

**Mohanlal Sukhadia University
Udaipur (Raj.)**

Syllabus

**BACHELOR OF
COMPUTER APPLICATION**



**BACHELOR OF
COMPUTER APPLICATION**

(Annual Scheme)

(To be offered in affiliated colleges from session
2010-11)

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MOHANLAL SUKHADIA UNIVER- SITY UDAIPUR

BACHELOR OF COMPUTER APPLICATION (BCA(Annual Scheme))

(To be offered in affiliated colleges from session
2010-11)

1. **Duration of the Course :** The BCA (Annual Scheme) course will be of three years duration. Each year will be approximately 10 months (minimum 180 working days) duration.
2. **Medium of Instruction :** The medium of instruction and examination shall be English/Hindi.
3. **Eligibility :** The candidate must have passed 10+2 examinations with at least 50% marks in aggregate (Pass marks for SC/ST candidates or as per Govt rules)
4. **Courses of Study and Examination**

I Year

Paper	Paper Name	Duration of exam. (hours)	Total
Paper-I (BCA-101)	Introduction to Information Technology	3	100
Paper-II (BCA-102)	PC Software Packages	3	100
Paper-III (BCA-103)	Problem Solving through C Programming	3	100

Paper-IV (BCA-104)	Basic Physics	3	100
Paper-V (BCA-105)	Basic Mathematics	3	100
Paper-VI (BCA-106)	Computer Organization	3	100
Practical-I (BCA-107)	PC Software & Basic Electronics Lab	6	200
Practical-II (BCA-108)	C Programming Lab	6	200
	TOTAL		1000

II Year

Paper	Paper Name	Duration of exam. (hours)	Total
Paper-I (BCA-201)	Computer Communication and Networks	3	100
Paper-II (BCA-202)	Database Management System	3	100
Paper-III (BCA-203)	Fundamentals of Operating Systems	3	100
Paper-IV (BCA-204)	Data Structures using C	3	100
Paper-V (BCA-205)	Business Organization and Management	3	100
Paper-VI (BCA-206)	Business Communications	3	100
Practical-I (BCA-207)	Database Management Lab	6	200
Practical-II (BCA-208)	Data Structures Lab	6	200
	TOTAL		1000

II Year

Paper	Paper Name	Duration of exam (hours)	Total
Paper-I (BCA-301)	Object Oriented Programming using C++	3	100
Paper-II (BCA-302)	Visual Programming	3	100
Paper-III (BCA-303)	Information Security & Cryptography	3	100
Paper-IV (BCA-304)	Systems Analysis and Design	3	100
Paper-V (BCA-305)	Web Technology	3	100
Practical-I (BCA-306)	C++ Programming & Network security Lab	6	200
Practical-II (BCA-307)	Visual Programming & Web Designing Lab	6	200
Project (BCA-308)	Project		200
	TOTAL		1100

5. Scheme of Instruction :

Each year shall be of ten months (180 working days) duration. Details of lecture hours per week shall be as follows:

Theory : Three hours/week for each Paper
Practical : Students are required to work in the Laboratory for 10 hours/week for each practical under four hours/week faculty guidance for each practical paper.

6. Examination Scheme:

1. University shall conduct examinations only after completion of 180 working days of instruction in a

year.

2. Each theory paper shall be of 100 marks
3. Each practical paper shall be of 200 marks
4. The question paper shall consist total six questions. Part-A shall consist of one compulsory question of 20 marks with ten parts covering the entire syllabus for which answer must be provided within 20 words for each. Part-B will consist five long answer questions (which requires answers in about 400 words for each), one from each unit with internal choice. Each question in the part-B will carry 16 marks each.
5. During examination students shall be provided with a single blank answer booklet and answers of all questions must be confined to the single answer booklet. No supplementary copies will be provided.
6. Question papers shall be set only in English. However, students can answer in English/Hindi

Project

Project evaluation shall be carry out as follows :

- (i) Project Report : 50 marks
- (ii) Presentation : 50 marks
- (iii) Work Assessment : 50 marks

Only the projects submitted by the candidates as per following guidelines will be evaluated.

1. The project must be of approximately 200 hours and so certified by the supervisor of the project.
2. The project must be submitted in the form in consonance with the format enclosed.
3. Project must be submitted before the prescribed last date .
4. Candidates are required to make a presentation of their project work during their project examination
5. Examination of the project work will be conducted by a committee consisting of at least two internal examiners and one external examiner.

Minimum passing marks and classification of Successful Candidates:

I Year:

- (a) The minimum marks for passing I year shall be 40% in each paper and 40% marks in the aggregate of papers.
- (b) A candidate may be promoted to II year if he has/she secured at least 40% marks in at least six papers/practical out of 8 theory/practical papers and more than 40% in aggregate. Such candidate shall be required to appear in papers in which he has secured less than 40% marks along with papers of II year when these courses are offered again, so as to satisfy the passing criteria laid in I(a).
- (c) A candidate fails to satisfy the criteria I(a), I(b) for

promotion to II year shall be required to rejoin the course in Ist year, if otherwise eligible in accordance with the University regulations laid in this regard.

II Year:

- (a) The minimum marks for passing II year shall be 40% in each paper and 40% marks in the aggregate of papers.
- (b) A candidate may be promoted to III year if he has/she secured at least 40% marks in at least six papers/practicals out of 8 theory/practical papers and more than 40% in aggregate. Such candidate shall be required to appear in papers in which he has secured less than 40% marks along with papers of III year when these courses are offered again, so as to satisfy the passing criteria laid in II(a).
- (c) A candidate fails to satisfy the criteria II(a), II(b) for promotion to III year shall be required to rejoin the course in II year, if otherwise eligible in accordance with the University regulations laid in this regard.

