

Under Graduate : BCA

Marks Distribution(BCA):

Sl. No.	Semester	Papers		Exam Marks(50)		Total marks of the paper(A+B)
				Internal Assesment	Written Marks	
1	1 st	BCA 101	A	15	35	100
			B	15	35	
		BCA 102	A	15	35	100
			B	15	35	
		BCA 103	A	15	35	100
			B	15	35	
		BCA 104	A	15	35	100
			B	15	35	
		BCA 105	A	15	35	100
			B	15	35	
2	2 nd	BCA 206	A	15	35	100
			B	15	35	
		BCA 207	A	15	35	100
			B	15	35	
		BCA 208	A	15	35	100
			B	15	35	
		BCA 209	A	15	35	100
			B	15	35	
		BCA 210	A	15	35	100
			B	15	35	
3	3 rd	BCA 311	A	15	35	100
			B	15	35	
		BCA 312	A	15	35	100
			B	15	35	
		BCA 313	A	15	35	100
			B	15	35	
		BCA 314	A	15	35	100
			B	15	35	
		BCA 315	A	15	35	100
			B	15	35	
4	4 th	BCA 416	A	15	35	100
			B	15	35	
		BCA 417	A	15	35	100
			B	15	35	
		BCA 418	A	15	35	100
			B	15	35	
		BCA 419	A	15	35	100
			B	15	35	

		BCA 420	A	15	35	100
			B	15	35	

Sl. No.	Semester	Papers		Marks(50)		Total marks of the paper(A+B)
				Internal	External	
5	5 th	BCA 521	A	15	35	100
			B	15	35	
		BCA 522	A	15	35	100
			B	15	35	
		BCA 523	A	15	35	100
			B	15	35	
		BCA 524	A	15	35	100
			B	15	35	
6	6 th	BCA 625	A	15	35	100
			B	15	35	
		BCA 626	A	15	35	100
			B	15	35	
		BCA 627	A	15	35	100
			B	15	35	
		BCA 628				100
Total marks of the BCA Course						2800

BCA-628(Project), Mark - 100

Details Marks Distribution

Project Work	Project Presentation	Project Note Book	Viva-voce	Total Marks
25	30	20	25	100

Details Marks Distribution of Practical Papers(each half) excluding internal marks

Program/Experiment	Viva-voce	Practical Note Book	Total Marks
20	10	5	35

SYZLABUS OF BCA IN DETAIL

BCA-101A English Language

Grammar, Parts of Speech, The frame work of English, The Architecture of the Sentence, Subject-Verb agreement, problems with Verbs-main and subordinate, active and passive voice, Infinitives, Participles, Tense, problems with Adjectives, Adverbs, pronouns, Prepositions and conjunctions, Ellipsis, Negatives, Punctuation and Capitals. Rules of spellings. Common misuse and confusion. Writing skills-Summary, Letter, document and translation.

Ref : Oxford Dictionary of English grammar By Sylvia Chalker & Edmond Weiner.

BCA-101B Functional Communication:

The process of communication, effective speaking, listening, non-verbal, communication, interviewing and being interviewed, group, discussions and meetings, oral presentation.

1. A course in Basic English, Ewer and Glatorre (Longman).
2. Mastering Communication, N Stanton (Macmillan India).
3. Effective English for Engineering students- Dr. B. Cauveri, Macmillan India,2004,
ISBN 1403-911134
4. Spoken English: A self learning guide to conversion & practice-V Sasikumar &
P.V. Damija(2nd Edition),Tata McGraw-Hill,2007

BCA (SEMESTER-I)

BCA-102 Physics

BCA-102A: Basic Physics I

Mechanics-Vectors; Newton's laws. Conservation of momentum, Rotational motion, Moment of Inertia, conservation of angular momentum.

Gravitation-Laws of gravitation, potential and intensity.

Waves and oscillations-S.H.M, forced vibration and resonance, progressive and stationary waves Resonator, Normal modes of oscillation.

Heat and thermodynamics-1st and 2nd laws of thermodynamics, C_p & C_v , isothermal-isobaric- and adiabatic processes, relations in adiabatic processes, work done in adiabatic and isothermal processes, reversible processes, definition and significance of entropy. Radiation: Kirchoff's law, Steafan's law and Wien's law (all the three in the form of statement only).

Principles of communication- Electromagnetic radiation, radio frequency and microwave satellite communication, fiber optic, co-axial cables (bandwidth, channel capacity, energy loss, noise advantage and disadvantage).

Digital and analog communication-principles, comparative study in brief.

Reference:

1. Fundamentals of Physics: Renid and haliday
2. Comunication: Canady, PHI

BCA-102B: Basic Physics II

Optics : Path difference. Phase difference, coherent sources, idea about interference, diffraction and polarization.

Electrostatics: Electric intensity and potential, field due to dipole, torque on a dipole, Dielectric medium, polarization, susceptibility, capacitor-Spherical and cylindrical, cio-axial cable

Steady current: Magnetic effect of current, Lorenz force, magnetic materials. Varying current: Charging and discharging a capacity, Electromagnetic induction, induced emf, Self and Mutual inductance, growth and decay of current in LR circuit. Alternating current: CR,LR and LCR circuits, resonance, sharpness of resonance, Q-value.

