
- (v) Disjunctive normal forms and simplification

BOOKS:

- 1) Elements of Discrete Mathematics by C.L.Liu
- 2) Discrete Mathematics by Olympia Nicodemi

- 3) Discrete Mathematical Structures for Computer Science by Alan Doerr and Kenneth Lavassuer.
- 4) Discrete Mathematics with application by H.F.Mottson jr.
- 5) Discrete and combinatorial mathematics by A.P.Hillmon., C.L.Alexanerson and R.M.Grassl
- 6) A first step in Graph Theory by Raghunathan, Numkar and Solapurkar
- 7) Graph Theory with Applications to Computer Science and Engineering by Narsinghs Deo.
- 8) Discrete Mathematical Structures for Computer Science by B.Kolman and R.S.Busby.
- 9) Foundation of Discrete Mathematics by K.D.Joshi (New International Ltd. Publisher, 1996 (Reprint)
- 10) "Boolean Algebra and Switching circuits" by Medelson, Tata McGraw Hill Publication Co-Ltd,4/12 Asaf Ali Road, New Delhi.

1ST6- Communication Skill

The theory paper for Semester-I shall consist of Unit-I to Unit-V carrying 10 marks each of total 50 marks. There will be one question on each unit with sub-questions based on syllabus. All the five questions are compulsory.

UNIT-I : Grammer and Vocabulary	-10
1.1 Articles and Preposition	-02
1.2 Appropriate forms of verbs	-02
1.3 Synonyms and Antonyms	-04
1.4 Error Detection	-02
UNIT-II : Language Proficiency	-10
2.1 Types of Sentences	-02
2.2 Clauses	-03
2.3 Do as directed	-05
UNIT-III : Forms of Written Communication	-10
3.1 Job Application	-05
3.2 Preparing Curriculum Vitae	-05
UNIT-IV : Creative Writing	-10
4.1 Preparing Advertisement	-05
4.2 Composing Messages (Notices, e-mails, telegrams)	-05
UNIT-V : Imaginative Approach	-10
5.1 Story Building	-03
5.2 Essay Writing	-07

Practicals :-

1SP1 - Lab-I based on 1ST1 & 1ST2

The distribution of marks in practical examination is given as :

(1) Program writing / execution (based on 1ST1)	15 Marks
(2) Program writing / execution (based on 1ST2)	15 Marks
(3) Practical Record	10 Marks
(4) Viva-voce	10 Marks

Total 50 Marks

1SP2- Lab-II based on 1ST3

The distribution of marks in practical examination is given as :

(1) Experiments (Construction, testing and performance)	30 Marks
(2) Practical Record	10 Marks
(3) Viva-voce	10 Marks

Total 50 Marks

1SP3 - Lab-III based on 1ST4

The distribution of marks in practical examination is given as :

(1) Practical Problems	30 Marks
(2) Practical Record	10 Marks
(3) Viva-voce	10 Marks

Total 50 Marks

**SYLLABUS PRESCRIBED FOR
Bachelor of Computer Application
Semester - II Examination**

2ST1- Operating System

- UNIT-I : Software :** Types of software, system software, application software, utility software, assembler, compiler, interpreter.
Operating System : Definition, types of Operating System, Batch O/S, multi programming, multitasking, introduction

to unix, unix kernel, shell application layer, introduction to linux.

UNIT-II : Introduction to Operating System : DOS : Booting processing, formatting, directory structure, FAT.

Internal DOS Commands : REN, CD, MD, RD, DIR, DEL, COPY, TYPE, DATE, TIME, COPYCON, External DOS Commands – FORMAT, XCOPY, CHKDSK, PATH, ATTRIB, AUTOEXEC.BAT, CONFIG.SYS.

UNIT-III : Functions of Operating System : Types of operating system, process management, states of processes, process scheduling algorithms.

UNIT-IV : File Management, space allocation techniques, directory types and structures.

UNIT-V : Memory Management, partitions, paging, segmentation, virtual memory management, demand paging, page replacement algorithm.

Books Recommended :-

- (1) System Software and Operating System : D.M.Dhamdhare (TMH)
- (2) Operating System, 3/e, Nutt Pearson.
- (3) Operating System Concept : silbershaz (Addison Education)
- (4) System Software : Leyland Beck (Pearson Education)
- (5) Operating System : William Stalling
- (6) Operating System : A.S.Godbole (TMH)
- (7) Operating System : Cowley (TMH)
- (8) Modern Operating Systems : Tenenbaum (Pearson Education)
- (9) Operating System : Peterson.

