**SCHEME OF STUDIES & EXAMINATIONS**
Bachelor of Computer Application (BCA) 1<sup>st</sup> Year 1<sup>st</sup> Semester
Credit Based Scheme w.e.f. 2013-14

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**SCHEME OF STUDIES & EXAMINATIONS**
Bachelor of Computer Application (BCA) 1<sup>st</sup> Year 2<sup>nd</sup> Semester
Credit Based Scheme w.e.f. 2013-14

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### Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonipat)

**SCHEME OF STUDIES & EXAMINATIONS**  
Bachelor of Computer Application (BCA) 2\textsuperscript{nd} Year 3\textsuperscript{rd} Semester  
Credit Based Scheme w.e.f. 2014-15

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**TOTAL**  
18 | 5 | 4 | 165 | 375 | 60 | 600 | 22 |

*The Environmental studies GES-101 B is compulsory & qualifying course only.*

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### Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonipat)

**SCHEME OF STUDIES & EXAMINATIONS**  
Bachelor of Computer Application (BCA) 2\textsuperscript{nd} Year 4\textsuperscript{th} Semester  
Credit Based Scheme w.e.f. 2014-15

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**TOTAL**  
15 | 5 | 6 | 185 | 375 | 90 | 650 | 23 |

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2
## Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonipat)

**SCHEME OF STUDIES & EXAMINATIONS**

Bachelor of Computer Application (BCA) 3rd Year 5th Semester
Credit Based Scheme w.e.f. 2015-16

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Total: 9 3 12 140 225 135 500 18
BCA-101B : Human Values and Professional Ethics  
Bachelor of Computer Application (B.C.A.) Semester –I

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Unit 1: **Course Introduction – Need, Basic Guidelines, Content and Process for Value Education:**
Understanding the need, basic guidelines, content and process for Value Education. Self Exploration—what is it?- its content and process; “Natural Acceptance and Experiential Validation- as the mechanism for self exploration.Continuous Happiness and Prosperity- A look at basic Human Aspirations.
Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority.
Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario.
Method to fulfill the above human aspirations: understanding and living in harmony at various levels

**Unit 2: Understanding Harmony in the Human Being – Harmony in Myself!**
Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
Understanding the needs of Self („I”’ and „Body”.
Understanding the Body as an instrument of „I” (I being the doer, seer and enjoyer)
Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail

**Unit 3: Understanding Harmony in the Family and Society- Harmony in Human Human Relationship**
Understanding harmony in the Family- the basic unit of human interaction
Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust and Respect as the foundational values of relationship
Understanding the meaning of Vishwas; Difference between intention and competence
Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human
Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha )- from family to world family!

**Unit 4: Understanding Harmony in the Nature and Existence – Whole existence as Co-existence:**
Understanding the harmony in the Nature
Interconnectedness and mutual fulfillment among the four orders of naturerecyclability and self-regulation in nature
Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space
Holistic perception of harmony at all levels of existence

Implications of the above Holistic Understanding of Harmony on Professional Ethics:

Natural acceptance of human values
Definitiveness of Ethical Human Conduct
Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

Competence in professional ethics:

- Ability to utilize the professional competence for augmenting universal human order
- Ability to identify the scope and characteristics of people-friendly and ecofriendly production systems
- Ability to identify and develop appropriate technologies and management patterns for above production systems.

Text/Reference Books:


NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-103 B: Mathematics - I  
Bachelor of Computer Application (B.C.A.) Semester –I

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<td>3 Hrs.</td>
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**Unit I**

**Trigonometry:** System of measuring angles, Trigonometric functions, identities and signs, Addition and subtraction formulae, transformation of products into sum or difference of t-ratios, transformation of sum or difference into product of trigonometric ratios, Trigonometric equations and graphs.

**Unit II**

**Binomial Theorem:** Statement of the binomial theorem for positive integral indices, general and middle term in binomial expansion, simple applications.

**Quadratic Equations:** Solution of Quadratic Equations by factor method, complete square method, and Discriminant method, Relation of the roots.

**Unit III**

**Co-ordinate Geometry:** Distance formulae, section formulae, shifting of origin. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axes, point-slope form, slope-intercept form, two-point form, intercepts form and normal form. General equation of a line. Equation of family of lines passing through the point of intersection of two lines. Distance of a point from a line.

**Unit IV**

**Sequence and Series:** Arithmetic Progression (A.P.), Arithmetic Mean (A.M.), Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P. Arithmetic and geometric series, infinite G.P. and its sum, geometric mean (G.M.). Relation between A.M. and G.M.

**Text/Reference Books:**
1. 11th & 12th NCERT Mathematics books.
2. Elementary Engineering Mathematics- B S Grewal

**NOTE:** Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-105 B: Personal Computing Software and Hardware  
Bachelor of Computer Application (B.C.A.) Semester –I

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**Unit 1:**

Computer Appreciation: Introduction, characteristics of computer; History of computers; classification of computers on size, architecture and chronology; Applications of computers; commonly used terms–Hardware, Software, Firmware; Computer Architecture and organisation; Input, Process and Output; Representation of information; BIT, BYTE, Memory, Memory size; Units of measurement of storage; Input/Output devices; Secondary storage devices; Networking concepts - LAN, WAN and Topologies:

Types of software; system and application software; functions of an operating system; Popular Operating systems; Generation of Languages; Translators - Interpreters, Compilers, Assemblers and their comparison.