Instruments-Galvanometer, Ammeter, Voltmeter, Multimeter, CRO. Transformer, CVT, UPS.

Reference Books:

3. Fundamentals of Physics: Renid and haliday
4. Electricity and Management: C.J. Smith

BCA-103 Basic Information Technology

BCA-103A Fundamentals of Computer

Introduction, Characteristics of Computers, Evolution of Computer, Generation of computer, , Types of computers and features- Mini Computers, Micro Computers, Mainframe Computers, Super Computers, Application of computer.

Number Systems- Introduction, Number systems, Conversion between number bases, Arithmetic system, Signed and unsigned numbers, Simple Addition, Subtraction, Multiplication, Division.

Computer Architecture- Introduction, Block diagram of computer, Central Processing unit (CPU), Modern Processors with example,

Memory- Introduction, Function of Memory, Type of memory – Primary Memory (Types of RAM and ROM).

Secondary memory- Introduction, classification of secondary storage Devices, Magnetic Tape, Magnetic Disk, Optical Disk and other secondary devices.

Input Devices-Introduction, Keyboard, Pointing Devices, Speech Recognition, Digital Camera, Scanners, Optical Scanners.

Output Devices- Introduction, Classification of Output, Hard Copy Output Devices, Printers, Plotters, Computer Output Microfilm (COM), Soft Copy Output Devices, Monitors, Audio Output, Projectors, Terminals.

Referential Books:

1. Fundamental of Computers – By V. Raja Raman, B.P.B. Publications
2. Fundamental of Computers – By P. K. Sinha , B.P.B. Publications

BCA-103B Fundamentals of Information Technology

Data & Information, categories of Information. Elements of Computerized Business Information System, different data processing methods.

Computer Program

Introduction, Developing a Program, Algorithm- Definition, Characteristics, Advantages and disadvantages Flowchart - Definition, Define symbols of flowchart, Advantages and disadvantages, Examples, Pseudocode (P-Code).

Computer Languages

Introduction, Evolution of Programming Languages, Classification of Programming Languages, Generations of Programming Languages, Features of a Good Programming Language, Selection of a Programming Language.

Computer Software

Introduction, Software: Definition, Relationship between Software and Hardware, Software Categories, System Software, Application Software and other software's with example, Software Terminology.

Operating System

Introduction, Operating System, Evolution of Operating System, Types of Operating System, Functions of an Operating System, Modern Operating Systems with example. Difference between process and program .Processing function of an Operating System with example.

Data Communication and Computer Network

Introduction, Data Communication, Data Transmission mode, Transmission Media, Multiplexing, Switching, Computer Network, Network Topologies, Communication Protocols, Network devices.

Internet Basics

Introduction, Evolution of Internet, Basic Internet Terms (Website, Webpage, URL, Web Browser etc), Internet Applications, Electronic Mail: An Introduction How E-Mail Works, Searching the Web (Search Engines), Languages of Internet, Difference between intranet, Internet and Extranet, Internet and Viruses.

Data Security: Need of security, Basic principle of security

Basic functions: FTP, WWW, TELNET.

Referential Books:

1. Fundamental of Computers – By V. Raja Raman, B.P.B. Publications
2. Fundamental of Computers – By P. K. Sinha, B.P.B. Publications

BCA-104PC SOFTWARE
BCA-104A PC SOFTWARE-SYSTEM SOFTWARE

UNIT – I

CUI based System Software: - Introduction ,Definition, Organization, File Structure, Various types of File Extensions, Different internal and external commands-Functions,Syntax,Examples, Batch Processing.

UNIT - II

GUI based System Software: - Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance. Using windows accessories, User Accounts- Administrator and Limited, System Security.

BCA-104B PC SOFTWARE-OFFICE PACKAGES

UNIT - I

Documentation Using MS-Word - Introduction and area of use, Menus and Commands, Toolbars and Buttons, Shortcut Menus, Wizards and Templates, Creating & Editing Document, Different Page views and layouts, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Paragraph and Page Formatting, Bullets, Numbering, Auto formatting, Bookmark, Printing and various print options, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Styles, linking and embedding object.

UNIT - II

Electronic Spread Sheet using MS-Excel – Introduction and area of use, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advance features of MS-Excel- Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Table, Validation, Goal Seek, Printing of Work book and work sheets with various options.

UNIT - III

Presentation using MS-PowerPoint: 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.

REFERENCES BOOKS

1. Microsoft Office – Complete Reference – BPB Publication

2. Learn Microsoft Office – Russell A. Stultz – BPB Publication
3. PC Software Made Simple- Dr. Madhulika Jain, Shashank Jain and Satish Jain- BPB Publication.
4. Windows XP Complete Reference – BPB Publication
5. Koers, D (2001). Microsoft Office XP Fast and Easy, PHI publication.
6. Courter, G Marquis (1999). Microsoft Office 2000: Professional Edition, BPB publication.

BCA – 105 LAB – I

BCA 105A	Practical on System software: MS-Windows,MS-DOS
BCA 105B	Practical on Application software: MS-Word, MS-Excel, MS-Powerpoint.

