SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

For

BACHELOR OF COMPUTER APPLICATIONS
(BCA) DEGREE

GURU GOBIND SINGH
INDRAPRASTHA UNIVERSITY
SECTOR-16C, DWARKA, DELHI

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Bachelor of Computer Applications

FIRST SEMESTER EXAMINATION

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
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<th>T/P</th>
<th>Credits</th>
<th>Marks Internal</th>
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*NUES

TOTAL MARKS : 800

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Bachelor of Computer Applications

SECOND SEMESTER EXAMINATION

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<td>Cyber Ethics</td>
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# Bachelor of Computer Applications

## THIRD SEMESTER EXAMINATION

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<td>Object Oriented Programming using C++.</td>
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*NUES
TOTAL MARKS: 800

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FOURTH SEMESTER EXAMINATION

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*NUES
TOTAL MARKS: 800

Summer Training will be held for 4 weeks after the end of fourth semester.
Viva-Voce will be conducted in fifth semester.

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FIFTH SEMESTER EXAMINATION

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<th>Paper</th>
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<td>BCA 301</td>
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<td>Microprocessor</td>
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| Total    | 12 | 20 | 26 | 280 | 420 |

*Evaluation will be based on Summer Training held after fourth semester and will be conducted by the college committee only.

*** Any Elective Subject will be offered if minimum 1/3 rd of the total strength of students in the class will opt for it.

**NUES
TOTAL MARKS: 700

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SIXTH SEMESTER EXAMINATION

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<th>Paper</th>
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Note:
1. The total number of the credits of the BCA programme = 160.
2. Each student shall be required to appear for examinations in all courses. However, for the award of the degree a student shall be required to earn the minimum of 150 credits.

Total Marks : 700
*** Any Elective Subject will be offered if minimum 1/3 rd of the total strength of students in the class will opt for it.

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Aim: To understand the basic concepts of mathematics.

Objectives
- To get the knowledge about the matrices, determinants and limits.
- To study the basics of differential and integral calculus

<table>
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<tr>
<th>INSTRUCTIONS TO PAPER SETTERS:</th>
<th>Maximum Marks : 75</th>
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<td>1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.</td>
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<tr>
<td>2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks</td>
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UNIT - I
DETERMINANTS: Definition, Minors, Cofactors, Properties of Determinants, MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Cramer's Rule, Rank of Matrix Dependence of Vectors, Eigen - Vectors of a Matrix, Caley-Hamilton Theorem (without proof) [No. of Hrs: 12]

UNIT – II
LIMITS & CONTINUITY: Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Continuity Over an Interval, Intermediate Value Theorem, Type of Discontinuities. [No. of Hrs: 10]

UNIT-III
DIFFERENTIATION: Derivative, Derivatives of Sum, Differences, Product & quotients, Chain Rule, Derivatives of Composite Functions, Logarithmic Differentiation, Rolle’s Theorem, Mean Value Theorem, Expansion of Functions (Maclaurin’s & Taylor’s), Indeterminate Forms, L’ Hospitals Rule, Maxima & Minima, Asymptote, Successive Differentiation & Liebnitz Theorem. [No. of Hrs: 12]

UNIT – IV
INTEGRATION: Integral as Limit of Sum, Riemann Sum, Fundamental Theorem of Calculus, Indefinite Integrals, Methods of Integration Substitution, By Parts, Partial Fractions, Integration of Algebraic and transcendental Functions, Reduction Formulae for Trigonometric Functions, Gamma and Beta Functions. [No. of Hrs: 10]

TEXT BOOKS:

REFERENCE BOOKS:

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Paper Code: BCA 103
Paper Id: 20103

Paper: Technical Communication

Pre-requisites: None

Aim: To Understand the correct use of English Language and improve the Communication Skills of the students.

Objectives

- To have basic understanding of the correct use of English Language.
- To improve oral as well as written communication skills.

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT-I
Concepts and Fundamentals: Introduction to Technical Communication, meaning of communication, Importance of communication, Communication scope, types, 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, and aids to communication.

[No. of Hrs: 11]

UNIT-II

[No. of Hrs: 11]

UNIT-III
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, Guidelines for interviewee.

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

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).

Listening Skills: Good listening for improved communications, Art of listening, Meaning, nature, process, types and importance of listening, Principles of good listening, Barriers in listening

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

Strategies to, improve oral, presentation, speaking and listening skills. [T1,T2, T3,T4]

[No. of Hrs: 11]

UNIT-IV

Soft Skills: Non Verbal communication- kinesics & Proxemics, parlanguage, interpersonal skills, Corporate communication skills - Business Etiquettes [T1,T2,T4]

Language Skills: Improving command in English, improving vocabulary, choice of words, Common problems with verbs, adjectives, adverbs, pronouns, tenses, conjunctions, punctuations, prefix, suffix, idiomatic use of prepositions. Sentences and paragraph construction, improve spellings, introduction to Business English. [T3, R1, R3]

[No. of Hrs: 11]

TEXTBOOKS:


REFERENCES:

Aim : To Understand the Programming Fundamentals and the basics of the ‘C’ Programming Language.

Objectives:

- To be able to build own logic for a given problem and finally develop one’s own programs
- To understand the syntax and the semantics of C programming language.

INSTRUCTIONS TO PAPER SETTERS:
Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT I
C basics: C character set, Identifiers and keywords, Data types, constants, variables and arrays, declarations, expressions statements, symbolic constants, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, conditional operators, bit operators.
C constructs: If statement, if….else statement, if…..else if….else statement, while statement, do….while statement, for statement, switch statement, nested control statement, break operator, continue operator, comma operator, goto statement. [T1,T2,T3] [No. of Hrs: 11]

UNIT – II
Storage Classes: automatic, external (global), static & registers.
Arrays: Arrays, pointers, array & pointer relationship, pointer arithmetic, dynamic memory allocation, pointer to arrays, array of pointers, pointers to functions, array of pointers to functions, Preprocessor directives: include, define, macro’s with arguments, the operators # and ##, conditional compilations. [T1,T2,T3] [No. of Hrs: 11]

UNIT – III
Structures: Structures, unions, passing structure to functions, bit fields, file handling [text (ASCII), binary] [T1,T2,T3] [No. of Hrs: 11]

UNIT – IV
String manipulation functions and other standard library functions from stdio.h, stdlib.h, conio.h, ctype.h, math.h, string.h, process.h.

Note : A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Usage of command line arguments. [T1, T2, T3] [No. of Hrs: 11]

TEXTBOOKS:

REFERENCES:
Paper Code: BCA 107  
Paper ID: 20107  
Paper: Introduction to Computers and IT  
Pre-requisites: None  
Aim: To provide the students Basic knowledge of computers and information technology.  
Objectives: 
This is an elementary course in computers and information technology. Upon completion of this course the student should be able to:
- Discuss the evolution of computers in different generations.
- Classify computers in different categories based on their capabilities.
- Describe the major components of computers and information technology applications: Hardware, software, data, processes, computer networks and people.
- Demonstrate an understanding of the importance of algorithms in the development of IT applications.