III Year:

- (a) The minimum marks for passing III year shall be 40% in each paper and 40% marks in the aggregate of papers.
- (b) A candidate may be allowed to reappear in two

papers of III year if he has/she secured at least 40% marks in at least six papers/practicals/project out of 8 theory/practical/project papers and more than 40% in aggregate. Such candidate shall be required to appear in papers in which he has secured less than 40% marks along with due papers of I & II year (if any) when these courses are offered again, so as to satisfy the passing criteria laid in III(a).
(c) A candidate fails to satisfy the criteria III(a), III(b) shall be required to rejoin the course in III year, if otherwise eligible in accordance with the University regulations laid in this regard.

No candidate shall be deemed to have satisfied examination requirement for the award of BCA degree unless he fulfills the criteria for passing I year, II year and III year examinations, as laid in I(a), II(a) and III(a).

Candidate will not be allowed to reappear in any papers of I,II & III year to improve the percentage.

At the end of final examination, the candidates eligible for the award of B.C.A. (Annual Scheme) degree shall be classified on the basis to the marks obtained in the I,II & III year examinations, taken together, as follows:

- (a) **I division with distinction** : 75% or more marks in the aggregate and provided the candidate has passed all the papers and examinations in the first attempt. (b) **I division** : 60% or more marks but fails to satisfy the criteria for being classified as first division with distinction laid in (a).

- (c) **II division** : 48% or more but less than 60%
(d) **III division**: 40% or more but less than 48%

A candidate must pass the examinations within five years of the initial admission to the first year of the course.

First Year B.C.A.

(Effective from session 2010-11)

BCA- 101: Introduction to Information Technology

UNIT-I

Computer Basics: Algorithms, A Simple Model of a Computer, Characteristics of Computers, Problem-solving Using Computers.

Data Representation: Representation of Characters in computers, Representation of Integers, Representation of Fractions, Hexadecimal Representation of Numbers, Decimal to Binary Conversion, Error-detecting codes.

Input & Output Devices: Description of Computer Input Units, Other Input Methods, Computer Output Units(Printers ,Plotters)

UNIT-II

Computer Memory: Memory Cell, Memory Organization, Read Only Memory, Serial Access Memory, Physical Devices Used to Construct Memories, Magnetic Hard Disk, floppy Disk Drives, Compact Disk Read Only Memory, Magnetic Tape Drives.

Processor: Structure of Instructions, Description of a Processor, Machine Language and Instruction set . processors used in desktops and lap tops.

Specification of a desktop and Lap top computer currently available in the market (Specifications of

processor,motherboard &chipset, memory, interface & capacity of hard disk & DVD drives, I/O ports)

UNIT-III

Computer Architecture: Interconnection of Units, Processor to Memory communication, I/O to Processor Communication, Interrupt Structures, Multiprogramming, Processor Features, Reduced Instruction , Set Computers (RISC), Virtual Memory.

Software Concepts: Types of Software, Programming Languages, Software (Its Nature & Qualities), Programming Languages.

UNIT-IV

Operating Systems: History and Evolution. Main functions of OS Multitasking ,Multiprocessing,Time Sharing ,Real Time OS with Examples

Database Management System :Purpose and Organization of Database ,Introduction to Data Models

Computer Generation & Classifications: First Generation of Computers, The Second Generation, The Third Generation, The Fourth Generation, The Fifth Generation, Moore's Law, Classification of computers, Distributed Computer System, parallel computers.

UNIT-V

Computers & Communications : Introduction to Computer Communications, Introduction to Computer Networks, Types of Networks, OSI/TCP Model, LAN tech-

nologies (fast Ethernet & Gigabit Ethernet), How LAN works, Brief survey of active and passive LAN components.

Internet: Network, Client and Servers, Host & Terminals, TCP/IP, World Wide Web, Hypertext, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services, Case Study, Intranet.

Cyber Laws: Introduction to Cyber Laws, Cyber crime, Cyber contract, Cyber privacy, IT Act

Recommended Books:

1. P .K. Sinha ,Fundamentals of Computers, BPB Publications
1. V. Rajaraman, Fundamentals of Computers, 3rd Edition , PHI Publications

BCA-102: PC Software Packages

(This paper must be taught in the Lab using PC software)

UNIT-I

DOS: Introduction, history & versions of DOS, DOS basics- Physical structure of disk, drive name, FAT, file & directory structure and naming rules, booting process, DOS system files, DOS commands- internal & external,

UNIT-II

Windows Operating System : Windows concepts, Features, Windows Structure, Desktop, Taskbar, Start Menu, My Computer, Recycle Bin, Windows Accessories- Calculator, Notepad, Paint, Wordpad, Character Map, Windows Explorer, Entertainment, Managing Hardware & Software- Installation of Hardware & Software, Using Scanner, System Tools, Communication, Sharing Information between programs.

UNIT-III

Word Processing; MS-Word: Features, Creating, Saving and Opening Documents in Word, Interface, Toolbars, Ruler, Menus, Keyboard Shortcut, Editing, Previewing, Printing, & Formatting a Document, Advanced Features of MS Word, Find & Replace, Using Thesaurus, Using Auto- Multiple Functions, Mail Merge, Handling Graphics, Tables & Charts, Converting a word document into various formats like- Text,

Rich Text format, Word perfect, HTML etc.