Practical : Minimum 08 practicals based on DOS.

2ST2- Advanced C

UNIT-I : String Handlings : Declaring and initializing string variables, string handling functions :

gets(), strcpy(), strcat(), strlen(), strcmp(), strncpy(), strlen(), strupr(), strcmp(), strcat(), strstr(), strrev(), strset(), Array of pointers to strings.

UNIT-II : Function in C :

Definition, prototype, local and global variables, storage classes function definition, function calling, call by value, call by pointer, return values and their types, functions with arrays, function recursion, pointer to functions.

UNIT-III : Structures :

Definition and declaration, initialization, array of structures,

nested structure, pointer to structures.

Union : Definition, declaration, and initialization of union, comparison of union with structure.

UNIT-IV : File Handling :

Streams and files in C, defining and opening a file (fopen()), file opening modes (options), closing a file (fclose()), I/O operations on File : fof(), fscanf(), fprintf(), getw(), putw(), fgetc(), fputc(), fgets(), fputs(), fread(), fwrite(), sizeof() operator.

UNIT-V : Random Access : fseek(), ftell(), rewind().

Handling Errors : feof(), ferror().

Dynamic Allocation of memory, alloc(), malloc(),

C Graphics : Line, circle.

Books Recommended :-

- (1) Programming in C – E. Balguruswamy, TMH Publications.
- (2) Programming in C – Ravichandran
- (3) Programming with C – Venugopal and Prasad, TMH Publications.
- (4) C Programming – Holzner, PHI Publication.
- (5) Let us C – Yashvant Kanetkar, BPB Publication.

Practicals :- Minimum 08 practicals based on Unit-I to Unit-V.

2ST3 – Digital Techniques-II

Unit-I : Multivibrators & Flip flops :

Construction & working of Astable, monostable and Bistable transistorized multivibrators, RS, CLK RS, D, JK, JKMS Flip Flops (Logic diagram, Truth table, construction & working), Concept of edge trigger Flip-Flop, Concept of preset & clear terminal.

Unit-II : Counters :

Asynchronous & synchronous Counter, Up-down counters (Up to 4-bits), modified asynchronous counter, Applications of counters, IC version of counters – 7493IC & 7490IC.

Unit-III : Shift registers :

Types of shift registers, SISO, SIPO, PISO & PIPO registers (Construction & working), left shift-right shift, registers, IC version of shift register – 7495, Application of shift register. Ring counter, Johnson's counter.

Unit-IV : Memory :

Concept of primary & secondary memory, memory hierarchy, classification of memories, Floppy disk, Winchester disk, CD, DVD, Semiconductor memories : RAM, ROM, PROM,

EPROM, EAROM, EEPROM.

Unit-V : A/D & D/A converters :

Need of A/D & D/A converters.

D/A converters : Weighted registers, R-2R ladder type, Specifications, IC version DAC0808.

A/D converters : Counter type, successive approximation type, Specifications, IC version, ADC0808.

Books Recommended :

1. Elements of Electronics by Bagade and Singh (S.Chand and company)
2. Electronic devices, application and integrated circuits by Mathur(Kulshrestha,Chadha,Umesh Publication)
3. Pulse, Digital, Switching wave forms by Millman and Taub (Mcgraw Hill-Kogakusha)
4. Basic Electronics -by B.L.Theraja (S.Chand and company)
5. Electronic Instrumentation and measurements system – Cooper (Prentics Hall)
6. Electrical and electronic measurements and instrumentation. A.K.Sawhney (Dhanpat Rai and sons)
7. Principles of electronics instrumentation- A.I.Diefenderfer.
8. A text book of electrical technology B.L.Theraja (S.Chand & Company Ltd.)
9. Functional Circuits in Electronics by Sh.S.G. Pimple (Macmillan Publication, India)
10. Micro Electronic Circuits (Fourth Edition) By Sedra and Smith (Oxford publication)

2ST4 - Numerical Methods

UNIT-I : Curve Fitting :

Least Square Regression : Linear regression, polynomial regression, multiple linear regression.

UNIT-II : General Linear Least Squares, non-linear regression, fitting of transcendental equations.

