SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

For

BACHELOR OF COMPUTER APPLICATIONS (BCA) DEGREE

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

Bachelor of Computer Applications

FIRST SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits	Marks Internal	Marks External
THEROY PAPERS						
BCA 101	Mathematics – I	3	1	4	25	75
BCA 103	Technical Communication	3	0	3	25	75
BCA 105	Introduction to Programming Language using C	3	1	4	25	75
BCA 107	Introduction to Computers & IT	3	1	4	25	75
BCA 109	Physics	3	1	4	25	75
PRACTICALS						
BCA 151	Practical – I C Prog. Lab	0	6	3	40	60
BCA 153	Practical – II IT Lab	0	6	3	40	60
BCA 155*	Communication Skills	2	0	2	100	------
	Total	**17**	**16**	**27**	**305**	**495**

*NUES

TOTAL MARKS : 800

Bachelor of Computer Applications

SECOND SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits	Marks Internal	Marks External
THEROY PAPERS						
BCA 102	Mathematics – II	3	1	4	25	75
BCA 104	Principles of Management	3	0	3	25	75
BCA 106	Digital Electronics	3	1	4	25	75
BCA 108	Data Structure Using C	3	1	4	25	75
BCA 110	Database Management System	3	1	4	25	75
PRACTICALS						
BCA 152	Practical – III DS Lab	0	6	3	40	60
BCA 154	Practical – IV DBMS Lab	0	6	3	40	60
BCA 156*	Cyber Ethics	2	0	2	100	------
	Total	**17**	**16**	**27**	**305**	**495**

*NUES
TOTAL MARKS: 800

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

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THIRD SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits	Marks Internal	Marks External
THEROY PAPERS						
BCA 201	Mathematics – III	3	1	4	25	75
BCA 203	Computer Architecture	3	1	4	25	75
BCA 205	Front End Design Tool VB.Net	3	1	4	25	75
BCA 207	Principles of Accounting	3	0	3	25	75
BCA 209	Object Oriented Programming using C++.	3	1	4	25	75
PRACTICALS						
BCA 251	Practical – V .NET Lab	0	6	3	40	60
BCA 253	Practical – VI C++ Lab	0	6	3	40	60
BCA 255*	Software Development Skills	2	0	2	100	------
	Total	**17**	**16**	**27**	**305**	**495**

*NUES
TOTAL MARKS: 800

Bachelor of Computer Applications

FOURTH SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits	Marks Internal	Marks External
THEROY PAPERS						
BCA 202	Mathematics – IV	3	1	4	25	75
BCA 204	Web Technologies	3	1	4	25	75
BCA 206	Java Programming	3	1	4	25	75
BCA 208	Software Engineering	3	1	4	25	75
BCA 210	Computer Networks	3	1	4	25	75
PRACTICALS						
BCA 252	Practical – VII Java Lab	0	6	3	40	60
BCA 254	Practical – VIII Web Tech Lab	0	6	3	40	60
BCA 256*	Personality Development Skills	2	0	2	100	------
	Total	**17**	**13**	**28**	**305**	**495**

*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

Code No.	Paper	L	T/P	Credits	Marks Internal	Marks External
THEROY PAPERS						
BCA 301	Operating System	3	1	4	25	75
BCA 303	Computer Graphics	3	1	4	25	75
BCA 305	E- Commerce	3	1	4	25	75
***ELECTIVES (Select any One)						
BCA 307	Software Testing	3	1	4	25	75
BCA 309	Microprocessor	3	1	4	25	75
BCA 311	Advance Computer Networks	3	1	4	25	75
BCA 313	Web Based Programming	3	1	4	25	75
BCA 315	Business Economics	3	1	4	25	75
PRACTICALS						
BCA 351	Practical – IX CG Lab	0	8	4	40	60
BCA 355*	Summer Project/ Training	0	0	2	100	------
BCA 357	Minor Project	---	8	4	40	60
	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

Code No.	Paper	L	T/P	Credits	Marks Internal	Marks External
THEROY PAPERS						
BCA 302	Data Ware Housing & Data Mining	3	1	4	25	75
BCA 304	Mobile Computing	3	1	4	25	75
BCA 306	Linux Environment	3	1	4	25	75
***ELECTIVES (Select any One)						
BCA 308	Multimedia & Its Applications	3	1	4	25	75
BCA 310	Bio Informatics	3	1	4	25	75
BCA 312	Artificial Intelligence	3	1	4	25	75
BCA 314	Network Security	3	1	4	25	75
BCA 316	Network Programming	3	1	4	25	75
PRACTICALS						
BCA 352	Practical – X Linux Lab	0	4	2	40	60
BCA 356	Major Project	----	10	5	40	60
BCA 358**	Seminar	2	0	2	100	
	Total	**14**	**18**	**25**	**280**	**420**

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.

Paper Code: BCA 101
Paper ID: 20101   **L   T   C**

Paper: Mathematics – I   **3   1   4**

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

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
DETERMINANTS: Definition, Minors, Cofactors, Properties of Determinants, MATRICES:
Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication
of Matrices, Adjoint, Inverse, Cramers 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 transcedental Functions, Reduction Formulae for Trigonometric Functions,
Gamma and Beta Functions.   **[No. of Hrs: 10]**

TEXT BOOKS:
[T1] Kresyig E., "Advanced Engineering Mathematics", 5th Edition, John Wiley & Sons,1999.
[T2] Babu Ram, "Engineering Mathematics", Pearson Education.
[T3] Apostol Tom M, Calculus, Vol I and II John Wiley (2003).
REFERENCE BOOKS:
[R1] B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
[R2] H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised
Edition, 2001.
[R3] Shanti Narayan, "Differential Calculas", S.Chand & Company, 1998

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Paper Code: BCA 103   **L**   **T**   **C**

Paper Id: 20103   **3**   **0**   **3**

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.[T1, T2, T3, T4]

[No. of Hrs: 11]