UNIT-IV

Worksheet- MS-Excel: Worksheet basics, creating worksheet, entering into worksheet, heading information, data, text, dates, alphanumeric values, saving & quitting worksheet, Opening and moving around in an existing worksheet, Toolbars and Menus, Keyboard shortcuts, Working with single and multiple workbook, working with formulae & cell referencing, Auto sum, Coping formulae, Absolute & relative addressing, Worksheet with ranges, formatting of worksheet, Pre-viewing & Printing worksheet, Graphs and charts, Database, Creating and Using macros, Multiple worksheets- concepts, creating and using.

UNIT-V

Introduction to Power Point: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

Other packages: DTP software: Brief survey of MS Publisher, Pagemaker, Coreldraw.

Adobe Photoshop

Recommended Books:

1. PC Software for Windows – R.K. Taxali
2. Unix Concepts and Applications – Sumitabha Das

BCA 103: Problem Solving through C Programming

UNIT-I

Algorithm and algorithm development:

Definition and properties of algorithm, flow chart symbols, conversion of flow chart to language, example of simple algorithms, Introduction to program design, errors – syntax error, runtime error, logic error.

UNIT-II

Basics of C – Language:

History, Constants – Integer, Real, Character; Variables and Keywords; Data types and size, constants, arrays, pointers, Operators – arithmetic, relational, logical, increment and decrement, bitwise and assignment, Hierarchy of Operators and Operations, Associativity of Operators, creation and evaluation of expressions.

UNIT-III

Control Structure:

Decision Structure: - Simple if, if – else, if – else – if, nested if, switch case; Loop Control Structure:- while , do while and for; Use of break, goto and continue;

UNIT-IV

Functions:

Function definition, declaration and prototypes, Call by Value and Call by Reference, Scope Rule of Functions.

UNIT-V

Complex C-Language:

Variables – external, static, register; Recursive functions; multi – dimensional arrays; Pointers and arrays, pointer arrays, Structures – declaring and accessing elements, array of structure, File Input/Output – Create, Open, Read, Write, Delete, Close;

Recommended Books:

1. Yashavant Kanetkar, Let us C
2. Balaguruswamy, Programming in C

BCA – 104: Basic Physics

(This paper must be taught to impart basic knowledge of physics to understand principle behind technologies used in Computer Application. Avoid derivations of equations and problem solving. Question paper must be set accordingly)

UNIT-I

Basic Concepts : Definition of Science, engineering and technology. Importance of Mathematics and Physics in ICT. Units and Dimensions, MKSA Units, Idea of order of magnitude scale of Mass, time and length with examples. Measurement of length using vernier caliper and screw gauge, Newton's laws of motion, physical quantities as scalars and vectors, vector addition, scalar and vector product of two vector, Brief idea of types of forces in nature, torque, rotational motion and moment of inertia, simple examples of conservation of energy, momentum and angular momentum.

Optical instruments: Electromagnetic spectrum, frequency, wavelength and energy associated with electromagnetic radiation, formation of image by lens, eye, Sensitivity of eye to electromagnetic radiation, defects of vision, Brief understanding of telescope, microscope, eye pieces.

UNIT-II

Electrostatics: Concept of Potential and field due to a

charge, Gauss's law; dielectric constant, capacitance of a parallel plate condenser, energy stored in condenser, series and parallel combination of capacitances, types of capacitances used in electronic circuits, rating of capacitances.

Current Electricity: Electric current, Ohm's law, types of resistances and colour codes, Kirchhoff's laws, analysis of simple circuits, Thevenin, Norton and maximum power transfer theorems, principle of potentiometer, magnetic effect of current, field due to circular current loop.

UNIT-III.

Transducers: Thermoelectric effect and thermocouples, thermistors, LDRs, piezo electric effect, speakers and mic, electro chemical effect, primary and secondary cells, batteries. Electrical rating of cells and batteries

Interaction of magnetic field and current: force on current carrying conductor, moving coil galvanometer, conversion of galvanometer into ammeter and voltmeter, multimeter.

UNIT-IV

Electromagnetic induction: self and mutual inductances, choke coil and transformers.

AC circuits: peak and rms voltage and current, power factor, L-R, C-R and L-C-R circuits with their phase dia-

grams, series and parallel resonant circuits.

AC & DC current, understanding electric power distribution in offices and houses, electrical safety, electric fuse, rating of electrical accessories. Importance of good earthing.

Semiconductors: Qualitative description of energy bands, metals, insulators and semiconductors, n and p types of semiconductors, semiconductor p-n junction, metal semiconductor junction, current voltage characteristics of pn junction diode, half wave and full wave rectifiers, Zener diode and voltage regulation, LEDs, photo diode, and solar cell.

UNIT-V

Transistors: Definition, Current in bipolar junction transistor, Amplifier: Brief idea of CE, CC amplifier and its characteristics, gain in decibels, Frequency vs gain graph, cascading amplifiers, Oscillator: Brief idea about oscillators of different frequency range, Different types of wave forms. Brief introduction to Integrated circuits with scale of integration, Use of MOS and CMOS Transistors.

Lasers: Basic principle, He-Ne and semiconductor lasers, basic concepts of communication using optical fibers.