BCA – 206 Mathematics
BCA – 206A Mathematics I

Elementary algebra : Polynomial equations, roots, inequalities, permutation & combination, Binomial theorem, Concepts of Series, Matrix (addition, multiplication, different types, rank of a matrix, inverse of a matrix) .

Sets, relations and functions : Intersection, union, mapping, complement, cardinality: difference, groups, rings, and fields, Cartesian products, relations and their representation, mapping.

Linear algebra and matrices

Calculus: Limits of function and continuity, concept of differentiation and derivative, rules, theorems, partial derivatives.

Integral calculus(Indefinite & Definite), differential equation(Exact form, Homogeneous form, Integrity factor method) .

Propositional Logic: Logical equivalent and Boolean algebra.

BCA – 206B Mathematics II

Statistics: Source and definition, collection of Statistical data and sampling, frequency distribution graph and chesfs, Measure of dispersion, Moment, Skewness and Kurtosis, Correlation and regression, time series and index number.

Probability : Introduction, Random experiment, outcome event, simple space and axioms of probability, Independence of two events, Discrete and continuous probability distribution-Binomial, Poission, Exponential, Normal, Chi Square

Propositional Logic: Logical equivalent and Boolean algebra.

Graph theory : Basic concepts, basic properties, list, matrix representation, trees definition, types and properties, spanning trees.

Numerical methods: Finding roots of non linear equation, bisection, Rgula-falsi, Newton Raphson method, Simpsons 1/3 rule, Trapezoidal rule, numerical intregation and solution of first order differential equation.

BCA – 207 Electronics
BCA – 207A Analog Electronics

Components: resistors, capacitors, inductors, transformers-definition, e.m.f. equation, voltage transformation ratio & simple problems and Network theorems(only statements and applications) Ohm's Law, Thevenin's Norton's superposition, maximum power transfer, semiconductors – classification, forward and reverse bias, p-n junction diode and its application(Rectification, clipping and clamping) Zener diode and voltage regulation, LED, Photodiode and Photo resistors, BJT, FET and MOSFET. Different types of amplifiers; OP-amp; oscillation. IC chips, VLSI Chips. Power supplies including SMPS.

Ref: Electronics Principles :Malvino, PHI publication
Electronics Device & circuit: Milman Hallkins
Basic Electronics: Arun Kumar

BCA – 207B Digital Electronics

Number systems: Decimal, Binary, Octal and Hex; digits bits, bytes; conversion from one to another, Representation of integers (unsigned, signed-sign-magnitude, 1's comp, 2's comp, biased), fractions and floating-point numbers, Arithmetic operations over binary integers and floating-point numbers. BCD arithmetic.

Character representation-ASCII codes.

Logic gates: basic principles of Boolean algebra and identities; De-Morgan's (theorem; basic gates-truth tables, combinational logic, SOP and POS simplification tools (identities, Karnaugh map up to 4 variables).

Combinational Circuit: half and full adder, subtractor, multiplexer, demultiplexer encoder; decoder.

Sequential circuit, concept; flip-flop, synchronous counters, shift registers Data converters- A/D and D/A converters.

Ref: Digital Principles and Application Malvino and Leach, PHI publication
Structured Computer Organization, Tanenbaum(4th ed., PHI publication)
Digital Electronics: Anand Kumar, PHI publication
Digital Logic and Computer Design: Morris Mano, PHI publication

BCA-208 Programming Language C

A. Programming Language C

Introduction: Basic structure, Characters, Keywords, Identifiers, Constants, Variables, Data types, program structure.

Operators and Expressions: Arithmetic, Relational, Logical, Bitwise, Conditional, Comma, sizeof operators, Elementary Arithmetic Operations and operators, Expression Evaluation and type conversion.

Assignments: Increments, Decrements, Precedence and Association, Non formatted input and output, Formatted input and output functions.

Control statements: IF, Nested IF, IF-Else, For, While, Do-While, Switch, Goto, Continue, Return and Break, specifying test condition for selection and iteration, Assignment, Initialization, simple programming.

Arrays, Strings and functions: One-dimensional and multidimensional arrays, String handling with arrays, String handling with functions, Functions- Arguments passing, Return values and their types, Recursion, Enumerated data types, Structures, Arrays of structures as within structures.

B. Programming Language C

Pointers: Declaration and Initialization, accessing variables through pointer arithmetic, Pointers and arrays, String pointer to Functions and Structures.

Files: Declaration of file pointers, Opening, closing, Working with text and binary files, accessing of files, I/O operations.

Linked List: Concepts, simple implementation, dynamic storage allocation, Low level programming.

Reference Books:

1. Let us C: Yashuvant Kanitkar, BPB publication
2. Ansi C: Balaguruswami, TMH publication
3. Computer Programming in C: Rajaraman, PHI publication
4. C Programming: Schaum's Outline
5. Programming in C: Pradip Dey and Manas Ghosh, OXFOPRD publication
6. Basics of C: Shivsankar, TMH publication

BCA-209 LAB-II (Electronics)

BCA 209 A

1. Identification of various Analog components
2. Measurement of various Analog components using
 - a) Digital Multimeter
 - b) CRO
3. Practical on series & parallel circuits
4. Practical on half wave & full wave rectifier
5. Practical on regulated DC power supply

BCA 209 B

1. Identification of various Digital components
2. Practical on logic gates a) using IC (74 series)
 - b) using discrete components
3. Practical on De-Morgan Theorems
4. Practical on Boolean expression
5. Practical on adder and subtractor

BCA-210 LAB-III(C Programming)

BCA-210A

Practical on BCA 208A

BCA-210B

Practical on BCA 208B

BCA – 311 Object Oriented Programming In C++

BCA – 311A Object Oriented Programming (C++) I

Evolution of Programming paradigms, Object based and Object Oriented themes. Basic Concepts of Object-Oriented Programming. Advantages and Application of OOPS.