UNIT-III : Interpolation :

Polynomial forms, linear interpolation, Newton's divided difference interpolation polynomials, Lagrange's interpolating polynomials, interpolation with equidistant points.

UNIT-IV : Inverse interpolation, spline interpolation, Chebyshev interpolation polynomial.

UNIT-V : Numerical Integration : Meaning of numerical integration, trapezoidal rule, Simpson's 1/3 Rule, Simpson's 3/8 rule.

Note : Minimum 16 experiments should be performed based on Unit-I to Unit-V.

Reference Books :-

- (1) Numerical Methods for Engineers : Steven C. Chapra & Raymond P. Canale. Publication-Tata Mc-Graw Hill.
- (2) Numerical Methods : E.Balguruswamy. Publication-Tata Mc-Graw Hill.
- (3) Fundamentals of Mathematical Statistics : S.C.Gupta & V.K.Kapoor. Publication – Sultan Chand & Sons.
- (4) Numerical Analysis by S.S.Shastri.

2ST5-MATHEMATICS-II

DISCRETE MATHEMATICS-II

UNIT I : Graph Theory (a)

- (i) Definition and elementary results
- (ii) Types of Graphs
- (iii) Isomorphism
- (iv) Adjacency and incidence matrix
- (v) Degree sequence and Havel- Halcmi theorem (without proof)
- (vi) Sub graphs, induced sub graphs.
- (vii) Complement of a graph, self-complementary graphs
- (viii) Union, intersection, ring-sum of two graphs.
- (ix) Connected, disconnected graph

UNIT II : Graph Theory (b)

- (i) Edge sequences, Trail, path, circuit's definitions and elementary results.
- (ii) Isthmus, cut vertex
- (iii) Vertex and edge connectivity
- (iv) Menger's theorem (without proof)
- (v) Dijkstra's shortest path algorithm

UNIT III : Graph Theory (c)

- (i) Eulerian graphs, Definitions and examples
- (ii) Characterization of Eulerian graph in terms of degree
- (iii) Fleury's algorithm
- (iv) Hamiltonian graph, definition and examples
- (v) Sufficient conditions for Hamiltonian graph (without proof)

UNIT IV : Graph Theory (d)

- (i) Definition of a tree equivalent Characterization elementary results.
- (ii) Centre, radius and diameter of a tree,

(iii) Spanning trees, fundamental circuits and cut sets .

(iv) Binary trees and elementary results

UNIT V: Graph Theory (e)

(i) Kruskal's algorithm for weighted spanning tree.

(ii) Different types of directed graphs

(iii) Connectedness

(iv) Directed trees , arborescence and polish notion

(v) Networks and flows : Definition, examples and construction of flows only.

BOOKS:

- 1) Elements of Discrete Mathematics by C.L.Liu
- 2) Discrete Mathematics by Olympia Nicodemi
- 3) Discrete Mathematical Structures for Computer Science by Alan Doerr and Kenneth Lavassuer.
- 4) Discrete Mathematics with application by H.F.Mottson jr.
- 5) Discrete and combinatorial mathematics by A.P.Hillmon., C.L.Alexanerson and R.M.Grassl
- 6) A first step in Graph Theory by Raghunathan, Numkar and Solapurkar
- 7) Graph Theory with Applications to Computer Science and Engineering by Narsinghs Deo.
- 8) Discrete Mathematical Structures for Computer Science by B.Kolman and R.S.Busby.
- 9) Foundation of Discrete Mathematics by K.D.Joshi (New International Ltd. Publisher, 1996 (Reprint)
- 10) "Boolean Algebra and Swithching circuits"by Medelson, Tata McGraw Hill Publication Co-Ltd,4/12 Asaf Ali Road, New Delhi.

2ST6-Communication Skill

The theory paper for Semester-I shall consist of Unit-I to Unit-V carrying 10 marks each of total 50 marks. There will be one question on each unit with sub-questions based on syllabus. All the five questions are compulsory.