UNIT-II
Written Communication: Objectives of written communication, Media of written communication, Merits and demerits of written communication, Planning and preparing of effective business messages. Persuasive writing.
Overview of Technical Research and Report Writing : Definition and Nature of Technical Writing, Properties/features and process of Technical Writing, Basic Principles of Technical Writing, Styles in Technical Writing, The Role of Technical Writing, The Wholistic Guide of Technical Writing , End-products of Technical Writing. Writing Proposals.
Writing Letters: Business letters, Office memorandum, Good news and bad news letters, Persuasive letters, Sales letters, Letter styles/ layout.
Report Writing**:** Meaning & Definition, Types of report (Business report & Academic report), Format of report, Drafting the report, Layout of the report, Essential requirement of good report writing.
Job Application**:** Types of application, Form & Content of an application, drafting the application, Preparation of resume. [T1,T2,T3,]

[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:

[T1]   Kavita Tyagi and Padma Misra , "Advanced Technical Communication", PHI, 2011
[T2]   P.D.Chaturvedi and Mukesh Chaturvedi, "Business Communication – Concepts, Cases and Applications", Pearson, second edition.
[T3]   Rayudu, "C.S- Communication", Himalaya Publishing House, 1994.
[T4]   Asha Kaul , "Business Communication", PHI, second edition.

REFERENCES:

[R1]   Raymond Murphy, "Essential English Grammar- A self study reference and practice book for elementary students of English" , Cambridge University Press, second edition.
[R2]   Manalo, E. & Fermin, V. (2007). Technical and Report Writing. ECC Graphics. Quezon City.
[R3]   Kavita Tyagi and Padma Misra , "Basic Technical Communication", PHI, 2011.
[R4]   Herta A Murphy, Herbert W Hildebrandt and Jane P Thomas, "Effective Business Communication", McGraw Hill, seventh edition.

Paper Code: BCA 105	**L**	**T**	**C**
Paper Id: 20105	3	1	4

Paper: Introduction to Programming Language using C

Pre-requisites: None

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
C Functions: Functions: declaration, definition & scope, recursion, call by value, call by reference.
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.

Usage of command line arguments. [T1, T2, T3]   **[No. of Hrs: 11]**

TEXTBOOKS:
[T1]Ashok N. Kamthane, "Computer Basics and C Programming", Pearson Education.
[T2]E. BalaGuruswamy, "Programming in ANSI C", 2008.
[T3]V Rajaraman, "Computer Basics and C Programming", PHI.

REFERENCES:
[R1]Herbert Schildt, "C The Complete Reference" Fourth Edition, 2000.
[R2]Yashwant Kanetkar, "Let us C" eighth edition, 2002.
[R3]Kernighan and d. Ritchie, "The ANSI C Programming Language", 2000.
[R4]Stephenn Prata, "C Primer Plus" Fourth Edition, 2001.
[R5]Schaum's Outline Series, "Programming with C", 2nd Edition, 1996.

Paper Code:BCA 107   **L**   **T**   **C**
Paper ID: 20107   **3**   **1**   **4**
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 upto 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. Classifications of Computers: Micro, Mini, Mainframe and super computers, Distributed Computer System, Parallel Computers.
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]

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.
[T1][T2][R1][R2]   **[No. of Hrs: 10]**

TEXT BOOKS
       [T1] P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications, 1992.
       [T2] Anita Goel "Computer Fundamentals", Pearson.

REFERENCE BOOKS
       [R1] B.Ram Computer fundamentals Architecture and Organization,New Age Intl.
       [R2] Alex Leon & Mathews Leon, "Introduction to Computers", Vikas Publishing .
       [R3] Norton Peter, "Introduction to computers", 4th Ed., TMH, 2001.
       [R4] Vikas Gupta, "Comdex Computer Kit", Wiley Dreamtech, Delhi, 2004.

Paper Code : BCA 109   **L   T   C**
Paper ID: 20109   **3   1   4**
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: MAXIMUM MARKS: 75
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
Work, Energy & Power: Work, Conservative force, Power, Kinetic Energy, Work energy theorem, Potential Energy, Conservation of gravitational P.E. into K.E., P.E. of spring.
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, Krichoff'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.
Semiconductors: Energy bands in solids, Difference between metals, insulators and semi conductors, Current carriers in semiconductors, Intrinsic semiconductor, Doping, Extrinsic semiconductors, Formation of p-n junction, Biasing of p-n junction, Light emitting diode.
Transistors: Action of n-p-n & p-n-p transistors, Advantages of transistors, Integrated Circuit.**[T3] [T4]**   **[No. of Hrs: 11]**

TEXTBOOKS:
[T1]: S.K. Gupta, "Modern ABC of Physics", Vol1, Modern Publishers.

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[T2]: Pradeep, "Fundamental Physics", Class XI, Pradeep Publications.
[T3]: S.K. Gupta, "Modern ABC of Physics", Vol2, Modern Publishers.
[T4]: Pradeep, "Fundamental Physics", Class XII, Pradeep Publications.

Paper Code: BCA 102
Paper ID: 20102
Paper: Mathematics – II

L   T   C
3   1   4

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. [T1][T2]   **[No. of Hrs: 11]**

UNIT – II
PARTIAL ORDER RELATIONS AND LATTICES: Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices. [T1][T2]   **[No. of Hrs: 10]**

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. [T1][T2]   **[No. of Hrs: 12]**

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. [T1[T2]   **[No. of Hrs: 11]**

TEXT BOOKS:
[T1]Rosen, K.H., Discrete Mathematics and its Applications, McGraw Hill, (2006) 6th ed.

[T2]Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.
[T3]Babu Ram, "Discrete Mathematics", Pearson Education

REFERENCE BOOKS:
[T1]S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000.

[T2]Tremblay, J.P. and Manohar, R., Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, (2007).

Paper Code: BCA – 104 **L T C**

Paper ID: 20104 **3 0 3**

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
[T1] Dr. C.B Gupta "Management concepts & practices" S.Chand & Sons, 2009.
REFERENCE BOOKS
[R1] Stoner,Freeman & Gilbert, "Management" 6th Edition, Pearson International.
Note : A Minimum of 40 Lectures is mandatory for each course.