Introduction to C++: Streams in C++. Basic Data Types. User-Defined Data Types. Derived Data Types. Keywords, Identifiers. C++ structures. Type Cast Operator.

Control Structures: The if-else statements, The jump statement, Break statement, continue statement. The switch statement and nested switch case statement. The for Loop, nested for Loops, The while loop, The do-while loop.

Functions in C ++ : Function signature. Call by value and Call by reference, Inline function vs Macro, Function Overloading, Friend and Virtual Functions.

Classes and Objects : A C ++ Program with Class. Specifying a Class, Defining Members of a class, Nesting of Member Functions. The role of Public, Private and Protected keywords. Static Data Members, Static Member Functions, Creating Objects, Arrays of Objects, Objects as Function Arguments, Returning Objects, Friendly Functions, Const Member Functions. Pointers to Memembrs.

Constructors and Destructors

Multiple Constructors in a Class, Parameterized Constructors, Constructor overloading, Copy Constructor, Dynamic Constructor, Destructors.

Ref. Books:

1. “Object-Oriented programming with C++”, Balagurusamy E., Tata McGraw Hill, New Delhi, 2002, 2nd edition
2. Object-Oriented programming with ANSI and Turbo C++, Ashok N. Kamthane
3. Mastering C++, R.K. Venugopal, Rajkumar, T Ravishankar.
4. C++: How to programe, 6th edition, Deitel & Deitel, PHI publication
5. C++ Programming today, 2nd edition,Johnston, PHI publication

BCA – 311B Object Oriented Programming (C++) II

Operator Overloading and Type Conversions

Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Overloading Binary Operators Using Friends, Type Conversions.

Inheritance: Extending Classes

Benefit of Inheritance. Overloading and Overriding. Different types of Inheritance: Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes. Visibility modifiers in Inheritance.

Pointer, Virtual Functions and Polymorphism

Pointers to Objects, this Pointer, Pointers to Derived Classes, Virtual Functions.

Template

Benefit of Templates. Types of Templates: Function Template and Class Template.

Working with Files

Opening and Closing a File, simple read, write operations. Detecting End-of-File.

Ref. Books:

6. “Object-Oriented programming with C++”, Balagurusamy E., Tata McGraw Hill, New Delhi, 2002, 2nd edition
7. Object-Oriented programming with ANSI and Turbo C++, Ashok N. Kamthane.
8. Mastering C++, R.K. Venugopal, Rajkumar, T Ravishankar.
9. C++: How to programe, 6th edition, Deitel & Deitel.
10. C++ Programming today, 2nd edition,Johnston.

BCA-312 Data Structure

BCA-312A Data Structure I

Introduction: Basic Terminology, Data Structure Operations, Algorithms – Complexity, Time-Space Tradeoff.

Arrays: Terminology, One-dimensional array, Operations on Arrays, Two-dimensional arrays, Sparse Matrices.

Linked List: Introduction, Single Linked List, Double Linked List, Circular Linked List, Polynomial Representation, Application of Linked List.

Stacks & Queues: Introduction, Array and Linked List Representation, Operations, Recursion, Evaluation of arithmetic expressions.

Recommended Books:

1. “Classic Data Structures” – D. Samanta
2. “Theory and Problems of Data Structures (Schaum’s Outline Series)” – Seymour Lipschutz
3. “Data Structure Using C” – J. Kanitker
4. “Introduction to Data Structures in C” – Ashoke N. Kamthane
5. “Data Structure Using C” – Tanenbaum A. S.

BCA-312B Data Structure I

Trees: Introduction, Definition of trees, Binary tree, Binary tree traversal, Types of binary tree, AVL tree, B-tree.

Searching & Sorting: Sequential Search and Binary Search with Complexity Analysis, Different types of sorting with complexity analysis.

Graphs: Terminologies, Representation of Graphs, Shortest Path Problem – Warshall’s Algorithm, Floyd’s Algorithm, Dijkstra’s Algorithm, Topological Sorting, Graph Traversals – BFS, DFS, Minimum Spanning Trees, Euler’s and Hamiltonian Circuits.

Recommended Books:

6. “Classic Data Structures” – D. Samanta
7. “Theory and Problems of Data Structures (Schaum’s Outline Series)” – Seymour Lipschutz
8. “Data Structure Using C” – J. Kanitker(BPB)
9. “Introduction to Data Structures in C” – Ashoke N. Kamthane
10. “Data Structure Using C” – Tanenbaum A. S.(PHI)

BCA-313 OPERATING SYSTEM

BCA-313A OPERATING SYSTEM I

UNIT-1

Definitions, Purpose, Early Batch Systems, Buffering and spooling Batch Systems, functions and types of OS, System Components, System Calls, System Programs, System Structure.