INSTRUCTIONS TO PAPER SETTERS: 
Maximum Marks: 75
1. The paper setters are required to restrict up to the overview of the concepts.
2. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
3. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT – I  
Introduction to Computers:  
The evolution of computers: Computer Generation from First Generation to Fifth Generation.  
Computer Hardware: Major Components of a digital computer, Block Diagram of a computer Input-output devices, Description of Computer Input Units, Output Units. CPU.  
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. [T1][R1] [No. of Hrs: 12]

UNIT – II  
Interaction With Computers:  
Computer Software: System software, assemblers, compilers, interpreters, linkers Elementary Operating System concepts, different types of operating systems, Application Software: Introduction to MS Office (MS-Word, MS Powerpoint, MS-Excel) Computer Programming and Languages: Algorithms, flow chart, decision tables, pseudo code, Low level languages and introduction to high level languages. [T1][T2][R3] [No. of Hrs: 12]

UNIT – III  
Computer Number System: Decimal, Binary, Octal, Hexa-decimal. Conversion: Decimal to all other number systems, Binary to octal and hexa decimal, Addition of binary numbers, Binary subtraction, Use of complements to represent negative numbers, Conversion of a binary fraction to a decimal fraction and decimal to binary fraction, Binary Coded Decimal (BCD), ASCII Codes, EBCDIC codes, Gray codes, Unicodes. [T1][R1] [No. of Hrs: 10]

Note: A Minimum of 40 Lectures is mandatory for each course.  
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
UNIT – IV
Computer Network & Internet
Basic elements of a communication system, Data transmission modes, Data Transmission speed, Data transmission media, Digital and Analog Transmission, Network topologies, Network Types (LAN, WAN and MAN), Client and Servers, Intranet, Extranet.

Internet: Terminologies related to Internet: Protocol, Domain name, IP address, URL, World Wide Web.

Overview of various services on Internet: E-mail, FTP, Telnet, Chat, Instant Messaging.

No. of Hrs: 10

TEXT BOOKS

REFERENCE BOOKS
Paper Code : BCA 109
Paper ID: 20109
Paper : Physics
Aim: To know the fundamentals of Physics
Objectives
- To get the knowledge about the basic laws of nature such as motion, work, power and energy
- To study the electrostatics, semiconductors and devices.

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and over the entire syllabus. It should be of 25 marks and it may contain objective or short type question.

2. Rest of the paper shall contain two questions from each unit. However students will attempt only one question from each unit. Each question should be 12.5 marks.

UNIT – I
Law of Motion: Force and Inertia, Law of inertia or Newton’s first law of motion, Newton’s Second law of motion, Newton’s third law of motion and it’s applications, Basic forces in nature, Weight of body in lift, Equilibrium of concurrent forces, Lemi’s Theorem
Friction: Cause of friction, Types of friction, Laws of friction, Angle of friction and repose, Centripetal and centrifugal force, velocity of vehicle on curved leveled and banked road. [T1] [T2] [No. of Hrs: 11]

UNIT – II
Collisions: Types of collision, elastic collision in 1D & 2D, Inelastic collision in 1D, Perfectly inelastic collision in 1D. [T1] [T2] [No. of Hrs: 11]

UNIT – III
Electricity & electromagnetism: Electric charge, Electron theory of electrification, Frictional electricity, Properties of electric charge, Coulomb’s Law, Superposition Principle, Electric field intensity, Electric Lines of forces.
Electrostatics: Line integral of electric field, Electrostatic potential, State & Proof of Gauss’s theorem.
Capacitance: Principal of Capacitor, Parallel and spherical capacitors, Grouping of capacitors and their capacitance, Effect of dielectric in capacitors.
Current Electricity: Current, Ohm’s Law, Resistance, Grouping of resistance, Kirchoff’s rule, Wheatstone bridge, Slide Wire Bridge. [T3] [T4] [No. of Hrs: 11]

UNIT – IV:
Structure of Atom: Thomson’s atomic model, Rutherford’s alpha scattering experiment and atomic model, Postulates of Bohr’s Model.
Transistors: Action of n-p-n & p-n-p transistors, Advantages of transistors, Integrated Circuit.[T3] [T4] [No. of Hrs: 11]

TEXTBOOKS:

Note : A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f academic session 2011-12
[T4]: Pradeep, “Fundamental Physics”, Class XII, Pradeep Publications.

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Aim: To understand the basics concepts of Discrete Mathematical Structures.

Objectives
- To get the Knowledge about sets, relations and functions.
- To study the basics of lattices and graphs.
- To get familiar with propositional logic.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT I
SETS: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.
RELATIONS AND FUNCTIONS: Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Hashing functions, Recursive function.

UNIT – II

UNIT-III
Graphs: types and operations(bipartite graph. Subgraph, distance of a graph, cut-edges & cut vertices, isomorphic and homomorphic graphs), degree of graphs, adjacent and incidence matrices, path circuit(Floyd’s and Warshall algorithms), hamiltonian graph, graph colouring.

UNIT – IV
Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

TEXT BOOKS:

REFERENCE BOOKS:
Paper Code: BCA – 104

Paper ID: 20104

Paper: Principles of Management

Pre-requisites: None

Aim: To understand the function of management and their application in the corporate world.

Objectives

- To get the knowledge about the important management concepts & their application,
- To have an insight of various functional departments in an organization.
- To make students well versed with programming in java.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT – I
Management: Meaning & concept, Management principles (Fayol & Taylor), Management process (in brief), Managerial levels, Roles & skills of a manager, Management Theories (Classical, Neo classical, Behavioral, Systems & Contingency) [Elementary][T1,R1]

[No. of hrs.-12]

UNIT – II :
Planning: Meaning, Purpose & process, Decision making: Concept & process,
Organizing: Process, Departmentation, Authority & Responsibility relationships, Decentralization. Staffing: Nature & Importance, [T1,R1]

[No. of hrs.-10]

UNIT-III
Staffing: Concept, nature & importance of staffing.
Directing: Motivation: concept & theories (Maslow’s, Herzberg Two factor, McGregor’s theory X & Y) , Leadership: Concepts & styles.
Controlling: Nature, Importance, significance & Process of control.[T1,R1]

[No. of hrs.-12]

UNIT – IV
Managing People - Meaning, Need of understanding human behavior in organization, Models of OB, Major concepts in OB (elementary)- Personality, Learning, Perception & Attitude Building. [T1,R2, R3]

[No. of hrs.-10]

TEXT BOOKS

REFERENCE BOOKS

Note : A Minimum of 40 Lectures is mandatory for each course.

Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Note: A Minimum of 40 Lectures is mandatory for each course.

Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Formal Entrepreneurship is a branch of the Global Entrepreneurship Index (GEI) and the Global Entrepreneurship Monitor (GEM), which aims to assess the level of entrepreneurship in a country. The GEI and GEM measure entrepreneurship by examining the entrepreneurial activities of individuals and the environment that supports entrepreneurship. The index is based on the idea that entrepreneurship is a key driver of economic growth and development.

The GEI and GEM are designed to provide a comprehensive and consistent measure of entrepreneurship across countries. The index includes a wide range of indicators, such as the number of new businesses started, the level of seed-stage financing, and the level of support for entrepreneurship in the country.

The GEI and GEM are also used to track changes in the level of entrepreneurship over time. This allows for the identification of trends and changes in the entrepreneurial environment. The index is also used to compare the level of entrepreneurship across countries, which can be useful for policymakers and investors.