[R2]   Ankur Chhabra, "Organisational Behaviour", Sun India Publications, 2009
[R3]   Robbins, Stephen P, "Organisational Behaviour". PHI, 2010

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 Counsil held 28th July 2011. W.e.f. academic session 2011-12

Paper Code: BCA - 106   **L   T/P   C**
Paper: Digital electronics   **3   1   4**
Paper Id 20106
Pre-requisite :
  • Physics

Aim
  • To understand various digital systems and their applications.

Objectives
  • To learn about the design principles of different digital electronic circuits
  • To study the applications of above circuits

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
Logic gates NOT , AND, OR, Universal gates- NAND , NOR. EX-OR and EX-NOR gates.
Diode and Transistor as a switch
Logic Families-RTL,DTL,TTL,ECL,CMOS – **(Main features only - without details of circuit
connections and working).** Definition of- current and voltage parameters, noise margin, Fan-
in, Fan-out
Boolean Algebra
Basics Laws of Boolean Algebra, Logic Gates, Simplifications of Boolean equations using
K-maps**.[T1,T2,T3]**   **[No. of Hrs: 11]**

UNIT-II
Review of various number systems (Binary, Octal, Hexadecimal), Definition of BCD , Gray
codes and Excess – 3 codes and their application **(without design of code convertors)**
Parity generation and Checking.
Arithmetic Circuits
Adder, Subtractor, Parallel binary adder/Subtractor, binary multiplier and dibvider.
Combinational Circuits
Multiplexers, De-Multiplexers, decoders, encoders,**.[T1,T2,R3]**   **[No. of Hrs: 11]**

UNIT-III
Flip-flops
S-R, D, J-K, T, Clocked Flip-flop, Race around condition, Master slave Flip-Flop,
Realisation of one flip-flop using other flip-flop.
Shift Registers
Serial-in-serial-out, serial-in-parallel-out, parallel-in-serial-out and parallel-in-parallel-out,
Bi-directional shift register. **[T1,T2,R3]**   **[No. of Hrs: 11]**

UNIT-IV
Counters
Ripple counter, Synchronous Counter, Modulo Counters, Ring Counter, Twisted Ring

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

Counter.
Memory Devices - RAM, ROM, PAL & PLA **[T1,T2,T3,R3]**

[No. of Hrs: 11]

TEXT BOOKS

[T1]. Moris Mano, "Digital Logic and Computer Design", PHI Publications, 2002.
[T2]. Raj Kamal, "Digital Systems ", Principles and Design, Pearson ,2011.
[T3]. R. P. Jain, "Modern Digital Electronics", TMH, 3rd Edition, 2003.
REFERENCES:
[R1]. R.L.Tokheim, "Digital Electronics, Principles and Applications", Tata McGraw Hill, 1999.
[R2]. W.Gothman, "Digital electronics", PHI.
[R3]. S. Salivahanan & S. Arivyhgan. "Digital circuits and design", Vikas Publication, 2001.
[R4]. Malvino Leach, "Digital Principles and Application", TMH, 1999.

Paper Code: BCA 108   **L   T   C**

Paper ID: 20108   **3   1   4**

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.[T1,T2,T3]
                                                              [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; [T1, T2, T3]
                                                              [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. [T1, T2, T3]
                                                              [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) [T1, T2, T3]
                                                              [No. of Hrs: 11]

TEXTBOOKS:

[T1]   Ashok N. Kamthane, "Introduction to Data Structures in C", Pearson Edu.

[T2]   Y. Langsam, Tananbaum, et. al., "Data Structures using C and C++", PHI, 1999.

[T3]   Schaum's outline series, "Data Structure", TMH, 2002

REFERENCES:

[R1]   Yashwant Kanetkar, "Data Structures Through C",BPB Publications, 2008

[R2]   A.K. Sharma, " Data Structure Using C", Pearson

[R3]   P. S. Deshpande and O.G. Kakde, "C & Data Structure", Wiley Dreamtech, 1st Edition, 2003.

[R4]   Richard F. Gilberg & Behrouz A. Forouzan, " Data Structures – A Pseudocode Approach with C", second edition, COURSE TECHNOLOGY, CENGAGE Learning

[R5]   E. Horowitz and S. Sahani, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd, 2003

Paper Code: BCA 110

Paper ID: 20110

Paper: Database Management System

Pre-requisites:

- **Basic knowledge of data storage and file management system**

	L	T	C
	3	1	4

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 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 1 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]**

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,Timstamp 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:

[T1] R. Elmarsi and SB Navathe, "Fundamentals of Database Systems", Pearson,5th Ed.

[T2] Singh S.K., "Database System Concepts, design and application", Pearson Education

[T3] Ramakrishnan and Gherke, "Database Management Systems", TMH.

REFERENCE BOOKS:

[R1]Abraham Silberschatz, Henry Korth, S. Sudarshan, "Database Systems Concepts", 4th Edition, McGraw Hill, 1997.

[R2]Jim Melton, Alan Simon, "Understanding the new SQL: A complete Guide", Morgan Kaufmann Publishers, 1993.

[R3]A. K. Majumdar, P. Battacharya, "Data Base Management Systems', TMH, 1996.

[R4]Bipin Desai, "An Introduction to database Systems", Galgotia Publications, 1991.

Paper Code: BCA 201
Paper: Mathematics – III
Paper ID 20201
Pre-requisites: Mathematics I and Mathematics II

L   T   C
3   1   4

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
Definition, Importance & Limitation. Collection of data and formation of frequency distribution. Graphic presentation of frequency distribution – graphics, Bars, Histogram, Diagrammatic. Measures of central tendency – mean, median and mode, partition values – quartiles, deciles and percentiles. Measures of variation – range, IQR, quartile, deciles and percentiles.

[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
General structure of transportation problem, solution procedure for transportation problem, methods for finding initial solution, test for optimality. Maximization of transportation problem, transportation problem. Assignment problem approach of the assignment model, solution methods of assignment problem, maximization in an assignment, unbalanced assignment problem, restriction on assignment.

[No. of Hrs: 11]

TEXT BOOKS
[T1] Sharma, J.K.; Operations Research: problems & solutions; Macmillan India

[T2] Gupta, S.P. and Gupta, P.K.; Quantitative Techniques and Operations   Research, Sultan Chand & Sons

[T3] Vohra, N.D.; Quantitative Techniques in Management 2003.