UNIT-I: Comprehension Skill	-10
1.1 Generating Ideas with quick response	-05
1.2 Attempting Precs	-05
UNIT-II: Command Over Language	-10
2.1 Using other forms of verbs.	-03
2.2 Voice	-02
2.3 Idoms and Phrases	-05
UNIT-III: Analytical Ability	-10

3.1 Paraphrasing of the poem -05

3.2 Expansion of ideas -05

UNIT-IV: Drafting Language -10

4.1 Domestic Letter -05

4.2 Drafting Reports -05

UNIT-V: General Awareness -10

5.1 One Word Substitute -02

5.2 Short Notes -03

(Audio-visual aids, Interview, Barriers of Communication, Verbal/Non Verbal Communication)

5.3 Personal Response in 100 words 05

(Pollution, Current Affairs, Education)

For References the following books are recommended for Semester-I & II :-

- (1) MacMillans English Grammer
- (2) Developing Communication Skills by Krishna Mohan, Beena Ayyar.
- (3) English for Practical Purposes by Z.N.Patil, B.S.Valke.
- (4) English Grammar Composition and Effective Business Communication by M.A.Pink, S.E.Thomas (Editor S.Chand)

Practicals :-

2SP1 - Lab-I based on 2ST1 & 2ST2

The distribution of marks in practical examination is given as :

(1) Program writing / execution (based on 2ST1)	15 Marks
(2) Program writing / execution (based on 2ST2)	15 Marks
(3) Practical Record	10 Marks
(4) Viva-voce	10 Marks

Total 50 Marks

2SP2- Lab-II based on 2ST3

The distribution of marks in practical examination is given as :

(1) Experiments (Construction, testing and performance)	30 Marks
(2) Practical Record	10 Marks
(3) Viva-voce	10 Marks

Total 50 Marks

2SP3 - Lab-III based on 2ST4

The distribution of marks in practical examination is given as :

(1)	Practical Problems	30 Marks
(2)	Practical Record	10 Marks
(3)	Viva-voce	10 Marks

	Total	50 Marks
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**Syllabus Prescribed for
B.C.A. Semester-III & IV
Semester- III**

3ST1 : Data Structure

- Unit-I** : Introduction :
Lists : General Algorithm and operation on data structure. e.g. ADD, DELETE, MERGE, SORT, SEARCH.
Arrays & Stacks:
Definition and examples of arrays and stacks in .C.
Implementation infix, postfix & Prefix using stacks and arrays.
- Unit-II** : Recursion:
Definition of recursion and processes, examples of recursion
Translation from prefix to postfix simulation recursion.
- Unit-III** : Queues & linked list
Definition of Queue and its representation as linked : single & double lists. Circular linked list, stack as a circular lists.
- Unit-IV** : Trees:
Definition of trees & its family definition & representation in a diagrammatic mode. Binary representation of tree as a linked lists.
- Unit-V** : Sorting : Sequential sort, Binary sort, merge sort, selection sorts, Insertion sort and merging technique.
Searching : Binary Search, Sequentially searching, hashing, indexed search techniques.

Books :

- 1) Fundamentals of Computer Algorithm : Horowitz & Sahani
- 2) Data structures and Algorithms in C++ : B.R. Weiss Pearson's.
- 3) Introduction to Data Structure in C: Kamthane (Pearson)
- 4) Introduction to Data Structure : Bhagat Singh, Nops
- 5) Data Structure by Trampley and Sorcnson.
- 6) Data Structure by Horowitz & Sahani.

Practical : Minimum 8-practicals based on above topic.

Semester III

3ST2 : Object Oriented Programming with C++

- Unit-I** : Introduction to oops:
OOps paradigm, features, advantages and applications of oops, Introduction to C++ programme, I/O functions, preprocessors, directives, Constants and variables, variable declaration and initialization, Type conversion, operators.

- Unit II** : Control Structure : if, switch, do-while, while and for statement, break, continue and goto statement.
Functions : Function prototype, function calling, function returning and their types, passing arguments to function, inline functions, default argument, overloaded functions.
- Unit III** : Classes and objects :- Class specification, defining objects, Nesting of member functions, friend functions, passing objects as arguments, returning objects from functions.
Constructors :- Defining constructor, parametrized constructor, multiple constructors in a class, Constructor with default argument, destructor.
- Unit IV** : Arrays and pointers : Arrays as class member data, Arrays of objects, Pointers to objects, this pointer, memory management using 'new' and 'delete'.
Operator overloading :- Overloading unary and binary operator, multiple overloading, rules for overloading operators.
Inheritance : Derived and base class, Types of Inheritance, visibility mode.
- Unit V :-** Virtual Functions and Polymorphism :
Introductions, pointers to derived class, definition of virtual functions, pure virtual functions, Rules for Virtual functions,
Files and streams : Hierarchy of file stream classes, opening and closing of files, file modes, file I/O with stream class.