UNIT-2

Process Concepts, Process Model, Process state and process control block, process scheduling, Different scheduling algorithms, Threads, Threads in Linux

BCA-313B OPERATING SYSTEM II

UNIT-1

Inter process Communication, Critical Section Problem, Semaphores, Deadlocks Characterizations, Method for handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from deadlock.

UNIT-2

Logical versus physical address space, Swapping, Contiguous Allocation, External and Internal Fragmentation, Paging and Segmentation, Virtual memory.

UNIT-3

File Concepts, Operations performed on Files, File Accessing Method, File Allocation Methods, Record Blocking, Directory and its types, File Protection.

REFERENCE BOOKS-

- 1) Operating System Concepts :- Silberschatz & Galvin, WILEY PHI publication
- 2) Operating System Concepts & Design :-Milan Milen Kovic, TMH Publication
- 3) William Stallings, ”Operating System”-PHI Publication.TMH publication
- 4) Operating Systems-P.Balakrishna Prasad, SCITECH Publication

BCA-314 Computer Architecture & Micro Processor I

BCA-314 A Computer Architecture

Basic Computer Organization

Introduction, General Register Organization, Control Word, Stack Organization, Instruction Formats, Instruction cycle, Control Unit, Addressing Modes, Register Transfer and micron operations.

Computer Arithmetic

Introduction, Integer Representation, Serial and Parallel Adders, 1s and 2s Complement Arithmetic, Multiplication of Signed Binary Numbers, Floating Point Number Arithmetic, Overflow Detection, Status Flags, Division algorithm.

Memory Organization

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Input/Output Organization

Input–Output Interface, Asynchronous Data transfer-Handshaking, Asynchronous Serial Transfer, Interrupt Initiated I/O, DMA Transfer, Interfacing Peripherals with CPU .

Reference:

- 1) Advanced Computer Architecture: Rafiquzzaman, PHI publication
- 2) Computer Architecture & Organization: Morios Mano, PHI publication
- 3) Computer Architecture & Organization: Hayes
- 4) Computer Organization and architecture: Willam Stallings, PHI publication

BCA-314 B Micro Processor I

Architecture and Organization of 8085: central Processing Unit, Accumulator, General Purpose Register, Status Register ALU, Program Counter(PC), Stack Pointer (SP), Control Unit, The Clock, Reset, Interrupt, HOLD, READ and WRITE, IOR, MR, Address Latch Enable, Timing and Control Unit, Pin Configuration of 8085, addressing modes, Interface.

Semiconductor Memories, RAM, ROM, Nonvolatile RAM, EPROM, EEPROM, Dynamic RAM, Memory Map.

Assembly Language Programming: Instruction Set, Simple programming

Reference:

1. Microprocessor and Microcomputer: Gaonkar(PRI)
2. Microprocessor 8085 and its interfacing: Mathur(PHI)
3. 8085 Microprocessor, programming and interface: Srinath(PHI)

BCA 315 LAB-IV

BCA 315 A (Unix)

Introduction to Unix OS, basic commands, Editing Files with Vi editor, Viewing Files, Combining Files and Using Wildcards, Moving Around in Directories, Linking Files, Removing and restoring Files, Permissions, Simple Shell-Programming

BCA 315 B (C+ + Programming)

Practical on BCA 311A & B

BCA- 416 Software Engineering

BCA- 416A The Conventional approach

Software and Software Engineering. Need of Software Engineering. Different methods of software development.

Software Lifecycle models. Need of Lifecycle model. Classical and Iterative Water-fall model, Prototyping, The Spiral Model, Rad model, V-model etc.

Comparison of different lifecycle models.

Managing software projects. Software project planning and Estimation Models. Project scheduling and tracking. Risk analysis and management. SCM, SQA.

Software Requirements Analysis and Specification. Importance of SRS. Analysis Modeling. Data Modeling. Functional Modeling and DFD. Behavioral Modeling.

Software Design. Design concepts and principles. Refining Analysis model during Design. Techniques of System Design. Elements of Detailed design.

Testing. Importance of Testing. Levels of Testing. Unit Testing, Integration Testing, System Testing, Acceptance Testing. Test-Cases. Methods of Test case Design. Black-Box and White-Box testing. V & V activities.

Software Maintenance. Need of maintenance. Types of Software maintenance.

Reference:

- 1) "Fundamentals of software engineering", Mall Rajib, PHI, Second Edition.
- 2) "Software Engineering". A practitioner's Approach, Pressman. R.S., McGROW-HILL International Edition, 2001, 5th Edition
- 3) "Object-Oriented Software Engineering", A Use Case Driven Approach. Jacobson Ivar. Pearson education, Asia Pvt.Ltd, 2002.
- 4) "An Integrated Approach to Software Engineering", Pankaj Jalote, Narosa publishing house, 1991.

BCA- 416B The Object-Oriented Approach

Object Oriented Concepts. Class and Object, Polymorphism, Abstraction and Encapsulation, Inheritance, Dynamic Binding. Delegation and its advantages. Delegation vs Inheritance.