[T4] Gupta, S.P. Statistical Methods, Sultan Chand &Sons.2004

[T5] A. M. Natarajan, P Balasubramani A. Tamilarasi, Operations Research, Pearson 2005

REFERENCE BOOKS

[R1] R.L.Rardin, Optimization in Operations Research, Prentice Hall.

[R2] A.Racindran, D.T.Phillips, J.S.Solberg, Second edition, John Wiley.

Paper Code: BCA-203   **L   T/P   C**
Paper: Computer Architecture   **3   1   4**
Paper ID : 20203
Pre-requisite :
- BCA 106 Digital Electronics

AimTo 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 –ouput 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 :
[T1]. Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of India Private Limited, 1999.
REFERENCE BOOKS:
[R1]. WIliam Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001

[R2]. Subrata Ghosal," Computer Architecture and Organization" , Pearson 2011
[R3]. Malvino, "Digital Computer Electronics: An Introduction to Microcomputers",
McGraw Hill,

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 205
Paper ID: 20205
Paper: Front End Design Tool VB.Net

L	T	C
3	1	4

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

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UNIT I
Introduction: Introduction to .Net, Two tier and Three tier client server model, .Net Architecture, Features of .Net, Advantages of .Net, .Net Framework, CLR, CTS, CLS, Assemblies, Memory management issues – Garbage Collector and collection process, Exception Handling, Code Access Security. [T1,R2]   **[No. of Hrs: 11]**

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
[R1] Mastering Microsoft Visual Basic 2010, Evangelos Petroutsos, Wiley Publications
[R2] Beginning Visual Basic 2010 (Wrox)

Paper Code: BCA 207	**L**	**T**	**C**
Paper ID: 20207	**3**	**0**	**3**

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

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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
Journal, Rules of Debit and Credit, Sub Division of Journal: Cash Journal, Petty Cash Book, Purchase Journal, Purchase Return, Sales Journal, Sales Return Journal, Ledger, Trial Balance

[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 Deprecation, Causes of Depreciation, Meaning of Depreciation Accounting, Method of Recording Depreciation, Methods of Providing Depreciation.

[No. of Hrs: 11]

TEXT BOOKS
[T1]   Maheshwari, S.N. and Maheshwari, S. K., (2009) An Introduction to Accountancy, Eighth Edition, Vikas Publishing House.
[T2]   Tulsian, P.C., (2009) Financial Accountancy, 2nd edition, Pearson Education.
REFERENCE BOOKS
[R1]   Gupta R. L., & Gupta V.K., "Principles & Practice of Accounting", Sultan Chand & Sons, 1999.
[R2]   Monga J R, "Introduction to Financial Accounting", Mayur Paperbacks, 2010.
[R3]   Raja Sekaran/Lalitha, "Financial Accounting", Pearsons .

Paper Code: BCA 209　　　　　　　　　　　　　　　　**L**　　**T**　　**C**
Paper ID: 20209　　　　　　　　　　　　　　　　　　**3**　　**1**　　**4**
Paper: Object Oriented Programming using 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

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UNIT – I
Introduction: Introducing Object-Oriented Approach, Relating to other paradigms (functional, data decomposition). Features of Procedure oriented programming, Basic Concepts of Object Oriented Programming, Benefits of OOP, Applications of OOP, Difference between C and C++, cin, cout, new, delete operators.
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.
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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
[T1] Ashok N. Kamthane, "Object-Oriented Programming With Ansi And Turbo C++", Pearson
Education.
[T2] A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.
[T3] E. Balguruswamy, **"C++ "**, TMH Publication ISBN 0-07-462038-x .

REFERENCE BOOKS
[R1] Mahesh Bhave, "Object Oriented Programming with C++", Pearson Education.
[R2] D . Parasons, "Object Oriented Programming with C++", BPB Publication.
[R3]Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas
Publication.
[R4] Schildt Herbert, "C++: The Complete Reference", 4th Ed., Tata McGraw Hill, 1999.
[R5] R. Lafore, "Object Oriented Programming using C++", Galgotia Publications, 2004.

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 202
Paper ID: 20202
Paper: Mathematics – IV

	L	T	C
	3	1	4

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

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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
INTERPOLATION: Operators: Shift, Forward Difference, Backward Difference Operators and their Inter-relation, Interpolation Formulae-Newton's Forward, Backward and Divided Difference Formulae: Lagrange's Formula.
SOLUTION OF NON LINEAR EQUATION: Bisection Method, False Position Method, Newton – Raphson Method for Solving Equation Involving One Variable only.
                                                                                    [No. of Hrs: 12]

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.
NUMERICAL DIFFERENTIATION- First and Second Order Derivatives at Tabular and Non-Tabular Points, Numerical Integration, Trapezoidal Rule, Simpsons 1/3 Rule: Error in Each Formula (without proof).
                                                                                    [No. of Hrs: 11]

TEXT BOOKS:
[T1] S.S. Sastry, " Numerical Analysis"; Prentice Hall of India, 1998.
[T2] Meyer, P.L.. Introductory Probability and Statistical Applications, Oxford (1970) 2nd ed.
[T3] Johnson, R., Miller, I. and Freunds, J., Miller and Freund's "Probability and Statistics for Engineers, Pearson Education(2005) 7th ed.
REFERENCE BOOKS:
[R1] Mathew, J.H., Numerical Methods for Mathematics, Science and Engineering, Prentice Hall Inc.J (2002).
[R2]Walpole, Ronald E., Myers, Raymond H., Myers, Sharon L. and, Keying Ye, Probability and Statistics for Engineers and Scientists, Pearson Education (2007) 8th ed.

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
Paper: Web Technologies

	L	T	C
	3	1	4

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

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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
Introduction to WYSIWYG Design tools, Introduction to Dreamweaver, Website Creation and maintenance, Web Hosting and Publishing Concepts, XML: Introduction to XML-Mark up languages, Features of Mark up languages, XML Naming rules, Building block of XML Document, Difference between HTML & XML

Components of XML, XML Parser, DTD's Using XML with HTML and CSS

                                                                                                [No. of Hrs: 11]

TEXT BOOKS

[T1] The complete reference HTML, by Thomas A powell, TMH publication.