Books Recommended:

- i) Object oriented programming with C++ - E, Balaguruswamy
- ii) Mastering C++- K.R. Venugopalan
- iii) Programming with C++ - Ravichandran
- iv) Programming with C++ - Robert Izafore
- v) C++ for beginners - B.M. Harwani- SPD Publications.

Practical :- Minimum 8 programmes based on C++

Semester III

3ST3 : Data-Base Management System.

- Unit I** : Basis Concepts : Abstraction and Data integration, Architecture for a database system, components of DBMS, advantages and disadvantages. DBA and its role, Database models : Relational, Hierarchical and network, their advantages, and disadvantages.

- Unit II** : Relational Model : Relation, Domain & attributes, keys, Relational algebra and calculus, Entity Relationship model, Reducing E-R diagram to tables, functional dependency, Normalization. 1NF, 2NF, 3NF and BCNF.
- Unit III** : **SQL** : Components of SQL, Data types, operators, DDL Commands : CREATE, ALTER, DROP for tables, DML Commands; SELECT, INSERT, DELETE and UPDATE, order by clause, Group By and Having clause; view and DML operations on view.
- Unit IV** : Functions: Numeric function : ABS, MOD, FLOOR, CEIL, TRUNC, SQRT, SIGN, SIN, COS, LOG, EXP, LEAST, GREATEST Group functions: AVG, MAX, MIN, SUM, COUNT, Character function : LENGTH, LOWER, UPPER, INITCAP, INSTR, SUBSTR, LPAD, RPAD, LTRIM, RTRIM, DECODE, SOUNDIX, Conversion function: To-NUMBER, To-CHAR' , Joins and union.
- Unit V** : PL/SQL : Features, Block structure, Constants and variables, data types, control structure, & programming cursor: Implicit and explicit cursor, their attributes, declaring, opening and fetching cursor;
Transaction : SET TRANSACTION, ROLLBACK, COMMIT and AUTO COMMIT, save point, Rollback Segment.

Books Recommended :-

- i) An Introduction to Database System - C.J.Date
- ii) Database- Management System : Mujumdar & Bhattacharya.
- iii) SQL programming - Ivan Bayross
- iv) Oracle the Complete reference - Koch & Loney.
- v) Database concepts and systems for students by Ivon Bayross.

Practicals : Minimum 08 practicals based on above topics.

Semester-III

3ST4 : Advanced Operating System

- Unit-I** : **Operating Systems** :
Introduction
Process Management
Process Concept - Definition of process states, process state Transitions, Process Control Block, suspend and reserve.
- Unit-II** : **Asynchronous Concurrent Processors** :
Parallel processors, A control structure for indicating parallelism- Parbegin/Parend.

Mutual exclusion primitives and their implementation. Dekkers & Peterson's algorithm.

N-processors synchronization with semaphore Implementing semaphores P and V.

Concurrent Programming:

Critical Regions and Conditional critical region monitors path expressions, message passing.

Unit-III : **Deadlock Indefinite postponement:**

Resource concept, four modification for deadlock, Dead lock prevention. Banker's Algorithm, Deadlock Detection. Deadlock Recovery.

Unit-IV : **Storage Management :**

Real Storage: Storage Organization, Storage Management storage Hierarchy. Storage Management strategies contiguous 4 non contiguous storage allocations. Single UGC contiguous storage allocation, fixed 4 variable partition multiprogramming, multiprogramming with storage swapin.

Virtual Storage Management :

Virtual storage management strategies, page replacement strategies, locality, working sets, page fault - frequency page replacement/ Demand Paging, page release page size.

Unit-V : **Processor Management :**

JOB & Processor Scheduling : Introduction, Scheduling levels, objectives and criteria, Preemptive vs. Non-preemptive scheduling HRN. Scheduling Multilevel feedback Queues fair share scheduling.

Case Studies : UNIX System, MS-DOS

Books:

- 1) Operating Systems - H.M. Deitel - Addison Wesley.
- 2) Operating Systems- John J. Donovan.