Benefit of Object-Oriented Approach to Software Engineering. Models used in Object-Oriented Approach. Object Model, Dynamic Model and Functional Model.

Object Oriented Analysis. Problem statement. Analysis using Object, Dynamic and Functional models.

Object Oriented Design. Overview and need of System design. Object design and its importance.

UML. Need of UML. Use-Case, collaboration, Sequence diagram etc.

Reference:

1. "Fundamentals of software engineering", Mall Rajib, PHI, Second Edition.
2. "Software Engineering". A practitioner's Approach, Pressman. R.S., McGROW-HILL International Edition, 2001, 5th Edition
3. "Object-Oriented Software Engineering", A Use Case Driven Approach. Jacobson Ivar. Pearson education, Asia Pvt.Ltd, 2002.
4. "An Integrated Approach to Software Engineering", Pankaj Jalote, Narosa publishing house, 1991.

BCA-417: DBMS

BCA-417A : DBMS I

Introduction to Database, Why Database, Characteristics of Data in Database. Data Dictionary, Types of Database languages: DDL, DML.

Database Management System (DBMS). Characteristics, Advantage and Disadvantage of DBMS.

3-level Architecture of DBMS: External, Conceptual & Internal Levels.

DBA: Role, Functionality and Importance.

Relational DBMS, Domains, Attributes, Tuples, Entities & Entity set, Relationship & Relationship set.

Concepts of Keys: Candidate key, Primary Key, Alternate Key, Super Key, Foreign Key.

Fundamental Integrity Rules: Entity integrity, Referential integrity.

Entity-Relationship Diagram (E-R Diagram). Strong & Weak entities, Generalization, Specialization, Aggregation, Attribute inheritance, Categorization.

Reference:

1. Data Base System Concepts, Korth, TMH publication
2. DBMS, Navate.
3. Data Base Concepts, Kroenke, PHI publication
4. Data Base Management System, V.K. Jain, Wiley Dreamtech.

BCA-417B : DBMS II

Structured Query Language(SQL), Implementing Query, SQL Functions, View.

Introduction to Relational Algebra, Relational Algebraic Operations: Select, Project, Cross product.

Different types of joins.

Relational Calculus, Tuple Relational calculus, Domain Relational calculus.

Concept of Database Normalization: 1NF, 2NF, 3NF, BCNF, 4NF 5NF. Functional dependencies, Multivalued dependencies.

Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols

Reference:

1. Data Base System Concepts, Korth, TMH publication
2. DBMS, Navate.
3. Data Base Concepts, Kroenke, PHI publication
4. Data Base Management System, V.K. Jain, Wiley Dreamtech.

BCA-418 Java and Microprocessor II

BCA-418A Java

An Overview Of JAVA. Data Types, Variables, Array declaration. Operators and Control statements.
Introducing Classes: Creating classes and objects. Constructors, Overloading Methos. Use of Static members. Inheritance and Polymorphism. Visibility modifiers.

Packages and Interfaces: Defining and Using a package. Simple examples using Interfaces.

Exception Handling: Exception types. Using Try and Catch. Creating your own Exception subclass.

Multithreaded Programming: Creating a Thread. Implementing Runnable. Thread Prioritits.

String Handling: Basic String handling functions.

Applet : Applet Basics. Simple Applet programming.

Event Handling: Simple programs, handling Mouse Events and Keyboard events.

Working with UTIL, AWT, SWING. Simple programs using Servlets.

Reference:

1. Java and Object-Oriented Programming Paradigm, Jana, PHI publication
2. Java: How to program, 8th edition, Deitel & Deitel, PHI publication
3. The Complete Reference, Herbert Schildt, PHI publication
4. Java Programming for the absolute beginner, Russell, PHI publication

BCA-418B Microprocessor II

Introduction to 16 bit microprocessors and other advanced microprocessors, 8086 pin diagram: Maximum and Minimum mode, functions of each pin, 8086 Architecture, various registers: GPR, Segment, Index, Base, Pointers, flags, interrupts, 8086 Addressing Modes, Instruction Format, Instruction Set, Introduction to Basic 8086 Assembly Programs.

Reference:

1. Advanced Microprocessors: Badri Ram,(TMH)
2. Microprocessor and Microcomputer: Gaonkar, (PRI)

BCA – 419 Lab – V

BCA – 419 A(Oracle SQL)

Related topics of Subject BCA – 417 A (Database Management System - I)

BCA – 419 B(Oracle SQL)

Related topics of Subject BCA – 417 A (Database Management System - II)

BCA – 420 Lab – VI

BCA – 420A (Java)

Related topics of Subject BCA – 418A (Java)

BCA – 420B (Microprocessor)

Assembly level programming on 8085 & 8086 microprocessors.

BCA-521: Computer Graphics and Image Processing

BCA-521A: Computer Graphics

Computer-Aided Design, Presentation Graphics, Computer Art, Visualization.
Video Display Devices, Color CRT Monitors, Three-Dimensional Viewing Devices, Stereoscopic and Virtual-Reality Systems, Raster-Scan Systems, Video Controller, Raster-Scan Display Processor, Random-Scan Systems, Graphics Monitors and Workstations, Input Devices, Hard-Copy Devices, Graphics Software.