The GEI and GEM are published annually and the latest update was in 2021. The index is also used by policymakers and investors to identify countries with high levels of entrepreneurship and to develop strategies to support entrepreneurship in their own country.
Memory Devices - RAM, ROM, PAL & PLA [T1,T2,T3,R3] [No. of Hrs: 11]

TEXT BOOKS

REFERENCES:
[R2]. W.Gothman, “Digital electronics”, PHI.
Paper Code: BCA 108

Paper ID: 20108

Paper: Data Structures Using C

Pre-requisites: BCA 105

Aim: To Understand the use of the basic data structures along with their applications.

Objectives

- Understand the use and working of the various data structures.
- Learn to be able to build own algorithms and pseudocodes for the various applications of the basic data structures.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT-I
Introduction to Data Structures: Basic Terminology, Elementary Data Organizations, Classification of data structures and its operations.

Arrays: Representation of single and multidimensional arrays (up to three dimensions); sparse arrays - lower and upper triangular matrices and Tri-diagonal matrices; addition and subtraction of two sparse arrays. (Multidimensional, and, sparse arrays, to be given elementary treatment.)

Stacks and Queues: Introduction and primitive operations on stack; Stack application: Polish Notations; Evaluation of postfix expression; Conversion from infix to postfix; Introduction and primitive operations on queues; D-queues and priority queues. 

[No. of Hrs: 11]

UNIT-II
Lists: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, Two way lists and Use of headers

Trees: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion and deletion; 

[No. of Hrs: 11]

UNIT-III
Introduction to and creation of AVL trees and m-way search trees - (elementary treatment to be given); Multilevel indexing and B-Trees: Introduction; Indexing with binary search trees; Multilevel indexing, a better approach to tree indexes; Example for creating a B-tree.

[No. of Hrs: 11]

UNIT-IV
Sorting Techniques: Insertion sort, selection sort and merge sort.

Searching Techniques: linear search, binary search and hashing. (Complexities NOT to be discussed for sorting and searching)

[No. of Hrs: 11]
TEXTBOOKS:

REFERENCES:

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code: BCA 110  
Paper ID: 20110  
Paper: Database Management System  
Pre-requisites:  
- Basic knowledge of data storage and file management system  

Aim: To introduce the concept of back end, data storage in computers, design of a DBMS, Queries to construct database, store and retrieve data from the database

Objectives:  
- To understand the difference between storing data in FMS and DBMS and advantages of DBMS.  
- To understand conceptual and physical design of a database.  
- To understand RDBMS and queries to design database and manipulate data in it.  
- To know basic database backup and recovery.

INSTRUCTIONS TO PAPER SETTERS:   Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only one question from each unit. Each question should be 12.5 marks.
3. Only basic level E-R diagram must be asked and complete scenario must be provided.

UNIT-I  
Introduction: An overview of database management system, database system Vs file system, Characteristics of database approach, DBMS architecture, data models, schema and instances, data independence.

Data Modeling using Entity Relationship Model: Entity, Entity types, entity set, notation for ER diagram, attributes and keys, Concepts of composite, derived and multivalued attributes, Super Key, candidate key, primary key, relationships, relation types, weak entities, enhanced E-R and object modeling, Sub Classes, Super classes, inheritance, specialization and generalization.[T1],[T2],[T3],[R1]  

[No. of Hrs.: 10]

UNIT – II  
Introduction to SQL: Overview, Characteristics of SQL. Advantage of SQL, SQL data types and literals.

Types of SQL commands: DDL, DML, DCL. Basic SQL Queries.

Logical operators: BETWEEN, IN, AND, OR and NOT

Null Values: Disallowing Null Values, Comparisons Using Null Values

Integrity constraints: Primary Key, Not NULL, Unique, Check, Referential key

Introduction to Nested Queries, Correlated Nested Queries, Set-Comparison Operators, Aggregate Operators: The GROUP BY and HAVING Clauses,

Joins: Inner joins, Outer Joins, Left outer, Right outer, full outer joins.

Overview of views and indexes. [T1],[R2]  

[No. of Hrs.: 12]

Note: A Minimum of 40 Lectures is mandatory for each course.

Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
UNIT – III

**Relational Data Model:** Relational model terminology domains, Attributes, Tuples, Relations, characteristics of relations, relational constraints domain constraints, key constraints and constraints on null, relational DB schema. Codd’s Rules

**Relational algebra:** Basic operations selection and projection, Set Theoretic operations Union, Intersection, set difference and division,

**Join operations:** Inner , Outer , Left outer, Right outer and full outer join.

**ER to relational Mapping:** Data base design using ER to relational language.

**Data Normalization:** Functional dependencies, Armstrong’s inference rule, Normal form up to 3rd normal form. [T1], [T2], [T3], [R1]

[No. of Hrs.: 12]

UNIT – IV

**Transaction processing and Concurrency Control:** Definition of Transaction, Desirable ACID properties, overview of serializability, serializable and non serializable transactions

**Concurrency Control:** Definition of concurrency, lost update, dirty read and incorrect summary problems due to concurrency

**Concurrency Control Techniques:** Overview of Locking, 2PL, Timestamp ordering, multiversioning, validation

**Elementary concepts of Database security:** system failure, Backup and Recovery Techniques, authorization and authentication. [T1], [T2], [T3]

[No. of Hrs.: 10]

**TEXT BOOKS:**

**REFERENCE BOOKS:**
Paper Code: BCA 201  L  T  C
Paper: Mathematics – III   3  1  4
Paper ID 20201
Pre-requisites: Mathematics I and Mathematics II

Aim: To Understand the use of the basic data structures along with their applications.

Objectives:
To get the knowledge about the important mathematical concepts & their application.

INSTRUCTIONS TO PAPER SETTERS:  Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT – I
Measures of Central Tendency & Dispersion

[No. of Hrs: 11]

UNIT – II
Correlation/Regression
Correlation Coefficient; Assumptions of correlation analysis; coefficients of determination and correlation; measurement of correlation- Karl Person’s Methods; Spearman’s rank correlation; concurrent deviation the correlation coefficient; Pitfalls and limitations associated with regression and correlation analysis; real world application using IT tools

[No. of Hrs: 11]

UNIT – III
Linear Programming & Queuing
Concept a assumptions usage in business decision making linear programming problem: formulation, methods of solving: graphical and simplex, problems with mixed constraints: duality; concept, significance, usage & application in business decision making.
Queuing Models: Basic structure of queuing models, Birth-Death queuing models and its steady state solution, M/M/1 and M/M/C models with infinite/finite waiting space.
PERT,CPM

[No. of Hrs: 11]

UNIT – IV
Transportation & Assignment Problem

[No. of Hrs: 11]

TEXT BOOKS
[T1] Sharma, J.K.; Operations Research: problems & solutions; Macmillan India
Note: A Minimum of 40 Lectures is mandatory for each course.

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Reference Books


Paper Code: BCA-203
Paper: Computer Architecture
Paper ID: 20203
Pre-requisite:
- BCA 106 Digital Electronics

Aim: To understand the concepts in modern computer architecture

Objectives:
- To learn the design of Control Unit and ALU of a typical computer
- To learn about the memory, input–output organization of a typical computer
- To learn the concepts of pipelining and vector processing.