[T2] Mastering HTML 4.0 by Deborah S. Ray and Erich J. Ray. BPB Publication.

[T3] Internet and World Wide Web Deitel HM, Deitel ,Goldberg , Third Edition

REFERNCES

[R1] HTML Black Book , Stephen Holzner, Wiley Dreamtech.

[R2]Rajkamal, "Web Technology", Tata McGraw-Hill, 2001.

[R3] Jeffrey C. Jackson, "Web Technologies : A Computer Science Perspective", Pearson.

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

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 206   **L   T   C**
Paper ID: 20206   **3   1   4**
Paper: Java Programming
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, acces 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 Sysem.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.

[T2] Y. Daniel Liang, "Introduction to Java Programming, Comprehensive Version, 7/e" Pearson.

REFERENCE BOOKS: -

 [R1] Krishnamoorthy R, Prabhu S ,"Internet and Java Programming", New Age Intl.

[R2] David Flanagan, Jim Farley, William Crawford and Kris Magnusson, "Java Enterprise in a Nutshell", O'Reilly.

Paper Code: BCA 208   **L   T   C**

Paper ID: 20208

Paper: Software Engineering   **3   1   4**
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 Management Concepts: The Management spectrum, The People, The Problem, The Process, The Project.
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 Testing: Code Review, Testing Process, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing(Performance Testing and Error Seeding), Debugging Activities. [T1][T2][R1]
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:

[T1]   K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International, 2005.
[T2]   Rajib Mall, "Fundamental of Software Engineering", 3rd Edition, PHI Learning Private Limited
[T3]   I. Sommerville, "Software Engineering", 9th Edition, Pearson Edu.

REFERENCE:

[R1]   Jibitesh Mishra and Ashok Mohanty, "Software Engineering", Pearson
[R2]   R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001.
[R3]   James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach", John Wiley & Sons.

Paper Code: BCA 210   **L   T   C**

Paper ID: 20210   **3   1   4**

Paper :Computer Networks

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 wirelessmedia
- Categories and topologies of networks (LAN and WAN) Layered architecture (OSI 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

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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
Basic Concepts: Components of data communication, distributed processing, Line configuration, topology, transmission mode, and categories of networks. OSI and TCP/IP Models: Layers and their functions, comparison of models. Digital Transmission: Interfaces and Modems: DTE-DCE Interface, modems, cable modems. Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon Capacity.T[1], T[2]

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
T[1]. A. S. Tenanbaum, "Computer Networks"; Pearson Education Asia, 4th Ed., 2003.
T[2]. Behrouz A. Forouzan, "Data Communication and Networking", 2nd edition, Tata Mc Graw Hill.
.
Reference Books
R[1]. D. E. Comer, "Internetworking with TCP/IP", Pearson Education Asia, 2001.
R[2]. William Stallings, "Data and computer communications", Pearson education Asia, 7th Ed., 2002.

Paper Code: BCA-301

L	T/P	C
3	1	4

Paper: Operating System

Pre-requisite: None

Aim: To introduce an operation 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

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UNIT – I

Introduction: What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems

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]**

UNIT – IV

Information Management: Introduction, A Simple File System, General Model of a File System, Types of File System File-System Interface: File Concept, Access Methods, Directory Structure, Protection: Goals of protection, Domain of protection, Access rights, Consistency Semantics Security: Authentication, Program threats, System threats, Encryption.

[No. of Hrs.: 12]

TEXT:
[T1] Silbersachatz and Galvin, "Operating System Concepts", John Wiley & Sons, 7th Ed. 2005
[T2] Haldar/Aravind, "Operating System", Pearson Edu.
REFERENCES:
[R1] Madnick E., Donovan J., "Operating Systems", Tata McGraw Hill, 2001
[R2] Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000
[R3] An Introduction to Operating Systems: Concepts & Practice, Bhatt, PHI

L T C
3 1 4

UNIT – I
Introduction: The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Applications, Development of Hardware and Software for Computer Graphics, Conceptual Framework for Interactive Graphics.
Overview, Scan Converting Lines, Scan Converting Circles, Scan Converting Ellipses.
Graphics Hardware
Hardcopy Technologies, Display Technologies, Raster-Scan Display Systems, The Video Controller, Random-Scan Display Processor, Input Devices for Operator Interaction, Image Scanners, Antialiasing.
Clipping
Cohen- Sutherland Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision algorithm. [T1][T2]

[No. of Hrs.: 12]

UNIT – II
Geometrical Transformations
2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Composition of 2D Transformations, The Window-to-Viewport Transformation, Efficiency, Matrix Representation of 3D Transformations, Transformations as a Change in Coordinate System.[T1][T2][R3]

[No. of Hrs.: 10]

UNIT – III
Representing Curves & Surfaces
Polygon Meshes, Parametric Cubic Curves
Solid Modeling
Representing Solids, Regularized Boolean Set Operations, Primitive Instancing, Sweep Representations, Boundary Representations, Spatial Partitioning Representations, Constructive Solid Geometry, Comparison of Representations, User Interfaces for Solid Modeling. [T1][T2]

[No. of Hrs.: 10]

UNIT – IV
Three Dimensional Viewing: Introduction, Representation of Three-dimensional objects, Projections, Parallel projections: Orthographic Projections, Oblique Projections. Perspective Projection, Three dimensional clipping, Three-dimensional Cohen-Sutherland clipping algorithm.
Hidden Surface Removal: Depth-Buffer(z-buffer) method, Depth-sorting Method(Painter's algorithm)[T1][T2]

TEXT BOOKS:
[T1] Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles & Practice, 2000, Pearson
[T2] Chennakesava R. Alavla "Computer Graphics", PHI Learning Pvt. Limited

REFERENCES BOOKS:
[R1] D. Hearn & Baker: Computer Graphics with OpenGL, Pearson Education, Third Edition, 2009.
[R2] Foley, J.D. & Van Dam, A: Fundamentals of Interactive Computer Graphics.
[R3] Rogers & Adams, "Mathematical Elements for Computer Graphics", McGraw Hill, 1989.