Points and Lines, Line Function, Circle-Generating Algorithms, Filled-Area Primitives, Fill-Area Functions, Cell Array.

Line Attributes, Curve Attributes, Area-Fill Attributes, Character Attributes, Bundled Attributes, Antialiasing, Pixel Phasing.

Basic Transformations: Translation, Rotation, Scaling. Other Transformations: Reflection, Shear.

Reference:

1. Computer Graphics, Donald Hearn & M. Pauline Baker, PEARSON publication.
2. Introduction to Computer Graphics, A. Mukherjee, VIKAS publication.
3. Fundamentals of Computer Graphics & Multimedia, Mukherjee, PHI publication.

BCA-521B: Image Processing

Introduction to Digital Image, Pixels, Pixel Addressing, Binary Image, Gray Image and Color Image Representation.

Introduction to Image Processing, Elements of digital Image Processing system, Image Acquisition, Image Digitization, Image Storage.

Elements of Visual Perception, Sampling and Quantization, Fourier Transforms.

Image Enhancement, Image Compression, Image Segmentation

Reference:

1. Computer Graphics, Donald Hearn & M. Pauline Baker, PEARSON publication.
2. Introduction to Computer Graphics, A. Mukherjee, VIKAS publication.
3. Fundamentals of Computer Graphics & Multimedia, Mukherjee, PHI publication.

BCA-522 Data communication and Computer Network

BCA-522A: Data communication and Computer Network –I

Data communication- component, Data flow, Data representation, protocol and standards
Why Computer Network? How to measure a network- latency, data transfer rate, bandwidth.
Network model- client server and peer-to-peer model.
Types of network- LAN, MAN, WAN.
Sender, receiver and carrier.
OSI reference model .TCP/IP

Physical Layer: Analog and Digital signal of data, sine wave, Time and Frequency Domain, Bandwidth. Digital Signal- Bit rate, Bit interval Baud rate. Digital vs. Analog.
Nyquist Bit rate, Noise, Attenuation, Distortion, Throughput, Propagation speed, Propagation time, Wavelength.
Transmission mode- parallel and serial.
Asynchronous vs. Synchronous
Modulation- Modulation of digital data- ASK, FSK, PSK, QAM.
Modulation of analog signal- AM, FM, PM
Transmission media- guided and unguided- Twisted pair, coaxial cable, optical fiber and wireless media.

Data Link Layer:

Types of error- Single bit, Burst error. Error Detection- Redundancy, Parity check, CRC, Checksum.
Protocol- Flow and Error control mechanism. Stop-and-Wait ARQ, GO-BACK-N-ARQ, Sliding Window Protocol, Selective Repeat-ARQ.

HDLC- configuration and transfer modes, frames, frame format, frame type.

Access method: point-to-point, multi point-CSMA/CD
LAN- Traditional Ethernet, MAC Sub layer, Physical layer, Three generation of Ethernet.
10Base2, 10Base5, 10Base-T, 10Base-FL

Reference Books: 1) Data Communication and Networking

By: **Behrouz A. Forouzan**, TMH Publishing Company limited, New Delhi

2) Computer Networks

By: **Andrew S. Tanenbaum**, PHI publication.

3) Data Communication and Networks

By: **Achyut S. Godbole**, TMH Publishing Company limited, New Delhi

4) Data and Computer Communication

By: **William Stallings**, PHI Publication.

BCA-522B: Data communication and Computer Network –II

Switching- Circuit Switching, Message Switching and Packet Switching

Network Devices- Repeater, Hub, NIC, Switch, Bridge, Router, Gateway.(Basic function and application only)

Network Layer:

Internetworking, Addressing- IP addressing- subnet masking-routing technique- static vs. dynamic.

Protocol- ARP, IPv4, ICMP

Transport layer:

TCP, UDP- Congestion.

Function of Session Layer, Presentation layer and application layer.

Basic Applications: DNS, TELNET, FTP, SMTP and MIME, HTTP HTML, CGI,

WWW –Hypertext and Hypermedia; browser; static and dynamic documents.

Network Security- Need of Security, Principle of security, Data encryption, Firewall

Reference Books: 1) **Data Communication and Networking**

By: **Behrouz A. Forouzan**, TMH Publishing Company limited, New Delhi

2) **Computer Networks**

By: **Andrew S. Tanenbaum**, PHI publication.

3) **Data Communication and Networks**

By: **Achyut S. Godbole**, TMH Publishing Company limited, New Delhi

4) **Data and Computer Communication**

By: **William Stallings**, PHI Publication.

BCA-523 Discrete Mathematics and Operations research

BCA-523A Discrete Mathematics

- 1. Formal logic:** Statements, truth table, logical connectives – negation, conjunction, disjunction, implication, logical equivalence, tautologies.
- 2. Set theory:** Introduction, sets, types of sets, cardinality of a set, subset and superset, power set, operations on sets, application of set theory.
- 3. Counting techniques:** Basic counting techniques, principal of inclusion and exclusion, pigeon – hole principle recurrence relation, generating function.
- 4. Lattice:** introduction, lattices, Hasse diagram, principle of Duality, Distributed Lattice, Bounded lattice, complemented lattice.
- 5. Graph theory:** Review of graph theory, Directed graph, Computer representation of graph, adjacency, matrix, Trees, minimal spanning trees, Kruskal’s algorithm.
- 6. Grammar, Languages and Automata:** Vocabulary, word, language, Finite state Automata, transition diagram, DSFA, NDSFA, Automata as language recognizes, Concept of Mealy and Moore machine.