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT-I
Register Transfer and Micro-operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Microoperations, Arithmetic logic shift unit
Basic Computer Organizations and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Register reference instructions, Input - Output Instructions, Design of Accumulator Logic [T1]

[No. of Hrs: 11]

UNIT-II
Design of Microprogrammed Control Unit
Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes. Difference between RISC and CISC.
Pipeline and Vector Processing: Arithmetic and Instruction pipeline, Vector operations, Matrix Multiplication, memory interleaving,[T1,R2]

[No. of Hrs: 11]

UNIT-III
Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, for fixed point-members.[T1,R2]
Input-Output Organization: Peripheral Devices, Input-Output Interfaces, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA)[T1]

[No. of Hrs: 11]

UNIT-IV
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware[T1]

[No. of Hrs: 11]

TEXT BOOKS:

REFERENCE BOOKS:

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12

Pre-requisite:
- Basic Programming Constructs
- Object Oriented Concepts

Aim
To understand Object Oriented and Object based programming paradigm in event based programming environment.

Objectives
- To get the Knowledge about different Object Oriented Features.
- To understand disconnected architecture of .Net.

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT I

UNIT – II
Introduction to Visual Basic.Net IDE: Creating a project, Types of project in .Net, Exploring and coding a project, Solution explorer, toolbox, properties window, Output window, Object Browser. [T1, T2]
VB.Net Programming Language: Similarities and Differences with Visual Basic, Variables, Comments, Data Types, Working with Data Structures – Arrays, Array Lists, Enumerations, Constants, Structures; Introduction to procedures, calling procedures, argument passing mechanisms, scope of variable.
Control Flow Statements – conditional statement, Loops, Nesting of Loops, MsgBox and Input Box. [T1,R2] [No. of Hrs: 11]

UNIT-III
GUI Programming: Introduction to Window Applications, Using Form – Common Controls, Properties, Methods and Events. Interacting with controls - Textbox, Label, Button, Listbox, Combobox, Checkbox, Picture Box, Radio Button, Panel, scroll bar, Timer, ListView, TreeView, toolbar, Status Bar. Dialog Controls, Creating and Using MDI applications, Toolbar, Status Bar, Creating custom controls, Creating Menus. [T1, T2, R1]
Object Oriented Features: Classes and Objects, Access Specifiers: Private, Public and Protected, Building Classes, Reusability, Constructors, Inheritance, Overloading, Overriding, Creating and Using Namespaces. [T2, R1] [No. of Hrs: 11]
UNIT – IV
Introduction to ADO: ADO vs ADO.Net, ADO.Net data namespaces, ADO.Net Object Model, Accessing data from Server Explorer, Creating Connection, Command, Data Adapter, Data Reader and Data Set with OLEDB and SQLDB, Data Binding. [T1, R1, R2]
Crystal Report: Connection to Database, Table, Queries, Building Report, Modifying Report, Formatting Fields, Publishing and exporting reports.. [T2]

[No. of Hrs: 11]

TEXT BOOKS
[T1]Visual Basic 2010 programming Black Book, by Kogent Learning Solutions, Wiley India
[T2]Visual Basic 2010 Step By Step, Michael Halvorson, PHI

REFERENCE BOOKS
[R2] Beginning Visual Basic 2010 (Wrox)
Paper Code: BCA 207
Paper ID: 20207
Paper: Principles of Accounting
Pre-requisites: None

Aim: To understand the basics of accounting and its application in general business environment

Objectives
- To get the Knowledge about the important concepts and characteristics of accounting.
- To study the application of accounting in the general business environment.

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

UNIT I
Meaning and nature of accounting, Scope of financial accounting, Interrelationship of Accounting with other disciplines, Branches of Accounting, Accounting concepts and convention, Accounting standards in India.
[No. of Hrs: 11]

UNIT – II
[No. of Hrs: 11]

UNIT-III
Preparation of Final Accounts, Profit & Loss Account, Balance Sheet-Without adjustments and with adjustments.
[No. of Hrs: 11]

UNIT – IV
Meaning of Inventory, Objectives of Inventory Valuation, Inventory Systems, Methods of Valuation of Inventories-FIFO, LIFO and Weighted Average Method, Concept of Depreciation, Causes of Depreciation, Meaning of Depreciation Accounting, Method of Recording Depreciation, Methods of Providing Depreciation.
[No. of Hrs: 11]

TEXT BOOKS

REFERENCE BOOKS

Note: A Minimum of 40 Lectures is mandatory for each course.

Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26\textsuperscript{th} July 2011 & Sub-Committee Academic Council held 28\textsuperscript{th} July 2011. W.e.f. academic session 2011-12
Paper Code: BCA 209  
Paper ID: 20209  
Paper: Object Oriented Programming using C++  
L T C  
Pre-requisites:  
- BCA-105(Introduction to Programming using ‘C’)  
- Data Structure Concepts  

Aim: To understand the basics of Object Oriented Programming and their applications.  
Objectives:  
- To gain knowledge of objects, Class, Data Abstraction, Encapsulation, Inheritance, Polymorphism and Dynamic Binding.  
- To know about constructing programs using Bottom-up design approach.  

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75  
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 20 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks  

UNIT – I  
C++ Environment: Program development environment, the language and the C++ language standards. C++ standard libraries. Introduction to various C++ compilers, C++ standard libraries, Testing the C++ program in Turbo C++/Borland C++/MicroSoft VC++/GNU C++ compiler. [T1][T2][T3]  
No. of Hrs: 12

UNIT – II  
Classes and Objects: Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, references, this pointer, Function Overloading, Constructors and destructors, instantiation of objects, Default parameter value, C++ garbage collection, dynamic memory allocation, Meta class/abstract classes.[T1][T2]  
No. of Hrs. 12

UNIT – III  
Inheritance and Polymorphism: Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition v/s classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric polymorphism, Virtual Function, Early v/s Late Binding.[T1][R2]  
No. of Hrs: 10

UNIT – IV  
Generic Programming – Introduction, templates, template functions, Overloading of template functions, Overriding inheritance methods.

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
**Files and Exception Handling:** Persistant objects, Streams and files, Namespaces, The basic stream classes: C++ predefined streams, Error handling during file operations, Command Line Arguments. Types of Exception, Catching and Handling Exceptions.[T1][T3]

[No. of Hrs: 10]

**TEXT BOOKS**

**REFERENCE BOOKS**
Aim: To understand the basics concepts of probability and numerical analysis.

Objectives:
- To get the Knowledge about mathematical probability.
- To get familiar with various numerical techniques.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT-I
COMBINATORICS: Permutation and Combination, Repetition and Constrained Repetition, Binomial Coefficients, Binomial Theorem.
PROBABILITY: Definition of Probability, Conditional Probability, Baye’s Theorem. [No. of Hrs: 11]

UNIT – II
PROBABILITY DISTRIBUTIONS: Review of Mean & Standard Deviation, Mathematical Expectation, Moments, Moment Generating Functions, Binomial, Poisson and Normal Distributions. [No. of Hrs: 10]

UNIT-III

UNIT – IV
SOLUTION OF LINEAR SIMULTANEOUS EQUATIONS: Gaussian Elimination Method with and without Row Interchange: LU Decomposition: Gauss - Jacobi and Gauss-Seidel Method; Gauss – Jordan Method and to find Inverse of a Matrix by this Method.