Paper Code: BCA 305   **L**   **T**   **C**

Paper Id: 20305   **3**   **1**   **4**
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
An Overview of E-Commerce: Trade Process & Trade Cycles their linkages with information exchange; Definitions of E-commerce & E-business & their difference; Problems with Manual Systems, Aims of E-commerce, Functions of E-commerce, Applications of E-commerce in business functions, Tools & Technologies for E-commerce,Types of E-commerce,Operational & Strategic benefits of E-commerce, Issues & Challenges in E-commerce .
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

Intranet, Extranet and VPN: Architecture of Intranet, Intranet Software, Applications of Intranets, Intranet Application Case Studies, Considerations in Intranet Deployment; The architecture of Extranets, Extranet Products & Services, Applications of Extranets, Business Models of Extranet Applications; Virtual Private Network (VPN): Architecture of VPN - service provider dependent & service provider independent configurations, VPN Security- User authentication & Data Security.

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

System through Credit & Debit Cards & encryption mechanism; ATM based cash disbursement system; Electronic Bill Payment System; 6. Inter bank clearing system.

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

Technology & Legal Issues in E-Commerce: Technological Issues: Availability of telecom infrastructure, interoperability, bandwidth issues, technical standards & spectrum management, Expansion of Internet: 128 bit IP addressing issue; Legal Issues: Uniform Commercial code for E-commerce (**'Model Law on Electronic Commerce'** by United Nations Commission on International Trade Law, IT Act 2000 by Govt of India), Intellectual Property Protection (Copyrights, Patents, Trademarks & Domain Names), Privacy, Security (storage of electronic messages & their evidence value), Customs & Taxation laws, Role of governments & regulatory bodies, Jurisdiction issues.

Applications of E-Commerce & Case Studies: 1. Case studies & applications of e-commerce in Retailing, Banking, Manufacturing, Airlines & Railway reservation & e-governance; 2. Cyber Crimes.   **[No. of Hrs: 10]**

TEXT BOOKS:
[T1] e-commerce: Strategy, Technologies and Applications, David Whiteley, Tata McGraw Hill
[T2] E-Commerce: The Cutting Edge of Business, KK Bajaj & Debjani Nag, McGraw Hill.

REFERENCES:

[R1] The Complete Reference: Internet, Margaret Levine Young, Tata McGraw Hill.
[R2] e-Commerce: Concepts, Models, Strategies, CSV Murthy, Himalayas Publishing House.
[R3] Frontiers of Electronic Commerce, Ravi Kalakota & Andrew B. Wilson, Addison-Wesley (An Imprint of Pearson Education)
[R4] Network Security Essentials: Applications & Standards, William Stallings, Pearson Education.

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

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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
Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Regression Testing, Extreme Testing [T1,T2,R8] **[No. of Hrs: 11]**

UNIT-IV
Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.
Testing Internet applications: Overview, challenges and strategies of testing internet applications. [T1,T2]
[No. of Hrs: 11]

TEXTBOOKS:
[T1]Paul C. Jorgensen, "Software Testing- A Craftsman's Approach", Second Edition, CRC Press, 2008
[T2]Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.
REFERENCES:
[R1]Paul Ammann and Jeff Offutt, Introduction to Software Testing, Cambridge University Press, Cambridge, UK, ISBN 0-52188-038-1, 2008.

[R2] Mauro Pezze, Michal Young, "Software Testing and Analysis: Process, Principles and Techniques",Wiley India , 2008

[R3]. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.

[R4]. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.

[R5]. Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.

[R6]. Louise Tamres, "Software Testing", Pearson Education Asia, 2002

[R7]. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.

[R8]. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, New Delhi, 2003.

Paper Code: BCA-309   L   T/P   C

Paper: Microprocessor   **3**   **1**   **4**

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:

[T1] Microprocessor Architecture, Programming & Application with 8085, Gaonkar, Penram Int. publication 2000.

[T2]. Lyla B. Das," The X86 Microprocessors" ,Pearson 2011

REFERENCE BOOK:

[R1]. Y.-C. Liu and G. A. Gibson, "Microprocessor Systems: The 8086/8088 family Architecture, Programming & Design", PHI, 2000.

[R2]4. A. K. Ray and K M Bhurchandi, "Advanced Microprocessors and Peripherals", TMH, 2000.

[R3]D.V. Hall, "Microprocessors and Interfacing", TMH, 2nd Ed. 1991.

Paper Code: BCA-311
Paper ID: 20311   **L   T   C**
Paper: Advance Computer Networks   **3   1   4**
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

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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:
[T1] Computer Networks, Fifth Edition: A Systems Approach (The Morgan Kauf Man Series).
REFERENCE BOOKS:
[R1] Computer Networking: A Top Down Approach (Fifth Edition), James F. Kurose.
[R2] W. Stallings, Networks Security Essentials: Application & Standards, Pearson Education, 2000.
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Paper Code: BCA-313	**L**	**T**	**C**
Paper ID: 20313	**3**	**1**	**4**

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

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UNIT – I
Introduction to web applications, HTML, Client Side Scripting Vs Server Side Scripting, Web Servers : Local Servers and Remote Servers, Installing Web servers, Internet Information Server (IIS) and Personal Web Server (PWS). Static website vs Dynamic website development.
[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:
[T1] Programming PHP. Rasmus Lerdorf, Kevin Tatroe. (O'Reilly, ISBN 1565926102).
[T2] PHP, MySQL, and JavaScript: A Step-By-Step Guide to Creating Dynamic Websites by Robin Nixon O'Reilly Media; 1 edition

REFERNCE BOOKS:
[R1] Core PHP Programming. Leon Atkinson (Prentice Hall, ISBN 0130463469).
[R2] Beginning PHP5 and MySQL: From Novice to Professional, W. Jason Gilmore, 2004, Apress, ISBN: 1-893115-51-8

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 315   **L**   **T**   **C**
Paper Id: 20315   **3**   **1**   **4**

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

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UNIT I
The Scope and Method of Economics, The Economic Problem: Scarcity & Choice, The Price Mechanism, Demand & Supply Equilibrium: The concept of Elasticity and its Applications.