Practicals :

3SP1 - Lab I based on 3ST1 & 3ST2

The distribution of marks in practical examination is given as :

- | | | |
|-----|---|-----------|
| (1) | Program writing / execution (based on 3ST1) | 15 marks. |
| (2) | Program writing / execution (based on 3ST2) | 15 marks. |
| (3) | Practical Record | 10 Marks |
| (4) | Viva-Voce | 10 Marks |

Total 50 Marks

3SP2 - Lab II based pm 3ST3 & 3ST4

The distribution of marks in practical examination is given as :

(1)	Program writing / execution (based on 3ST3)	15 marks.
(2)	Program writing / execution (based on 3ST4)	15 marks.
(3)	Practical Record	10 Marks
(4)	Viva-Voce	10 Marks

	Total	50 Marks

SEMESTER III**3ST5 : ELECTRONICS**

- UNIT-I** : Evolution of microprocessor, microcomputer, (Block diagram with function of each block), architecture of Intel 8085 microprocessor, function of each block of 8085, pin diagram and function of all pins of 8085, instruction format. Instruction cycle, fetch and execute operation, machine cycle and state, timing diagram (opcode fetch, MR, MW, IOR, IOW).
- UNIT-II** : **Instruction and programming of 8085**
Addressing mode, classification of instruction set of 8085 with examples, concept of stack and stack pointer, PUSH and POP instruction, simple program illustration. Concept of subroutine: CALL and RET instruction, Delay subroutine (using one register and register pair).
Programming : Algorithm, Flowchart, Assembly and machine language, its advantage and disadvantage, assembly language program for addition, subtraction, multiplication, division, finding maximum and minimum numbers.
- UNIT-III** : **Interfacing**
Basic interfacing concept, memory mapped I/O and I/O mapped I/O schemes, data transfer scheduling. 8255PPI: block diagram, function of each block, pin diagram, , function of each pin, operating modes of 8255, control word format in I/O and BSR mode, illustrative examples.
- UNIT-IV** : **8086 Architecture**
Block diagram of 8086 microprocessor, BIU and EU, operating modes of 8086, register of 8086-G.P.R, pointer and index register, segment register, concept of segmented memory, instruction pointer, status flag, pin diagram of 8086 microprocessor, physical and effective address.
- UNIT-V** : **Instructions and programming of 8086**

Instructions: MOV, PUSH, POP, LEA, LDS, LES, Arithmetic & Logic Instructions. Addressing mode, 8086 instruction, Bus cycle , programming: programs of data transfer, addition, subtraction, division, multiplication using various addressing mode.

BOOKS RECOMMENDED:

- 1) Microprocessor and microcomputer By B.Ram
- 2) Microprocessor architecture, programming and application by Ramesh Gaonkar
- 3) Introduction to Microprocessor by A.P. Mathur
- 4) Microprocessor architecture and application by Douglas Hall.

3SP3 : LAB-III Based on 3ST5

(PRACTICALS : Atleast 10 practicals based on 8085 microprocessor & 10 practicals based on 8086 microprocessor to be performed by each student)

SYLLABUS FOR**B.C.A. Part-II****Semester IV****4ST1 : Systems analysis design & MIS****Unit-I : System Analysis & Design :**

Introduction, Successful systems, systems developments, role of analyst and designer, better system development, Introduction to approaches for SAD, Traditional and structured approaches, Yourdon, Jacquesar, Information Engg., SSHPM, Merise, Euromethod, OOP.

Introduction to communicating with people, types of communication, improving skills - Building better systems, quality concepts, cost & quality, ISO90000 quality in structured life.

Unit-II : Project Management :

Introduction, stages of system development, Project plannign estimation, monitoring and control.

System Analysis :

Concepts : Introduction, structured approach, Planning the approach : Introduction, Objectives, Constraints, feasibility study, Asking questing and Collection data.

Recording the information :

Introduction, case tools, FD, entity models, Interpreting the information collected :

Introduction, modeling, ELH, ECD. Specifying the requirements : Introduction from Analysis to design.