Brief idea of working and uses of Cathode ray Oscilloscope, Working principle of LCD and plasma devices, UPS, SMPS.

Recommended Books:

- 1 Physics, Part-I Kumar, Mittal; Nageen Publication, Meerut.
- 2 Concepts Of Physics, Part 1, H C Verma; Bharati Bhawan.
- 3 Concepts of Physics, Part2, H C Verma; Bharti Bhawan.

BCA 105: Basic Mathematics

UNIT-I

Evaluating Algebraic Expressions

Order of operations
Evaluating algebraic expressions

Linear Equations

Translating algebraic expressions
Combining like terms
Solving linear equations: Addition property
Solving linear equations: Multiplication property
Combining rules
Literal equations
Solving linear inequalities

Graphing Linear Equations

Linear equations in two variables
The Cartesian coordinate system
The graph of a linear equation
Slope
Point-slope form of a line
Graphing linear inequalities

UNIT-II

Systems of Linear Equations

Systems of equations in two variables (addition/elimination)

Operations with polynomials

Positive integer exponents
Zero and negative integer exponents
Definition of polynomials
Addition and subtraction of polynomials
Multiplying polynomials

Factoring polynomials

Introduction to factoring
Difference of squares
Quadratic trinomials
Solving equations by factoring
Some word problems involving quadratic equations

UNIT-III

Radical expressions and complex numbers

Introduction to roots and radicals

Simplifying radical expressions [No variables]

Operations with radical expressions [No rationalizing binomials]

Complex Number [i Notation only, No operations]

Quadratic equations and some conics

Special methods, completing the square
The quadratic formula
Parabolas [Graph by table]

UNIT-IV

SETS: Sets, subsets, equal sets, null set, universal set, finite & infinite sets, open & closed sets etc., operations on sets, partition of sets, cartesian product.

DIFFERENTIATION: Derivative, derivatives of sum, differences, product & quotients, chain rule, derivatives of composite functions .

UNIT-V

INTEGRATION Integral as limit of a sum, indefinite & definite integrals, methods of integration substitution, by parts, partial fractions, integration of algebraic and transcendental functions

PLANE CURVES & POLAR COORDINATES: Polar coordinates, curve tracing in polar coordinates, area in polar coordinates, Arc length, area & volume of surface of revolution in Cartesian and polar coordinates.

Text/Reference Books :

1. C. L. Liu.: Elements of Discrete Mathematics , Tata Mac-Graw Hill.

2. Thomas, G.B. and R. L. Finney: Calculus & Analytical Geometry, Addison-Wesley , 9th edition.
3. Chandrika Prasad : Mathematics for Engineers, Prasad Mudranalaya, Allahabad, 19th edition
4. Shanti Narayan: Differential Calculus, S.Chand & Co.
5. Shanti Narayan: Integral Calculus, S.Chand & Co.

BCA 106: Computer Organization

UNIT-I

Overview of electronics:

Electronic components - Register, Capacitor and Inductors, Semiconductor devices - Diodes, Transistors (BJT and FET). Analog vs Digital electronics, Transistor as a switch. Integrated circuits, SSI, MSI, LSI, and VLSI circuits. Multivibrators - astable, bistable, monostable, counters ripple and decade, edge and level triggering.

UNIT-II

Building blocks of computer system:

Basic building blocks - I/O, Memory, ALU and its components, Control Unit and its functions, Instruction - word, Instruction and Execution cycle, branch, skip, jump and shift instruction, Operation of control registers; Controlling of arithmetic operations;

UNIT-III

Addressing techniques and registers:

Addressing techniques - Direct, Indirect, Immediate, Relative, Indexed addressing and paging. Registers - Indexed, General purpose, Special purpose, overflow, carry, shift, scratch, Memory Buffer register; accumulators; stack pointers; floating point; status information

and buffer registers.

UNIT-IV

Memory:

Main memory, RAM, static and dynamic, ROM, EPROM, EEPROM, EAROM, Cache and Virtual memory.

UNIT- V

Interconnecting System components:

Buses, Interfacing buses, Bus formats – address, data and control, Interfacing keyboard, display, auxiliary storage devices and printers. I/O cards in personal computers.

Introduction to Microprocessors and Microcontrollers: introduction to 8085 micropocesor, examples of few instructions to understand addressing techniques. Difference between microprocessor and microcontrollers.

Recommended Books

1. Andrew S. Tanenbaum , Structured Computer Organization,Printice Hall.
2. William Stallings, Computer Organization and Architecture , Sixth Edition, Pearson.

BCA 107: Practical I: PC Software and Basic Electronics Lab.

Experiments based on papers BCA 102 and BCA 106.

BCA 107: Practical II: C Programming Lab.

Experiments based on paper BCA 103.

Second Year B.C.A.

(Effective from session 2011-12)

BCA 201: Computer Communications and Networking

UNIT-I

Protocol Architecture : Overview: Communication model, Communication Tasks, Data Communication Networking: WAN, LAN,Wireless Networks. Basics of Network Software: Protocol and protocol architecture, Protocol functions, Design Issues for the layers, interfaces &Services, Connection oriented and connectionless services, service primitives, relationship of services to protocols , ISO REF Models, TCP/IP Model.

Data Communications: Data Transmission: Concepts of Frequency,Spectrum, bandwidth, Electromagnetic spectrum and frequencies for data communication, Fourier analysis , Data and signal, Transmission impairments, channel capacity, Nyquist bandwidth, Shannon capacity formula ,decibels and signal strength, Trans-

mission media: Coaxial, twisted pair, Comparative study of Categories of cables, Coaxial, Optical Fibers, Wireless transmission: Terrestrial Microwave, satellite, Broadcast Radio, Infrared,.