TEXT BOOKS:

REFERENCE BOOKS:

Note : A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code: BCA-204  
Paper ID: 20204  
L T C  
3 1 4  

Paper: Web Technologies  
Pre-requisite: Basic Programming Concepts  
Aim: To highlight the features of different technologies involved in Web Development  
Objectives:  
- Students should be able to design and implement a basic website.  
- Students should be able to implement different navigation strategies.  
- Students should be able to use client-side technologies (XHTML, CSS, forms, JavaScript).  
- Students should be able to develop simple back-end database to support a website.  
- Students should be able to recognize and evaluate website organizational structure and design elements.  

INSTRUCTIONS TO PAPER SETTERS:  
Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks  

UNIT – I  
History of the Internet and World Wide Web, Search Engines, News-group, E-mail and its Protocols, Web Portal, Browsers and their versions, Its functions, URLs, web sites, Domain names, Portals.  
Static Web Development: HTML - Introduction to HTML, HTML Document structure tags, HTML comments, Text formatting, inserting special characters, anchor tag, adding images and Sound, lists types of lists, tables, frames and floating frames, Developing Forms, Image maps.  
[No. of Hrs: 11]

UNIT – II  
Introduction to Java Script: Data Types, Control Statements, operators, Built in and User Defined Functions, Objects in Java Script, Handling Events.  
Cascading Style Sheet: Types of Style Sheets – Internal, inline and External style sheets, creating styles, link tag.  
[No. of Hrs: 11]

UNIT – III  
DHTML : Introduction to DHTML, JavaScript & DHTML, Document Object Model, Filters and Transitions, DHTML Events, Dynamically change style to HTML Documents.  
[No. of Hrs: 11]

UNIT – IV  
Components of XML, XML Parser, DTD’s Using XML with HTML and CSS  
[No. of Hrs: 11]
TEXT BOOKS
[T3] Internet and World Wide Web Deitel HM, Deitel ,Goldberg , Third Edition

REFERENCES
[R4] XML How to Program by Deitel Deitel Nieto.

Note : A Minimum of 40 Lectures is mandatory for each course.
Pre-requisites: Object Oriented Concepts
Aim: To understand the use of object oriented features along with their applications
Objectives
- To make students well versed with programming in java.

INSTRUCTIONS TO PAPER SETTERS: 
Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT-I
Java Programming: Introduction, Data types, access specifiers, operators, control statements, arrays.
Classes: Fundamentals, objects, methods, constructors.
Inheritance: Super class, sub class, this and super operator, method overriding, use of final, packages, abstract class, interface.
Polymorphism: Method overloading, constructor overloading. [T1, R1] [No. of Hrs.: 10]

UNIT – II
Exception Handling: Exception Class, built in checked and unchecked exceptions, user defined exceptions, use of try, catch, throw, throws, finally.
Multi threaded programming: Overview, comparison with multiprocessing, Thread class and runnable interface, life cycle, creation of single and multiple threads, thread priorities, overview of Synchronization.
Java Library: String handling (only main functions), String Buffer class.
Elementary concepts of Input/Output: byte and character streams, System.in and System.out, print and println, reading from a file and writing in a file. [T1, R1] [No. of Hrs.: 12]

UNIT – III
Software Development using Java:
Applets: Introduction, Life cycle, creation and implementation,
AWT controls: Button, Label, TextField, TextArea, Choice lists, list, scrollbars, check boxes, Layout managers,
Elementary concepts of Event Handling: Delegation Event Model, Event classes and listeners, Adapter classes, Inner classes.
Swings: Introduction and comparison with AWT controls. [T1, R1] [No. of Hrs.: 12]

UNIT – IV
Networking Basics: Socket (datagram and TCP/IP based client and server socket), factory methods, InetAddress
JDBC: JDBC Architecture, JDBC Drivers, Connecting to the Database
Introduction to Java Servlets: Life cycle, Interfaces and classes in javax.servlet package (only description) Creating a simple servlet [T1, T2, R1, R2]
TEXT BOOKS:
[T1] Patrick Naughton and Herbert Schildt, “Java-2 The Complete Reference”, TMH.

REFERENCE BOOKS:
Paper Code: BCA 208  
Paper ID: 20208  
Paper: Software Engineering  
Pre-requisite:  
- None  

Aim  
- To understand the importance, limitations and challenges of processes involved in software development.  

Objectives  
- To gain knowledge of various software models.  
- To gain knowledge of various software design activities.  
- To learn cost estimation, software testing, Maintenance and debugging.  

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: 75  
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.  

UNIT – I  
Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models  
Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD, Requirements analysis using DFD(with case studies), Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.[T1][T2][T3]  
[No. of Hrs.: 12]  

UNIT – II  
Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.[T1][T2][T3]  
[No. of Hrs.: 10]  

UNIT – III  
Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Layered arrangement of modules, Function Oriented Design, Object Oriented Design[T1][T2]  
Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics.[T1][T2]  
[No. of Hrs.: 10]  

UNIT – IV  
Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.[T1][T3]  
[No. of Hrs.: 12]  

Note: A Minimum of 40 Lectures is mandatory for each course.  
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
TEXT Books:

REFERENCE:
Note: A Minimum of 40 Lectures is mandatory for each course.

Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12

Paper Code: BCA 210

Pre-requisites: None

Aim: The aim of this course is to allow students to develop background knowledge as well as core expertise in networking technologies, which one of the fastest growing industries is in today’s world.

Objectives

- The students will be exposed different types of media, multiplexing, switched networks, the Internet, TCP/IP suite, fibre-optic communications and the state-of-art networking applications.
- Various transmission media, their comparative study, fibre optics and wireless media
- Categories and topologies of networks (LAN and WAN) and TCP/IP and protocol suites
- Channel error detection and correction, MAC protocols, Ethernet and WLAN
- Details of IP operations in the Internet and associated routing principles

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Unit - I

Unit – II
Telephony: Multiplexing, error detection and correction: Many to one, one to many, WDM, TDM, FDM, circuit switching, packet switching and message switching. Data Link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols overview. ISDN: Services, historical outline, subscriber’s access, ISDN, Layers, and broadband ISDN. T[1], T[2]

Unit-III
Devices: Repeaters, bridges, gateways, routers, The Network Layer, Design Issues, Network Layer Addressing and Routing concepts (Forwarding Function, Filtering Function);Routing Methods (Static and dynamic routing, Distributed routing, Hierarchical Routing);Distance Vector Protocol, Link State protocol. T[1], T[2]
Unit – IV
Transport and upper layers in OSI Model: Transport layer functions, connection management, Functions of session layers, Presentation layer, and Application layer. T[1], T[2]

Text Books

Reference Books
Paper Code: BCA-301

Paper: Operating System

Pre-requisite: None

Aim: To introduce an operating System and describe the functionalities of Operating System.

Objectives

• To Understand the services provided by an operating system.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT – I


Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations

[No. of Hrs.: 12]

UNIT – II

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling.

Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

[No. of Hrs.: 10]

UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary-Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability

[No. of Hrs.: 10]

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
UNIT – IV


[No. of Hrs.: 12]

**TEXT:**

**REFERENCES:**
Paper Code: BCA 303  
Paper ID: 20303  
Paper: Computer Graphics  
Pre-requisites: None  
Aim: To understand the graphics applications and its use.