The Production Process: Output decisions – Revenues, Costs and Profit Maximisation Laws of Returns & Returns to Scale; Economies and Diseconomies of Scale.
                                                 [No. of Hrs.: 12]
UNIT II
Market Structure: Equilibrium of a Firm and Price, Output Determination Under Perfect Competition, Monopoly, Monopolistic Competition & Oligopoly.   **[No. of Hrs.: 12]**

UNIT III
Macro Economic Concerns: Inflation, Unemployment, Trade-Cycles: Circular Flow upto Four Sector Economy, Government in the Macro Economy: Fiscal Policy, Monetary Policy, Measuring National Income and Output.
                                                   [No. of Hrs.: 10]
UNIT IV
The World Economy – WTO, Globalisation, MNCs, Outsourcing, Foreign Capital in India, Trips, Groups of Twenty (G-20), Issues of Dumping, Export- Import Policy 2004-2009.
                                                   [No. of Hrs.: 10]

TEXT BOOKS*:*
[T1] Ahuja H.L., "Business Economics", S. Chand & Co., New Delhi, 2001
[T2] Karl E. Case & Ray C. Fair, "Principles of Economics", Pearson Education, Asia, 2000
[T3] Ferfuson P.R., Rothschild, R and Ferguson G.J. "Business Economics", Mac- Millan, Hampshire, 1993.
[T4] D N Dwivedi, "Micro Economics", 2nd edition, Pearsons
[T5] Nellis, Joseph, Parker David, "The Essence of Business Economics", Prentice Hall, New Delhi, 1992.

Paper Code: BCA 302	L	T	C
Paper ID: 20302	3	1	4

Paper: Data warehouse and data mining
Pre-requisites:
• **Information System Concepts**

Objectives: This course is an attempt to provide you with the basic information about data ware house and their development. This course also provides the basic conceptual background necessary to design and develop data ware house 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

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UNIT – I
Data mining: Inttroduction, 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 descretization and concept hierarchy generation.
[No. of Hrs: 11]

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.
[No. of Hrs: 11]

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.
[No. of Hrs: 11]

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.
[No. of Hrs: 11]

TEXT BOOKS:
   [T1] Kamber and Han, "Data Mining Concepts and Techniques", Hartcourt India P. Ltd.,2001.
   [T2] Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2003.

REFERENCE BOOKS:

[R1] Margaret Dunham, " Data Mining: Introductory and Advanced Topics, 1/e", Pearson
[R2] G. K. Gupta, "Introduction to Data Mining with Case Studies", PHI, 2006.
[R3] W. H. Inmon, "Building the Operational Data Store",2nd Ed., John Wiley, 1999
[R4] B. M. Shawkat Ali, Saleh A. Wasimi, "Data Mining Methods and Techniques",
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   **L   T   C**
Paper ID: 20304   **3   1   4**
Paper: Mobile Computing
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

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UNIT - I
Introduction to wireless communications: Applications, Short History of Wireless Communications, Market of Mobile Communications. [T1]
Elementary Knowledge on Wireless Transmission: Frequency of Radio Transmission, Signals, Antennas, Signal Propagation: Path Loss of Radio Signals, Additional Signal Propagation Effects, Multipath Propagation, Multiplexing: Space Division Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing, Modulation: Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Advanced Frequency Shift Keying, Advanced Phase Shift Keying, Multicarrier Modulation, Spread Spectrum: Direct Sequence Spread Spectrum, Frequency Hopping Spread Spectrum, Cellular Systems. [T1]   **[No. of Hrs: 11]**

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]
Elementary Knowledge on Telecommunications Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services, DECT: System architecture, Protocol architecture.[T1]
Elementary Knowledge on Satellite systems: History, Applications, Basics: GEO, LEO, MEO, Routing, Localization, Handover. [T1]   **[No. of Hrs: 11]**

UNIT – III

Mobile Internet: Introducing the Mobile Internet, Services for the mobile Internet, Business opportunities.[T2]

Implementing WAP Services: WML: WML Variables and Contexts: Variable Substitution, Setting Variables, Browser Contexts, WML Tasks and Events, WML User Interaction: Problems with Web Interaction, Interaction in WAP, Elements: <input> , <select> ,<option> , <optgroup>, <do> , <anchor> , <a> , The tabindex Attribute, WML Timers, WML Decks, Templates, and Cards: Elements: <wml>, <head>, <access>, <meta> , <card> , <template>, WML Text and Text Formatting, Elements <p>, <br>, Character Formatting, Tables, WML Images: <img> Element, The WBMP Image Format. [T2, T3]   **[No. of Hrs: 11]**

UNIT – IV

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

Implementing WAP Services: WML Script: Datatypes, Variables, and Conversions, Operators and Expressions: Operand Conversions, Assignment Operators, Arithmetic Operators, Bitwise Operators, Shift Operators, Logical Operators, Increment and Decrement Operators, Comparison Operators, Type Operators, The Conditional Operator, The Comma Operator, Precedence and Associativity, WMLScript Statements: Expressions as Statements, Blocks of Statements, Conditions, Loops, Returning from a Function, Other Statements, WMLScript

Functions: Function Declarations, Function Calls, Calls to Other Script Units, Calling WMLScript from WML, Standard Libraries, WMLScript Pragmas: The access Pragma, The meta Pragma, Elementry Knowledge on Libraries: Lang , Float , String ,URL , WMLBrowser , Dialogs [T2, T3]   **[No. of Hrs: 11]**

TEXT BOOKS

[T1] Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2003.

[T2] Sandeep Singhal, "The Wireless Application Protocol, Writing Applications for Mobile Internet", Pearson Education, 2000

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

REFERENCE BOOKS

[R1] William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002

[R2] Theodore S Rappaport, "Wireless Communication Principles and Practice", 2nd Ed, Pearson Education. 2002

[R3] C. Y. Lee and William, "Mobile Cellular Telecommunications", 2nd Ed, McGraw Hill. 2001

Paper: Linux Environment
Pre-requisites: Operating Systems
Aim: To understand Linux Operating System and its security.