UNIT-II

Data Encoding: (Brief idea of NRZ, Bipolar AMI, B8ZS, HDB3, ASK, FSK, PSK, PCM, AM, FM, PM), Spread Spectrum. Asynchronous and Synchronous transmission, Full and Half duplex, Interfacing, Functional and Procedural aspects of V.24,

Data Link Control: Flow control: Stop and Wait, Sliding window, Error detection: Parity Check, CRC. Error control: Stop and Wait ARQ, Go back-N ARQ, Selective-Reject ARQ, Brief idea of HDLC and other Data Link control protocols

UNIT-III

Circuit Switching: Simple switching Network, Circuit Switching Networks, Brief idea of following (detail working) not required:

Circuit Switching Concepts: Space Division switching, Time Division Multiplexing, Routing in circuit switching Networks, Control Signalling, Inchannel & common channel signaling, Brief idea of SS7. Packet Switching: Packet switching principles, Routing, X.25

UNIT-IV

LAN Technology: LAN architecture, IEEE 802 standards, Ethernet (CSMA/CD): Medium Access Control, 10Mbps, 100Mbps, Gigabit Ethernet. Brief survey of other LAN systems (Token ring, FDDI, ATM, Fiber channel). Wireless LANS, Bridges, Latest trends in LAN technologies

LAN Devices: Study of specifications of L2 and L3 switches, Structured cabling, Passive components.

UNIT-V

Principles of Internetworking, connection less Internetworking, IP, IPv6, IP multicasting. Routing protocols, TCP, UDP, SNMP, SMTP and MIME, HTTP.

Recommended Books :

1. William Stallings: Data & Communications, Sixth Edition
2. A. S. Tanenbaum : Computer Networks

BCA- 202: Database Management Systems

UNIT-I

Introduction : Purpose of the data base system, data abstraction, data model, data independence, data definition language, data manipulation language, data base administrator, data base users, overall structure.

ER Model : entities, mapping constrains, keys, E-R diagram, reduction E-R diagrams to tables, generatio, aggregation, design of an E-R database scheme.

UNIT-II

Relational Model : The catalog, base tables and views. Relational Data Objects - Domains and Relations: Domains, relations, kinds of relations, relations and predicates, relational databases.

Relational Data Integrity - Candidate keys and related matters: Candidate keys. Primary and alternate keys. Foreign keys, foreign key rules, nulls. Candidate keys and nulls, foreign key and nulls.

UNIT-III

The SQL Language: Data definition, retrieval and update operations. Table expressions conditional expressions, embedded SQL.

Views: Introduction, what are views for, data definition, data manipulation, SQL support.

UNIT-IV

Network model : basic concepts, data structure diagrams, DBTG CODASYL model, DBTG data retrieval facility, DBTG update facility, DBTG set processing facility, mapping networks to file, networks system.

Hierarchical model : basic concepts, tree structure diagrams, data retrieval facility, update facility, virtual records, maping hierarchical to files, hierarchical system.

UNIT-V

File and system structure : overall system structure, file organisation, logical and physical file organization, sequential and random, hierarchical, inverted, nulllist, indexing and hashing, B-tree index files.

Recommended Books :

1. Date C.J., Database Systems, Addison Wesley.
2. Korth, Database Systems Concepts, McGraw Hill.

BCA 203: Fundamentals of Operating Systems

UNIT-I

Introduction: What is an operating system? Mainframe, desktop, multiprocessor, distributed, clustered, real-time and handheld systems.

Operating System Structures: System components, operating system services, system calls, systems programs, system structure, virtual machines.

UNIT-II

Process: Process concept, process scheduling, operations on processes, cooperating processes. Inter process communication.

CPU Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation.

UNIT-III

Process Synchronization: The critical section problem, semaphores, classical problems of synchronization.

Deadlocks: Deadlock characterization, methods for handling deadlocks. Deadlock prevention, avoidance and detection. Recovery from deadlocks.

UNIT-IV

Memory Management: Swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.

Virtual Memory: Demand paging, page replacement, allocation of frames, thrashing.

UNIT-V

Linux: History, design principles, kernel modules, process management, scheduling, memory management, file systems, input and output, inter process communication, network structure, security.

Recommended Books:

1. Silberschatz G.G., Operating System Concepts, John Wiley & Sons Inc.

BCA 204: Data Structures using C

UNIT-I

Linear Structure: Arrays, records, stack, operation on stack, implementation of stack as an array, queue, operations on queue, implementation of queue.

UNIT-II

Linked Structure : List representation, operations on linked list - get node and free node operation, implementing the list operation, inserting into an ordered linked list, deleting, circular linked list, doubly linked list.

UNIT-III

Tree Structure : Binary search tree, inserting, deleting and searching into binary search tree, implementing the insert, search and delete algorithms, tree traversals

UNIT-IV

Graph Structure : Graph representation - Adjacency matrix, adjacency list, adjacency multilist representation. Orthogonal representation of graph . Graph traversals - bfs and dfs. Shortest path, all pairs of shortest paths, transitive closure, reflexive transitive closure.

UNIT-V

Searching and sorting : Searching - sequential searching, binary searching, hashing. Sorting - selection sort, bubble sort, quick sort, heap sort, merge sort, and insertion sort, efficiency considerations.