INSTRUCTIONS TO PAPER SETTERS:  
Maximum Marks: 75  
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT – I  

Graphics Hardware  

Clipping  
Cohen- Sutherland Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision algorithm. 

[No. of Hrs.: 12]

UNIT – II  
Geometrical Transformations  

[No. of Hrs.: 10]

UNIT – III  
Representing Curves & Surfaces  
Polygon Meshes, Parametric Cubic Curves

Solid Modeling  

[No. of Hrs.: 10]

UNIT – IV  

Hidden Surface Removal: Depth-Buffer(z-buffer) method, Depth-sorting Method(Painter’s algorithm)

Note : A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
TEXT BOOKS:

REFERENCES BOOKS:

Note : A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code: BCA 305

Paper Id: 20305

Paper: E-commerce

Pre-requisites: None

Aim: To understand the process of Electronic commerce and Business strategy involved in it.

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT-I


Electronic Data Interchange (EDI): Definition, Concept & Evolution of EDI, Traditional versus EDI enabled system for document exchange, EDI Layered Architecture, Process of EDI Message Exchange, Components of EDI, UNEDIFACT Standards & Message Structure, EDI in India, EDI enabled procurement process, EDI Implementation, UN ‘Model Interchange Agreement’ for international commercial use of EDI.

Web based E-Commerce: Need for web based business, Choosing the right format of website: Characteristics of PR site, Marketing site, Sales site/web-store and vertical & horizontal portals; Steps in setting up business on Internet: Selection & registration of domain name, Website development-client & server side tools, web authoring tools, catalogue & web store tools, Website hosting considerations-own versus rented server; Website Maintenance Online Promotion tools & techniques: Getting links to your site, banner advertisements & measuring advertisement effectiveness, Web Traffic Analysis: Various measures, structure of log file data at server side & its analysis for promotion and tools for analysis, Search Engine optimization techniques, Payment Gateways for online payment, Security of transactions on Web: Selling through Secure Servers, use of digital certificates and international standards.

[No. of Hrs: 12]

UNIT – II


Electronic Payment Systems: E-cash: Purchasing & using of e-cash; Electronic Purses their loading with cash and use; E-cheque payment system; Online Third Party Verified Payment
Security E-Commerce Transactions: Security issues: confidentiality, integrity, authentication, non-repudiation & access control their objectives & techniques; Types of security attacks; Cryptography & Digital Signatures: Symmetric & asymmetric cryptography, Public-Private Key Cryptography, Digital signatures & their use, Public Key Infrastructure (Digital Certificate, Certification Authority, Registration Authority, Key Repository), SSL and SET, Legal issues in cryptography  

[No. of Hrs: 12]

UNIT – III

Business Strategy in an Electronic Age: Impact of Internet on Competition - Porter’s Five Forces Model & Business Strategies in Digital Economy; Impact of IT Enabled Systems on Value Chain - Porter’s Value Chain Model; Supply Chain & Supply Chain Management: Definition & flows in a supply chain, Evolution of supply chain-JIT & Quick Response Retailing, Push, Pull and Built-to-order model of supply chains, E-commerce enabled supply chain management using Internet, Intranet & Extranet.

Business Process Management: Concepts of Business Process Management & Business Process Reengineering; Call Centre operations: Purpose & functions, mode of operations, Components (Telephony, Web, Application servers & middle ware, Desktop applications); Customer Relationship Management (CRM).  

[No. of Hrs: 10]

UNIT – IV


[No. of Hrs: 10]

TEXT BOOKS:

REFERENCES:

Paper Code: BCA-307 L T/P C
Paper: Software Testing 3 1 4
Paper ID 20307

Pre-requisite:
- BCA 204 Software Engineering
- Knowledge and skills of at least one programming language

Aim
- To understand the importance, limitations and challenges of testing process.

Objectives
- To gain knowledge of various functional and structural testing techniques
- To gain knowledge of various activities and levels of testing
- To learn the issues in testing of object oriented and internet based applications

INSTRUCTIONS TO PAPER SETTERS:  Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT-I
Introduction: What is software testing and why it is so hard? Psychology and economics of software testing, Principles of Software Testing, Error, Fault, Failure, Incident, Error and Fault Taxonomies, Test Cases, Limitations of Testing, Code inspections, desk checking, group walkthroughs and peer reviews. Overview of Graph Theory for testers. [T1,T2, R1] [No. of Hrs: 11]

UNIT-II
Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.
Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Slice based testing [T1,R2, R8] [No. of Hrs: 11]

UNIT-III

UNIT-IV
Testing Internet applications: Overview, challenges and strategies of testing internet applications. [T1,T2] [No. of Hrs: 11]

TEXTBOOKS:
REFERENCES:

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code: BCA-309
Paper: Microprocessor
Paper ID 20309

Pre-requisite:
- BCA 106 Digital Electronics and BCA 203 Computer Architecture

Aim
- To understand the architecture, programming and interfacing of microprocessors and their applications

Objectives
- To learn architecture, addressing modes and programming of a typical 8-bit microprocessor
- To learn architecture and programming of typical 16-bit microprocessors
- To learn microprocessor interfacing and applications

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks : 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT – I
Introduction to Microprocessors, microcontrollers and microcomputers, Study of 8085 8 bit Microprocessor, pin-out, its internal architecture, addressing modes, 8085 Microprocessor complete instruction set and timing. Arithmetic, logic, branch instructions, programming techniques - looping, counting, indexing, stacks and subroutines, code conversion, BCD Arithmetic. [T1] [No. of Hrs: 11]

UNIT - II
Counters and time delays using programming, Software development systems and assemblers, writing complete programs for 8085. Basic interfacing concepts, interfacing memory, interfacing keyboards and output displays, memory mapped and isolated I/O. Interrupts and their processing, 8259, Interrupt interface circuits using 8259. [T1] [No. of Hrs: 11]

UNIT - III
General purpose programmable peripheral devices-8255,8253 programmable interval timer, 8257 DMA controller, serial I/O and data communication, RS-232C standard, Serial I/O lines, 8251A Programmable communications interface. [T1] [No. of Hrs: 11]

UNIT – IV
Introduction to 8086/8088 microprocessors, pin-out, architecture, segmented memory, timing diagrams, addressing modes, instruction set. Comparison of 8085, 8086, 8088 microprocessors [T2] [No. of Hrs: 11]

TEXT BOOKS:
[T2]. Lyla B. Das,” The X86 Microprocessors” ,Pearson 2011

REFERENCE BOOK:

Note : A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12

Paper Code: BCA-311
Paper ID: 20311
Paper: Advance Computer Networks
Pre-requisite: Familiar with Computer Network Concepts
Aim: To equip students with good knowledge on the selected advanced research topics in networking

Objectives
- To understand three basic security concepts important to information on the Internet: confidentiality, integrity, and availability.
- To understand the Concepts relating to the people who use that information: authentication, authorization, and no repudiation.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT - I
Foundation: Building a Network, Getting Connected: encoding, links, framing error detection, reliable transmission, Ethernet & MAC
Internetworking: Switching & Bridging, Basic Internetworking, Routing, Implementation, Performance. [T1]
[No. of Hrs: 11]