References

1. S. Lipschutz, M Lipson – Discrete Mathematics, 2nd edn TMH publication,
2. J.P. Tremblay and R. Manohar - Discrete Mathematical structures with Applications,
3. E.G. Goodaire, M.M. Parmenter – Discrete Mathematics with Graph Theory, Pearson Education Asia, 2003.
4. Rm. Somasundaram, Discrete Mathematical structures, PHI publication.

BCA-523B Operations Research

Defination, Scope of Operation Research, Phases of OR, Models in Operation Research, Advantages of a model.

Introduction to Linear Programming, formulation of LP Problems, Procedure of solving LPP by graphical method.

Introduction to Simplex method, Simplex Algorithm, Artificial variables Technique, The Big M-method.

Assignment problem, Mathematical Formulation of the Assignment Problem,

Network scheduling, Rules of network construction, Time analysis, Critical Path Method (CPM), Programme Evaluation and Review Technique (PERT), Cost consideration in PERT/CPM.

1. Linear Programming --- J. G. Chakraborty & P.R. Ghosh, Moulik Library publication
2. Operation Research --- Taha, PHI publication
3. Operation Research --- Taha, Pearson Education

BCA-524 Lab-VII (Computer Networking & Web Programming)

BCA-524A (Computer Networking)

Related topics covered in BCA-522 (Data Communication & Computer Networking). Network simulator like Boson can be used if physical components such as routers, managed switches, unmanaged switches are not available.

BCA-524B (Web Programming)

Basic web page designing using HTML, Advanced HTML and scripting languages.

BCA- 625 Simulations and Modeling

BCA- 625A: Simulation & Modeling I

System Models: The Concepts of a System, System Environment, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of Models, Principles used in Modeling.

System Studies: Subsystems, A Corporate Model, Environment Segment, Production Segment, Management Segment, The Full Corporate Model, Types of System Study.

System Simulation: The Technique of Simulation, The Monte Carlo Method, Comparison of Simulation and Analytical Methods, Experimental Nature of Simulation, Types of System Simulation, Distributed Lag Models, Cobweb Models.

Recommended Books:

1. “ System Simulation” – Geoffrey Gordon, PHI publication
2. “System Simulation with Digital Computer” – Deo N., PHI publication

BCA- 625B: Simulation & Modeling II

Continuous System Simulation: Continuous System Models, Differential Equations, Analog Computers, Hybrid Computers, Digital-Analog Simulators, CSSLs, CSMP III, Hybrid Simulation, Feedback Systems, Real-Time System.

System Dynamics: Control Theory, Exponential Growth Model, Exponential Decay Model, System Dynamics Diagram, Multi-Segment Model, Representation of Time-Delay.

GPSS: GPSS Programs, General Descriptions, Action Times, Simulation of a manufacturing shop, Facilities & Storages, Priorities and Parameters, Standard Numerical Attributes, Functions, Simulation of a Supermarket.

Recommended Books:

1. “ System Simulation” – Geoffrey Gordon, PHI publication
2. “System Simulation with Digital Computer” – Deo N, PHI publication

BCA-626 : GUI Based Programming Languages/Tools

BCA-626A: Visual Basic 6.0

Introduction to VB, History of VB, VB Form Structure, Programming Concept.

Control structures: If/Then, If/Then/Else, While, Do While, Do Until, For/Next etc.

User Controls: TextBox, ComboBox, ListBox, Scrollbars, Menus, Pop-Up Menus, MsgBox, Image Controls etc.

Connectivity of VB with DBMSs like MS Access, SQL Server, Oracle etc.

Storing, Retrieving and Updating Databases using VB Controls.

Reference:

1. Visual Basic 6.0 How to Program, Deitel & Deitel, T.R. Nieto, PEARSON.
2. Visual Basic .NET Black Book, Steven Holzner, Paraglyph Press.
3. ASP.NET 2.0, Stephen Walther, SAMS.

BCA-626B :VB.NET & ASP.NET

Introduction to VB.NET, Windows Forms Structures, Using Form Controls, Validation Controls etc.
Data access with ADO.NET, Binding Controls to Database.

Introduction to ASP.NET, Using Web Forms and Web Controls, Designing ASP.NET Web Sites,
Performing Data Access from Database.

Reference:

1. Visual Basic 6.0 How to Program, Deitel & Deitel, T.R. Nieto, PEARSON Education.
2. Visual Basic .NET Black Book, Steven Holzner, Paraglyph Press.
3. ASP.NET 2.0, Stephen Walther, SAMS.

BCA-627 Lab-VIII (GUI Based Programming)

BCA-627A (Visual Basic)

Related topics of Subject BCA – 626A (Visual Basic 6.0)

BCA-627B

Related topics of Subject BCA – 626B(VB.NET & ASP.NET)

BCA-628 (Project)

Project on the topics selected by the student from the course and approved by the Department. Students have to complete their projects under the supervision of the teachers of the Department.