Recommended Books :

1. Horowitz E Sartaj Sahni, Fundamentals of Data Structure, Galgotia Publication Private Limited., New Delhi.

BCA 205: Business Organization and Management

UNIT - I

Business and Management: Business Meaning and Contents, Business as a system, Business Environment.

Management Concept and Nature, Management Process, Basic function of Management, Management Level, Role of Manager, Management Principles (Henry fayol's principle of management, Taylor's Scientific Management) .

UNIT - II

Organizational Behaviour: Need of Understanding human behaviour in organization, Challenges and Opportunities for OB.

Management by Objective (MBO), Decision making process and models, Conflict Management, Strategies & Policies.

UNIT- III

Managing Personnel: HRM- Meaning and Functions, Man Power Planning, Job Analysis and Design, Training, Career Planning & Development.

Motivation Theories & Practices, Leadership Concept theories & Style, Compensation Management.

UNIT- IV

Marketing Management and Finance: Basic Concepts of Marketing, Nature & Scope of Marketing, Sales Promotion, Product Life Cycle, Marketing Information System (MIS) and Marketing Research.

Main Sources of Finance, Concept of Fixed & Working Capital, Introduction of Tax – Income Tax, Service Tax & VAT, Basic Concept of Invoice & Quotations.

UNIT- V

Case Study: IT & BPO Industry, HR & Finance, Case Study of Local Industry with around Hundred Employees, Industry Visit, Project.

Recommended Books:

1. B.P. Singh & T.N. Chabbra, "Business Organization and Management Functions" , Dhanpat Rai & Co. 2000.
2. P.C Tripathi & P. N. Reddy, " Principles of Management", Tata McGraw Hill Publishing Company New Delhi.
3. L.M. Prasad, " Principles and Practices of Management" .
4. Stephen P. Robbins, " Organisational Behaviour", (8th Ed.) Prentice Hall of India.

5. K. Aswathappa, "Human Resource Management", Tata McGraw Hill Publishing Company New Delhi.
6. Philip Kotler, "Marketing Management", (9th Ed.) Prentice Hall of India.
7. Ramaswamy. V.S. and Namakumari.S. " Marketing Management : Planning, Control." New Delhi, MacMillan. 1990.
8. Dr. S.N. Maheshwari, " Financial Management – Principles and Practices" (6th revised Ed.) S. Chand & Sons.

BCA 206: Business Communications

(Note: All institutions offering BCA course shall be required to establish a language laboratory for English speaking and other softskills. Institution may use Software from reputed firms like Linguaphone or any other firms for active learning with well defined curriculum)

UNIT-I

Concepts and Fundamentals : Meaning of communication, Importance of communication, Communication scope, Process of communication, Communication models and theories, Essentials of good communication - The seven Cs of communication, Factors responsible for growing importance of communication, Channels of communication, Verbal and Non-Verbal communication Formal and Informal communication Barriers of communication.

UNIT-II

Written Communication : Objectives of written Communication, Media of written communication, Merits and demerits of written communication, Planning business messages.

Writing Letters : Business letters, Office memorandum , Good news and bad news letters , Persuasive letters , Sales letters , Letter styles/ layout.

UNIT-III

Report Writing : Meaning & Definition, Types of report (Business report & Academic report) ,Format of report, Drafting the report ,Layout of the report, Essential requirement of good report writing.

Language Skills : Improving command in English ,Choice of words, Common problems with verbs, adjectives, adverbs, pronouns, conjunctions, punctuation, prefix, suffix etc.

UNIT-IV

Oral Communication : Principles of effective oral communication, Media of oral communication, Advantages of oral communication, Disadvantages of oral communication, Styles of oral communication.

Interviews : Meaning & Purpose, Art of interviewing, Types of interview, Interview styles, Essential Features, Structure , Guidelines for Interviewer, Guide lines for interviewee.

Arts of Listening : Good listening for improved communications, Art of listening, Meaning, nature and importance of listening, Principles of good listening, Barriers in listening.

Meetings : Definition, Kind of meetings, Advantages and disadvantages of meetings/ committees, Planning and organisation of meetings.

UNIT-V

Job Application : Types of application, Form & Content of an application, Drafting the application, Preparation of resume.

Project Presentations : Advantages & Disadvantages, Executive Summary, Charts, Distribution of time (presentation, questions & answers, summing up), Visual presentation, Guidelines for using visual aids, Electronic media (power-point presentation).

Business Negotiation : Definition of negotiation, Factors that can influence negotiation, What skills do we need to negotiate, Negotiation process (preparation, proposals, discussions, bargaining, agreement, implementation).

Recommended Books :

1. Communication by C.S. Rayudu, Himalaya Publishing House.
2. Communication Today - Understanding Creative Skill by Reuben Ray, Himalaya Publishing House.
3. Successful Communication by Malra Treece.
4. Business Communication Today by Bovee & Thill, McGraw Hill.
5. Principles of Business Communication by Murphy

and Hilderbrandth.

6. Effective Communication Skills by O. N. Kaul & K. K. Sharma, Creative Publishers
7. Chicago Manual of style PHI.
8. Essentials of Business Communication by Rajendra Pal & J. S. Korlahalli, Sultan Chand & Sons.
9. Business Communication by K. K. Sinha.

BCA 207: Practical I: Database Management & Data Structure Lab.