UNIT – II
Advance Internetworking: The global Internet, Multicast, MPLS, Routing among mobile devices.
End to End Protocols: Simple Demultiplexer, Reliable Byte Stream (TCP), RPC, RTP [T1]
[No. of Hrs: 11]

UNIT – III
Congestion Control & Resource Allocation: Issues, Queuing Disciplines, TCP Congestion Control Avoidance mechanisms, Quality of Service. Multimedia Networking: Multimedia networking applications, RTSP, RTCP, SIP, H.323. [T1, R1]
[No. of Hrs: 11]

UNIT – IV
Network Security: Cryptographic Building Blocks, Symmetric Key Encryption, Public Key Encryption, authentication protocols, PGP, TLS, SSL, Firewalls, Intrusion Detection [T1, R1, R2]
[No. of Hrs: 11]

TEXT BOOKS:
REFERENCE BOOKS:
Paper Code: BCA-313  
Paper ID: 20313  
Paper: Web Based Programming (PHP)  
Pre-requisite: Basic Programming Concepts & BCA 204  
Aim: To highlight the features of different technologies involved in Web Development  
Objectives  
- Students should be able to design and implement a basic website.  
- Students should be able to implement different navigation strategies.  
- Students should be able to develop simple back-end database to support a website.  
- Students should be able to recognize and evaluate website organizational structure and design elements.  

INSTRUCTIONS TO PAPER SETTERS:  
Maximum Marks: 75  
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT – I  

[No. of Hrs: 11]

UNIT – II  
Introduction to PHP, Start and End Tags of PHP, Data types in PHP, Variables, Constants, operators and Expressions, printing data on PHP page, Control statements – if, switch case, for, while, do while.  
Arrays: Initialization of an array, Iterating through an array, Sorting arrays, Array Functions.  
Functions: Defining and Calling Functions, Passing by Value and passing By references, Inbuilt Functions.  

[No. of Hrs: 11]

UNIT – III  
Working with Forms: Get and Post Methods, Querystrings, HTML form controls and PHP, Maintaining User State: Cookies, Sessions, Application State.  
Working With Files: Opening and Closing Files, Reading and Writing to Files, Getting Information on Files  

[No. of Hrs: 11]

UNIT – IV  
PHP Database Connectivity: Introduction to MYSQL, Creating database and other operations on database, connecting to a database, Use a particular database, Sending query to database, Parsing of the query results, Checking data errors.  

[No. of Hrs: 11]

TEXT BOOKS:  

REFEREN CE BOOKS:  

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper: Business Economics

Pre-requisite: None

Aim: To Understand the concepts of Economics.

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT I


The Production Process: Output decisions – Revenues, Costs and Profit Maximisation Laws of Returns & Returns to Scale; Economics and Diseconomies of Scale.

[No. of Hrs.: 12]

UNIT II


[No. of Hrs.: 12]

UNIT III


[No. of Hrs.: 10]

UNIT IV


[No. of Hrs.: 10]

TEXT BOOKS:


Note: A Minimum of 40 Lectures is mandatory for each course.

Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Objectives: This course is an attempt to provide you with the basic information about data warehouse and their development. This course also provides the basic conceptual background necessary to design and develop data warehouse applications.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT – I
Data mining: Introduction, Data mining – on what kind of data, data mining functionalities – what kind of patterns to be mined, Classification of data mining systems, data mining task primitives, integration of a data mining systems with a database or data warehouse systems, major issues in data mining.
Data preprocessing: Descriptive data summarization, data cleaning, data integration and transformation, data reduction, data discretization and concept hierarchy generation.

UNIT – II
Data warehouse and OLAP technology: What is data warehouse, A multidimensional data model, data warehouse architecture, data warehouse implementation, data warehouse usage, OLAP, OLAM
Mining frequent patterns, association and correlation, efficient and scalable frequent itemset mining methods, From association mining to correlation analysis.

UNIT – III
Classification and prediction: Introduction, issues, classification by decision tree induction, rule based classification, classification by back propagation, lazy learners, other classification methods, Prediction: accuracy and error measures, evaluating the accuracy of a classifier or predictor.
Cluster Analysis: Types of data in cluster analysis, a categorization of major clustering methods, partitioning methods.

UNIT – IV
Mining complex types of data: Multidimensional analysis and descriptive mining of complex data objects, mining spatial database, multimedia database, mining world wide web.
Applications and trends in data mining: Data mining applications, data mining system products and research prototypes, social impact of data mining, trends in data mining.

TEXT BOOKS:
REFERENCE BOOKS:

[R1] Margaret Dunham, “Data Mining: Introductory and Advanced Topics, 1/e”, Pearson
Cengage Learning, 2009

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-
Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code: BCA 304
Paper ID: 20304

Pre-requisites: Knowledge of Digital Electronics (BCA 106), Computer Networks and Programming Concepts

Aim
To provide basic knowledge on Wireless Communications, Mobile Internet and Mobile Content Services.

Objectives
• To learn the basics of Wireless voice and data communications technologies.
• To build working knowledge on various telephone and satellite networks.
• To build skills in working with Wireless application Protocols to develop mobile content applications
• To build practical knowledge on WML and WML Script

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT - I
Introduction to wireless communications: Applications, Short History of Wireless Communications, Market of Mobile Communications. [T1]

UNIT – II
Elementary Knowledge on Medium Access Control: Motivation for a specialized MAC, Hidden and exposed terminals, Near and far terminals, Introduction to SDMA, FDMA, TDMA: Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access, CDMA, Spread Aloha multiple access, Mobile communications, Comparison of S/T/F/CDMA. [T1]

UNIT – III

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Mobile Internet: Introducing the Mobile Internet, Services for the mobile Internet, Business opportunities. [T2]


UNIT – IV
WAP: the Mobile Internet Standard, Making the Internet Mobile: Challenges and Pitfalls, Overview of the Wireless Application Protocol [T2]


TEXT BOOKS
[T3] Learning WML, and WMLScript, Programming the Wireless Web, Martin Frost, Publisher: O'Reilly 2000

REFERENCE BOOKS

Note: A Minimum of 40 Lectures is mandatory for each course.

Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code: BCA 306
Pre-requisites: Operating Systems
Aim: To understand Linux Operating System and its security.