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
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
etcLinux 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
Enivironment 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 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,.Intoduction to kernel debuggers(in windows
and linux)[T2]   **[No. of Hrs: 11]**

TEXT BOOKS:
[T1] Sumitabha Das, "Unix Concepts and Application", TMH
[T2] Robert Love, "Linux Kernel Development", Pearson Education
[T3] Sumitabha Das, "Your Unix The Ultimate Guide", TMH

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:

[R1] Sivaselvan, Gopalan, "A Beginner's Guide to UNIX", PHI Learning

[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

Paper Code: BCA 308   **L   T   C**

Paper ID: 20308   **3   1   4**
Paper: Multimedia & Its Applications

Pre-requisite: Computer Graphics

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.

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  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
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UNIT   -   I
Introductory 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
Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW - Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, Designing for the WWW -Working on the Web, Multimedia Applications - Media Communication, Media Consumption, Media Entertainment, Media games.[T2.R2]   **[No.   of   Hrs: 11]**

UNIT-IV
Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Virtual Reality, Digital Camera. Assembling and delivering a Multimedia project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM: The CD family, production process, CD-i – Overview – Media Types Technology.[T2,R2]

TEXTBOOKS:
[T1] Tay Vaughan, "Multimedia: Making it work", TMH, 1999.
[T2] Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications Applications",Pearson, 2001.

REFERENCES:
[R1] Keyes, "Multimedia Handbook", TMH, 2000.
[R2] Steve Heath, "Multimedia & Communication Systems", Focal Press, UK, 1999.
[R3] K. Andleigh and K. Thakkar, "Multimedia System Design", PHI, PTR, 2000.
[R4] Steve Rimmer, "Advanced Multimedia Programming", MHI, 2000.

Paper Code:BCA 310   **L   T   C**
Paper ID:20310   **3   1   4**
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

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UNIT-I
HISTORY, SCOPE AND IMPORTANCE: Important contributions - sequencing development - aims and tasks of Bioinformatics - applications of Bioinformatics - challenges and opportunities - Computers and programs – internet - world wide web – browsers - EMB net – NCBI.   **[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
INTRODUCTION TO BIOINFORMATICS ALGORITHMS: Algorithms and Complexity- Biological algorithms versus computer algorithms – The change problem –Correct versus Incorrect Algorithms – Recursive Algorithms – Iterative versus Recursive Algorithms – Big-O Notations – Algorithm Design Techniques.   **[No. of Hrs: 11]**

UNIT-IV
UNIX COMMANDS: Advanced Unix commands-Introduction-ls-cat-more-, Advanced Unix commands-mv-rm-rmdir-uniq-sort- , Advanced Unix commands-grep.
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
[T1] T K Attwood, D J parry-Smith, Introduction to Bioinformatics, Pearson Education, 1st Edition, 11th Reprint 2005.
[T2] S. Ignacimuthu, S.J., Basic Bioinformatics, Narosa Publishing House, 1995.
[T3] Neil C. Jones and Pavel A. Pevzner, An Introduction to Bioinformatics Algorithms, MIT Press, First Indian Reprint 2005.
[T4] Harshawardhan P BAL, Perl Programming for Bioinformatics, Tata McGraw Hill, 2003.

REFERENCES BOOKS:

[R1] Stephen A. Krawetz, David D. Womble, Introduction To Bioinformatics A Theoretical and Practical Approach, Humana Press, 2003.
[R2] Hooman H. Rashidi, Lukas K. Buehler, Bioinformatics Basics-Applications in Biological Science and Medicine, CRC press, 2005.
[R3] C S V Murthy, Bioinformatics, Himalaya Publishing House, 1st Edition 2003.
[R4] ary Benson Roderic page (Eds), Algorithms in Bioinformatics, Springer International Edition, First Indian Reprint 2004.
[R5] James Tisdall, Mastering Perl for Bioinformatics, O'Reilly, 2003.

Paper Code: BCA 312   **L   T   C**

Paper Id: 20312   **3   1   4**

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: Represent ting 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.

Learning: Introduction learning, Rote learning, Learning by taking advice, learning in problem solving, Learning from example-induction, Explanation based learning.

                                             [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:

[T1] E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1999.

REFERENCE:

[R1] D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999
[R2] Nils J Nilsson,"Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.

Paper Code: BCA 314   L   T   C
Paper Id: 20314   3   1   4
Paper: Computer Network & Information Security

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: **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

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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
Public Key Cryptography Principles & Applications, Algorithms: RSA, Message Authentication: One way Hash Functions: Message Digest, MD5, SHA1. Public Key Infrastructure: Digital Signatures, Digital Certificates, Certificate Authorities. T[1], T[2]

Unit-III
Network Security
Network Attacks: Buffer Overflow, IP Spoofing, TCP Session Hijacking, Sequence Guessing, Network Scanning: ICMP, TCP sweeps, Basic Port Scans; Denial of Service Attacks: SYN Flood, Teardrop attacks, land, Smurf Attacks.
IP security Architecture: Overview, Authentication header, Encapsulating Security Pay Load, combining Security Associations, Key Management. Virtual Private Network Technology: Tunneling using IPSEC. T[1], T[2]

Unit – IV
Web Security
Requirements, Secure Socket Layer, and Secure Electronic Transactions,
Network Management Security: Overview of SNMP Architecture- SNMPV1, SNMPV3.
Firewall Characteristics & Design Principles, Types of Firewalls: Packet Filtering Router, Application Level Gateway or Proxy, Content Filters, Bastion Host. T[1], T[2]

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

TEXTBOOKS:

[T1] W. Stallings, Networks Security Essentials: Application & Standards, Pearson Education, 2000

[T2] TCP/IP Protocol Suite , Behrouz A. Forouzan, "Data Communication and Networking", Tata Mc Graw Hill,

REFERENCE BOOKS:

[R1] W. Stallings, Cryptography and Network Security, Principles and Practice, Pearson Education, 2000.

Paper Code : BCA 316   **L**   **T**   **C**

Paper Id: 20316   **3**   **1**   **4**

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

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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]

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:
[T1] UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. - W.Richard Stevens, Pearson Edn. Asia.
[T2] UNIX Network Programming, 1st Edition, - W.Richard Stevens. PHI.

REFERENCES:
[R1] UNIX Systems Programming using C++, T CHAN, PHI.
[R2] UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
[R3] Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education