Experiments based on the paper BCA 202. & 204

BCA 208: Practical II: Business Communications Lab

Experiments based on the paper BCA 206.

Atleast a 10 seat Language Lab must be established and used for English Communication(Language Skill, Oral Communications and Art of listening). Students are expected to go through well defined curriculum offered with English Language Lab Software and their competency shall be checked during external evaluation.(50 Marks)

Candidates competency in other aspects of business communications shall be evaluated for remaining 50 marks.

Third Year B.C.A.

(Effective from Session 2012-13)

BCA 301: Object Oriented Programming using C++

UNIT - I

Different paradigms for problem solving, need for OOP, differences between OOP and procedure oriented programming, abstraction, overview of OOP principles- encapsulation, inheritance and data binding polymorphism. abstraction.

C++ basics: structure of a C++ program, data types, declaration of variables, expressions, operators, type conversions, pointers and arrays, strings, structures, references, flow control statement, functions-scope of variables, parameter passing, recursive functions, default arguments, inline functions, dynamic memory allocation and deallocation operators.

UNIT - II

C++ classes and data abstraction: class definition, class structure, class objects, class scope, this pointer, static class members, constant member functions, constructors and destructors, dynamic creation and destruction of objects, friend function and class, static class member.

Overloading : function overloading, operator overloading - unary, binary operators.

UNIT - III

Inheritance: defining a class hierarchy, different forms of inheritance, defining the base and derived classes, access to the base class members, base and derived class construction, destructors, virtual base class.

Polymorphism: static and dynamic bindings, base and derived class virtual functions, dynamic binding through virtual functions, virtual function call mechanism, pure virtual functions, abstract classes, implications of polymorphic use of classes, virtual destructors.

UNIT - IV

Templates - function templates and class templates, overloading of function template, static class member in class template.

Exception handling: benefits of exception handling, throwing an exception, the try block, catching an exception, exception objects, exception specifications, rethrowing an exception, catching all exceptions.

UNIT-V

File handling : stream classes hierarchy, stream I/O, file streams, opening and closing data file, creating a data file, read and write functions, error handling during file operations, formatted I/O, sequential and random file processing.

Standard template library (STL): component of STL, containers, iterators, algorithms, application of container classes.

Recommended books :

Object Oriented Programming with C++ : E. Balagurusamy

BCA 302: Visual Programming

UNIT-I

WINDOWS PROGRAMMING : Windows environment - a simple windows program - windows and messages - creating the window - displaying the window - message loop - the window procedure - message processing - text output - painting and repainting - introduction to GDI - device context - basic drawing - child window controls

UNIT-II

VISUAL C++ PROGRAMMING - INTRODUCTION
Application Framework - MFC library - Visual C++ Components - Event Handling - Mapping modes - colors - fonts - modal and modeless dialog - windows common controls - bitmaps

UNIT-III

THE DOCUMENT AND VIEW ARCHITECTURE
Menus - Keyboard accelerators - rich edit control - toolbars - status bars - reusable frame window base class - separating document from its view - reading and writing SDI and MDI documents - splitter window and multiple views - creating DLLs - dialog based applications

UNIT-IV

ACTIVEX AND OBJECT LINKING AND EMBED-

DING (OLE) : ActiveX controls Vs. Ordinary Windows Controls - Installing ActiveX controls - Calendar Control - ActiveX control container programming - create ActiveX control at runtime - Component Object Model (COM) - containment and aggregation Vs. inheritance - OLE drag and drop - OLE embedded component and containers - sample applications

UNIT-V

ADVANCED CONCEPTS : Database Management with Microsoft ODBC - Structured Query Language - MFC ODBC classes - sample database applications - filter and sort strings - DAO concepts - displaying database records in scrolling view - Threading - VC++ Networking issues - Winsock - WinInet - building a web client - Internet Information Server - ISAPI server extension - chat application - playing and multimedia (sound and video) files

TEXT BOOKS :

1. Charles Petzold, "Windows Programming", Microsoft press, 1996 (Unit I)
2. David J.Kruglinski, George Shepherd and Scot Wingo, "Programming Visual C++", Microsoft press, 1999 (Unit II - V)

REFERENCE:

1. Steve Holtzner, "Visual C++ 6 Programming", Wiley Dreamtech India Pvt. Ltd., 2003.

BCA 303: Information Security & Cryptography

UNIT-I

Overview of cryptography : Need of security, cryptographic goals, security approaches, basic terminology and concepts, symmetric key encryption - block cipher and stream cipher, substitution cipher and transposition ciphers, key space, public key cryptography, symmetric key v/s public key cryptography. Protocols and mechanisms, key management through symmetric key and public key techniques, attacks on encryption schemes, attacks on protocols, models for evaluating security, perspective for computational security.

UNIT-II

Pseudorandom bits and sequences : Random bit generation - hardware based generator and software based generator, tests for measuring randomness - frequency, serial, poker, runs and autocorrelation test. Blum-Blum-Shub pseudorandom bit generator.

Stream ciphers: Classification, one time pad, properties of synchronous and self-synchronizing stream cipher, linear and nonlinear feedback shift registers, stream ciphers based on LFSRs and its property, SEAL.

UNIT-III

Block ciphers : Modes of operation - ECB, CBC, CFB

and OFB mode, exhaustive key search and multiple encryption, classical ciphers – transposition and substitution based ciphers, Vigenere ciphers, cryptanalysis of classical ciphers, Data Encryption Standard algorithm, double and triple DES, IDEA, Advance encryption standard, comparison of block ciphers, differential and linear cryptanalysis.