UNIT – I
UNIX & LINUX:- Overview of UNIX and LINUX Architectures, UNIX Principles, GNU Project/FSF, GPL, Getting help in Linux with –help, whatis, man command, info command, simple commands like date, whoami, who, w, cal, bc, hostname, uname, concept of aliases etc. Linux filesystem types ext2, ext3, ext4. Basic linux directory structure and the functions of different directories basic directory navigation commands like cd, mv, copy, rm, cat command, less command, runlevel (importance of /etc/inittab) [T1, T2, R1] [No. of Hrs: 11]

UNIT – II
Standard Input and Output, Redirecting input and Output, Using Pipes to connect processes, tee command, Linux File Security, permission types, examining permissions, changing permissions (symbolic method numeric method), default permissions and umask. Vi editor basics, three modes of vi editor, concept of inodes, inodes and directories, cp and inodes, mv and inodes, rm and inodes, symbolic links and hard links, mount and umount command, creating archives, tar, gzip, gunzip, bzip2, bunzip2 (basic usage of these commands) [T1, T2, R1] [No. of Hrs: 11]

UNIT – III
Environment variables (HOME, LANG, SHELL, USER, DISPLAY, VISUAL), Local variables, concept of /etc/passwd, /etc/shadow, /etc/group, and su- command, special permissions (suid for an executable, sgid for a directory, sticky bit for a directory) tail, wc, sort, uniq, cut, tr, diff, aspell, basic shell scripts grep, sed, awk (basic usage) [T1, T2, R1] [No. of Hrs: 11]

UNIT – IV
Process related commands (ps, top, pstree, nice, renice), Introduction to the linux Kernel, getting started with the kernel (obtaining the kernel source, installing the kernel source, using patches, the kernel source tree, building the kernel process management, process descriptor and the task structure, allocating the process descriptor, storing the process descriptor, process state, manipulating the current process state, process context, the process family tree, the Linux scheduling algorithm, overview of system calls, introduction to kernel debuggers (in windows and linux) [T2] [No. of Hrs: 11]

TEXT BOOKS:
[T1] Sumitabha Das, “Unix Concepts and Application”, TMH

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
REFERENCE BOOKS:
[R2] The Unix Programming Environment by Brian W. Kernighan and Rob Pike, PHI
[R3] Understanding the Linux Kernel Daniel P. Bovet; Marco Cesati, O'Reilly Media, Inc. 2005

Note : A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Aim: To understand the basics of software testing, its need and implications on software development and its overall effect on software quality.

Objectives

- To get the Knowledge about the basics concepts of multimedia and its applications.
- To get the knowledge of its relevance with internet and its future aspects.

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT I
Introduction Concepts: Multimedia - Definitions, Basic properties and medium types. (Temporal and non temporal) Multimedia applications. Uses of Multimedia, Introduction to making multimedia - The Stages of project, the requirements to make good multimedia, Multimedia skills and training.

Multimedia-Hardware and Software: Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Media software - Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards. [T1,T2,R1] [No. of Hrs: 11]

UNIT II
Multimedia building blocks Creating & Editing Media elements: Text, image, Sound, animation Analog/ digital video Data Compression: Introduction, Need, Difference of lossless/lossy compression techniques. Brief overview to different compression algorithms concern to text, audio, video and images etc. [T1,T2,R3] [No. of Hrs: 11]

UNIT III

UNIT IV
TEXTBOOKS:

REFERENCES:

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code: BCA 310  
Paper ID: 20310  
Paper: Bioinformatics  
Pre-requisites: None  
Aim: Aims at providing an elementary knowledge of Bioinformatics, Databases and Algorithms. It aims at introduction of PERL as PERL is one of the important programming languages for Bioinformatics  
Objectives  
1. To understand Scope of Bioinformatics  
2. To understand Types of Databases and their use.  
3. To understand Notation and different types of Algorithms  
4. To understand the basic commands in Unix and PERL.

INSTRUCTIONS TO PAPER SETTERS:  
Maximum Marks: 75  
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

UNIT-I  
[No. of Hrs: 11]

UNIT-II  
DATABASES - TOOLS AND THEIR USES: Importance of databases - nucleic acid sequence databases - protein sequence data bases - structure databases - bibliographic databases and virtual library - specialized analysis packages  
[No. of Hrs: 11]

UNIT-III  
[No. of Hrs: 11]

UNIT-IV  
PERL: Introduction to Perl-scalars, Arrays-Using standard Perl modules-Perl regular expressions I.  
BIOPERL: Installation and usage of bioperl modules  
[No. of Hrs: 11]

TEXTBOOKS  
REFERENCES BOOKS:

Note: A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code: BCA 312  
Paper Id: 20312  

Paper: Artificial Intelligence  
Aim: To understand the concept of Artificial Intelligence, Knowledge Representation, Logic, NLP and Learning.  

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: 75  
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.  

UNIT - I  
Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.  
Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem.  
Heuristic search techniques: Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction.  
[No. of Hrs.: 11]  

UNIT - II  
Knowledge representation: Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation, Issues in knowledge representation.  
Using Predicate Logic: Representing Simple Facts in logic, Representing instances and is-a relationship, Computable function and predicate.  
[No. of Hrs.: 12]  

UNIT - III  
Natural language processing: Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing.  
[No. of Hrs.: 11]  

UNIT - IV  
Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. LISP and other AI Programming Language  
[No. of Hrs.: 10]  

TEXTBOOKS:  

REFERENCE:  
[R1] D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999  
Pre-requisite: Basic knowledge of Computer networks and various network protocols

Aim: The aim of this course is to provide an overview of information security and network security and management.

Objectives

- The course covers a broad range of security related concepts and issues that face industries today.
- The course will also examine the practical aspects of the issues involved in secure systems and networks and industry practices being adopted to protect information systems.
- Students will gain the knowledge, skills and abilities to incorporate good information security practice in any organization.

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Unit I

Information security

Attributes of Information Security: Confidentiality, Integrity, Availability. Threats & Vulnerabilities: Unauthorized Access, Impersonation, Denial of Service, Malicious Software; Trap Doors, Logic Bomb, Trojan Horses; Viruses, Worms & Bacteria; Cryptography Basics: Plain Text, Cipher Text, Encryption Algorithm, Decryption Algorithm; Requirements for Cryptography, Symmetric vs Asymmetric, Block and Stream ciphers, DES. T[1], T[2]

Unit II

Public Key Infrastructure & Message Authentication


Unit III

Network Security


Unit IV

Web Security


Note: A Minimum of 40 Lectures is mandatory for each course.

Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
**TEXTBOOKS:**

**REFERENCE BOOKS:**

Note : A Minimum of 40 Lectures is mandatory for each course.
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
Paper Code : BCA 316  
Paper Id: 20316  
Paper: Network Programming  

Pre-requisite: Knowledge of Basic Networking/ Networking Protocols  

Aim: To enable the students to develop the necessary skills for developing robust & scalable network applications and to build necessary basic knowledge for managing networks  

Objective  
- To learn the basics of socket programming using TCP Sockets.  
- To learn basics of UDP sockets.  
- To develop knowledge of threads for developing high performance scalable applications.  
- To learn about raw sockets.  
- To understand simple network management protocols & practical issues.  

INSTRUCTIONS TO PAPER SETTERS:  
Maximum Marks: 75  
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.  
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks  

UNIT-I  
Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application. [No. of Hrs.: 11]  

UNIT-II  
Sockets: Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function. [No. of Hrs.: 11]  

UNIT-III  
TCP client server: Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination,  
Crashing and Rebooting of server host shutdown of server host. I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option. [No. of Hrs.: 11]  

Note : A Minimum of 40 Lectures is mandatory for each course.  
Syllabus of Bachelor of Computer Applications (BCA), approved by BCA Coordination Committee on 26th July 2011 & Sub-Committee Academic Council held 28th July 2011. W.e.f. academic session 2011-12
UNIT-IV

**Elementary UDP sockets:** Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. Elementary name and Address conversions: DNS, gethost by Name function, Resolver option.

[No. of Hrs.: 11]

**TEXT BOOKS:**

**REFERENCES:**
[R1] UNIX Systems Programming using C++, T CHAN, PHI.
[R2] UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education