- Unit-III :** System Design : Protecting the system : Introduction, various damages, protection.
Human Computer I/F : O/P design, I/P design, dialogue design.
System Interfaces : Introduction
Logical Data Design : Introduction
Files & Databases :
Introduction Physical Data design & program design: DAD, IRC, STD.
- Unit-IV :** MIS :
Introduction, System Implementation, MIS frame work, importance, concepts, management, information system
Definition, IT, Nature & Scope :Characteristics, function, structure & classification : Physical Components, processing functions, decision support, classification of MIS, DSS, ESS, OAS, RES, Various information system.
Decision making and MIS : Types, level, utility management of Information System:
Implementation, Planning, organisation & development, user training, testing, changeover, procedures, evaluation.
- Unit V :** Information system planning :
Mission, Objectives, strategies, policies, resource, allocation, project planning.
Case study : P vehicle booking information system, Network of Technology Institute.

Books Recommended :

1. System Analysis and Design- Don Yaeatesm, shiebls, Helmy (M).
2. Management Information System - Goyal (M)
3. Workbook on system analysis & Design-Gang & Srinivasan PHI.
4. System Analysis & Design Igon-H-PHI
5. Information System for Modern Management -Murdicle, Ress, Clagett-TMH.
6. Managing with information - Kanter - PHI
7. System Analysis & Design - Edward -TMH
8. Information systems - Hussain &Hussain-TMH.

Practicals : Minimum 8 practicals based on above topics of syllabus.

Semester- IV

4ST2 : Visual Basic

- Unit I :** Visual nature, programming process, Event driven programming model, VB environment, Variables, constants, Arrays, Operations, string manipulation, logical Expressions, Decision structures & looping.
- Unit II :** Objects and classes in VB : Visual design, VB Projects, Creating and using classes, Window common controls Active X Components: creating & testing. OLE : basics, terminological, automation, working with text and graphics in VB, Common dialog control, Image control, picture box control, displaying text, line and shape controls, the printer objects.
- Unit III :** Introduction to internal functions : msgbox(s), inputbox(s)
VB Programs : Program structure, private & public procedure, Variable Code, Internal functions : Numeric function, string function.
- Unit IV :** Working with terms : properties, events and method, Forms Collections, accessing the forms.
Collection using subscripts, uploading forms, placing text on forms, format with print, multiples forms.
- Unit V :** Files : Open statements, file modes, locking the file, close statement, working with sequential access file, Print statement, Input statement, Write statements, working with random access file, put, get statements.

Books :

- 1) V.B. Unleashed (Techmedia)
- 2) Teach Yourself YBG . Scott Warner T Mtg.
- 3) Dan Application Com/ActiveX using VB6 (Techmedia)
- 4) VB6.0 in 21 days - Grey Perry-
- 5) Musturing VB 6.0 Block Book -Peter - NMaston-Techmedia.
- 6) Guide VB6.0 Block Book -Peter-Norton - Techmedia.

Semester- IV

4ST3 : Web Designing and Office Automation

- Unit-I :** Information Technology : Introduction, office applications, Medical and Health applications, Educational applications, www, other applications in Society, IT projects in India.
IT infrastructures : Site planning, AC, Ergonomics, security, training, communication trends.

- Unit-II** : Excel : Basics Getting started, tool bar, work book, editing, saving, advanced worksheets using auto format, printing charts, graphs, dealing with web pages.
- Unit-III** : Access : Introduction, creating, databases and tables, forms, entering and editing data, finding, sorting and displaying data, printing, RDBMS, Import, Export, troubleshooting and maintainance, using with webpages.
- Unit-IV** : Web Publishing : Introduction, Web authoring, tools, Web page design considerations, principles of design, web site hosting, search engines, Registering web site on search engine.
E-Commerce : Introduction Emergence of E-Commerce, how E-Commerce works, setting up shop on E-Commerce, future vision.
- Unit-V** : Web Page Construction : HTML-4 Introduction, common tages, Headers, text styling, linking images, formatting text, tables, forms, meta tags.
Introduction to pointshop pro : Image & screen capturing, layers, www resources, Introduction to Ms Visual Interdev, Introduction of Dreamviewer.