Public key encryption : Overview of symmetric key cryptography, RSA algorithm, ElGamal encryption, Knapsack encryption algorithm. public key cryptography standard (PKCS), PKI and security.

UNIT-IV

Message and Users authentication : One way hash functions, message digest, MD5 algorithm, secure hash algorithm (SHA1), comparison between different message digest algorithm, message authentication code.

Users authentication : authentication basics, password, authentication tokens, certificate based authentication, biometric authentication, Kerberos, Single sign on approach.

UNIT-V

Digital signature: digital envelope, classification of digital signature schemes – appendix and message recovery, attacks on signature.

Key management techniques: simple key establishment

models, tradeoffs among key establishing protocols, techniques for distributing confidential key, techniques for distributing public keys, comparison of techniques for distributing public keys, key management involving multiple domains, key management life cycle.

Text/Reference Books :

1. Applied cryptography – Menezes, Oorschot and Vanstone
2. Network Security Essentials - William Stallings

BCA 304: System Analysis and Design

UNIT-I

Introduction: System Concept and the need for system approach, Definition of system and system analysis, Factoring into subsystems, Black box system, Introduction to the basic elements of the system, Different types and behaviour of the system.

UNIT-II

The System Development Life Cycle and System Analyst: Source and inspiration of a new system development, Recognition and need, Linear approach and prototype approach, Different phases in SDLC, Role of System Analyst.

UNIT-III

System Analysis: Importance of planning and control, Information Gathering: Various Methods, Tools of Structured Analysis: DFD, Decision Tree, Structured English, Decision Tables, Data Dictionary, Feasibility study. **System Design:** The Process of Design: Logical and Physical design, Methodologies: Structured, Form-Driven, IPO Charts etc., Input Output Form Design, File Organization: Sequential Indexed, inverted list, Database Design, Logical and Physical View of Data.

UNIT-IV

System Implementation: Need of Testing, Test Plan, Quality Assurance, Trends in Testing, Audit Trail, Post Implementation Review, Project Scheduling, Selection of Hardware and Software

UNIT-V

Security and Recovery in System Development: System Security: Definition, Threats to system security, Control measures, Disaster/ Recovery Planning, Ethics in System Development. Case Study.

Recommended books:

1. System Analysis and Design - E.M.Awad
2. System Analysis and Design - Dennis Wixom

BCA 305: Web Technology

UNIT I

INTRODUCTION

History of the Internet and World Wide Web – HTML 4 protocols – HTTP, SMTP, POP3, MIME, IMAP. Introduction to JAVA Scripts – Object Based Scripting for the web. Structures – Functions – Arrays – Objects.

UNIT II

DYNAMIC HTML

Introduction – Object refers, Collectors all and Children. Dynamic style, Dynamic position, frames, navigator, Event Model – On check – On load – Onerror – Mouse rel – Form process – Event Bubblers – Filters – Transport with the Filter – Creating Images – Adding shadows – Creating Gradients – Creating Motion with Blur – Data Binding – Simple Data Binding – Moving with a record set – Sorting table data – Binding of an Image and table.

UNIT-III

MULTIMEDIA

Audio and video speech synthesis and recognition – Electronic Commerce – E-Business Model – E-Marketing – Online Payments and Security – Web Servers –

HTTP request types – System Architecture – Client Side Scripting and Server side Scripting – Accessing Web servers – IIS – Apache web server.

UNIT-IV

DATABASE- ASP – XML

Database, Relational Database model – Overview, SQL – ASP – Working of ASP – Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – Server side Active-X Components – Web Resources – XML – Structure in Data – Name spaces – DTD – Vocabularies – DOM methods.

UNIT-V

SERVLETS AND JSP

Introduction – Servlet Overview Architecture – Handling HTTP Request – Get and post request – redirecting request – multi-tier applications – JSP – Overview – Objects – scripting – Standard Actions – Directives.

Brief survey of Web 2.0 technologies, introduction to Semantic web and other current technologies

Recommended Books:

1. Deitel & Deitel, Goldberg, "Internet and world wide web – How to Program", Pearson Education

REFERENCES

1. Eric Ladd, Jim O' Donnel, "Using HTML 4, XML and JAVA", Prentice Hall of India - QUE 2.
2. Aferganatel, "Web Programming: Desktop Management", PHI
3. Rajkamal, "Web Technology", Tata McGraw-Hill,

BCA 306: Practical I: C++ Programming & Network security

Experiments based on the paper BCA 301 & BCA 303.

BCA 307: Practical II: Visual Programming & Web Designing Lab.

Experiments based on the paper BCA 302 and BCA 305.

BCA 308: PROJECT

In house project must be done by each student on simple applications using any computer language/ RDBMS/ Web design/visual programming etc.

The total work must be of minimum 180 hours per student. The internal guide must schedule the work & evaluate internally from time to time.

The project report must be prepared for the external examination. Monthly report of the students must be taken to monitor progress and must be placed for evaluation by external examiner. Projects submitted by the students shall be evaluated during external evaluation to ensure independent contribution and proficiency acquired by the students.

Note: Students must be allotted projects in the beginning of the session. Candidates submitting ready made projects/copied/ projects developed by professionals in the market etc shall be awarded zero marks.

Two copies of the project report and the software developed must be submitted to the external examiner. One copy of the project shall be returned to the student with the signature of external examiner.