Books recommended :

1. Office Automation - K.K. Bajaj (M)
2. ABC's of win 98 - Sharon Grawford and Salkind (BPB)
3. Office Professional - Mansfield (BPB)
4. IT tools and applications (M)
5. Infrastructure for information technology - H Ravindran (M)
6. Business on the net - Agrawal, Lal, Agrawala (M)
7. Web Programming
8. Internet and Web Design - (M)
9. Developing E-Commerce site - Sharma and Sharma (PE)
10. Web Design in a Nut Shell - Jennefer Neiderst (SPD) O'Reily
11. Web 101 - Lenheert (PE)
12. Web Programming with Asp and COM - M.J. Crouds (PE)
13. HTML by example - hararoso & Stanftor (PHI)
14. Internet Standard zand protocols - Naik (PHI)
15. Using HTML4- Philips (PHI)
16. The CompleteIDIOT's guide to Ms-Feront page 2000- Pankar (PHI)
17. Web Publishing - Deseuza and D'souza
18. HTML Complete - BPB

Practicals : Minimum 8 practicals based on above topics of syllabus

Semester- IV

4ST4: NETWORKING

- Unit - I** : Network concept, advantages, goals, Network topologies: Star, ring, completely connected N/W, Hybrid N/W, Multipoint N/W, LAN, WAN, OSI, model, ISO etc.
- Unit - II** : Digital and Analog data transmission, MODEM, and Block diagram of Digital & Analog data communication.
OSI model, media access control, Error Control in network.
- Unit - III** : Data link protocols, Transmission efficiency.
Network layer : Network topologies, network routing, network standards, Network protocols, TCP/IP, FTP, HTTP.
- Unit - IV** : LAN : Types, components of LAN, Ethernet, token ring, MAP, MAN & WAN. Fast ethernet, FDDI, switched network, performance improvement.
- Unit - V** : Types of communication services, Dialed, dedicated and switched circuit services, Packet switched network. Network Security; Needs, threats, Risk assessment, unauthorised Access.

Books-

- i) Computer fundamental and Networking, by P.K. Sinha.
- ii) Local Area Network by Keiser, TMH Publication
- iii) Computer Networks by Andrew S. Tanenbaum PHI Pub.
- iv) Data and Computer Communication by W. Stalling.
- v) Business Data Communication & Networking by Fitzgerald & Dennis.

Practicals :

4SP1-Lab-I based on 4ST1 & 4ST2

The distribution of marks in practical examination is given as :

(1)	Program writing/execution (based on 4ST1)	15 marks
(2)	Program writing/execution (based on 4ST2)	15 marks
(3)	Practical Record	10 marks
(4)	Viva-Voce	10 marks
Total		50 marks

4SP2-Lab-II based on 4ST3 & 4ST4

The distribution of marks in practical examination is given as :

(1)	Program writing/execution (based on 4ST3)	15 marks
(2)	Program writing/execution (based on 4ST4)	15 marks
(3)	Practical Record	10 marks
(4)	Viva-Voce	10 marks
Total		50 marks

SEMESTER-IV**4ST5 : Advance Microprocessors and Microcontroller**

- Unit-I** : **80286 and Instructions:** Salient features of 80286 microprocessor, Internal Architecture, addressing modes, Interrupts, real mode , protected mode, privilege, protection, instruction set features.
- Unit-II** : **80386:** Register organization of 80386, addressing modes, data types, real addressing mode, protected mode, segmentation, paging, virtual 8086 mode,
Introduction to 80486 and 80586: Salient features, register organization, flag register.
- Unit-III** : **Microcontroller :** Introduction, comparison of microcontroller & microprocessor, block diagram of 8051 & study of internal blocks, reset clocks, registers, flags & internal memory, I/O ports, counter & timers, interrupts.
- Unit-IV** : 8051 Instruction Set and Bit and Byte Level programming: Instruction set, addressing mode, data transfer instruction, arithmetic & logic instructions, JUMP & CALL, programming of Bit & Byte, Additions, subtraction, multiplication, division.
- Unit-V** : **8051 Interfacing & Application :** Basics of serial communication, interfacing with RS-232C interfacing a DAC, interfacing to the 8255, power down mode.

References:

1. The 8086/88, 80186, 80286, 80386, 80486, Pentium and Pentium Pro microprocessors By Barry B. Bray (PHI)
2. Advanced Microprocessors and Peripherals: Ray and Bhurchandi (PHI)
3. The 8051 Microcontroller by Kenneth J. Ayala (Penram)
4. The 8051 Microcontroller by Mazidi and Mazidi (LPE)
5. The 8051 Microcontroller by Predko

PRACTICALS : (4SP3 Lab-III based on 4ST5) Atleast 15 practicals to be performed by each student based on microcontroller 8051 Ic

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