**Unit 2:** DOS and Advanced DOS: Profiling an Operating system; Booting sequence; Operating System files and command Processor file; Definition of a file; File naming; Booting from floppy and HDD; Warm and Cold reboot; Types of DOS commands; Internal and External; Introduction to AUTOEXEC.BAT; Versions of DOS; Directory commands: Copy, XCOPY, DEL, RENAME, ATTRIB, BACKUP, RESTORE, FIND, SYS; General commands; TYPE, DATE, TIME, PROMPT; Disk organisation and Disk storage.

**Unit 3:** Disk Management Commands: FORMAT, CHKDSK, DISKCOPY, LABEL, VOL, DISKCOMP, COMP, RECOVER; Redirecting command input and output pipes, study of a line editor and screen editor; Using COPY CON to build a file; Introduction to simple batch files; configuring the system:CONFIG.SYS and AUTOEXEC.BAT files; Setting the Environment; SET Command; System Configuration: FILES, BUFFERS, COUNTRY, DEVICE, SHELL, LASTDRIVE; Batch files commands: ECHO, PAUSE, REM; Batch files with command line arguments; Single and multiple command line parameters; Loop structures in Batch files: IF ERRORLEVEL condition = = condition EXISTS and NOT conditions. GOTO, CALL; Nested Batch Files; preparing Batch files; preparing Batch File Menu Shell; DOS Utility commands: MEMMAKER, MSAV, DBLSPACE, MOVE, DEFrag, DELTREE, MSBACKUP, SCANDISK, SETVER, UNDELETE, UNFORMAT, XCOPY.

Using Windows: Windows Basics; Start Windows; Using different windows simultaneously; Moving through windows and mouse; Maximize/Minimize windows; Use of help feature; Exit windows; Starting an application; File Management through windows: Copy, Move, Delete files/Directories, Creating Directories. Renaming files and directories; Disk operation Using File Manager, Using Essential Accessories: Starting and using Notepad, Type and Edit text in a document in Notepad/Wordpad, Insert pictures in a document in Notepad /Wordpad, Format text in Notepad/Wordpad document, Save and Print a document file in Notepad/Wordpad, Starting and Using Paint, Printing a drawing.
Unit 4: System Maintenance: Introduction to Various Physical components of a Computer, Physical Inspection of a PC and internal cards, Diagnostics on a PC, Functional description of various modules and cards. Various types of display and other peripherals used in a PC. Installing a software, Detection of viruses and protection on a PC.

Text/Reference Books:

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
HUM- 501 B: ENGLISH – I
Bachelor of Computer Application (B.C.A.) Semester –I

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**OBJECTIVE**
To improve students’ knowledge of English language and its usage

**COURSE CONTENT**

**UNIT I**

**Grammar**

Noun phrases; Adjectives: demonstrative, possessive, comparative & superlative; Gerunds and infinitives; Subject-verb agreement

**UNIT II**

**Vocabulary**

Vocabulary of academic world, technology, life stages, sports, emotions, greetings, apologies

**UNIT III**

**Comprehension**

Reading about a wide variety of subjects from history of computers to IT age; understanding important notices and documents in English, such as instructions, rules and regulations, advertisements, invitations; reading articles in English about technical festivals and fairs

**UNIT IV**

**Composition**

Personal text messages and e-mails in English to and from friends and family; How to plan and compose interesting, descriptive writing in English with stress on organisation, content and structure; writing short description of informational and instructional texts in English

**RECOMMENDED READING**


**SCHEME OF END SEMESTER EXAMINATION (MAJOR TEST) AND INSTRUCTIONS FOR THE EXAMINER**

**Theory**

1. The duration of the exam will be 3 hours.
2. The Question Paper for this theory course shall have four questions in all.
3. The student is required to attempt all the four questions.
4. Question no. 1 will be of 20 marks. It will be in the form of ‘Do as directed: trace the error, choose the correct alternative, supply the correct alternative/s, putting scrambled sentence/s into order or vice-versa’, MCQ etc. covering the Unit I of the syllabus. The emphasis would be on testing the basic conceptual understanding of students regarding Standard English grammar.
5. Question no. 2 covering the Unit II, will be of 20 marks. The question/parts of questions is/are to be designed to evaluate the vocabulary base of student. It may be in the form of ‘Do as directed: trace the root, give usage of the word/phrase given, explain meaning of word/s given through sentence construction, elaborate meaning of selective words/phrases from a passage given’ etc.
6. Question no 3 based on Unit III will test comprehension competence of the text given. It could be through short answer questions or a long answer question to assess the students’ reading comprehension, culling of information, ability to infer and interpret. This question will be of 15 marks.
7. Question no 4 from Unit IV will be of 20 marks. The question may have two parts with internal choice asking student to create a small informational/instructive text on a gadget, process etc or to describe a product/ person/ place or to e-mail a message.
BCA-107 B: Information Technology Fundamentals
Bachelor of Computer Application (B.C.A.) Semester –I

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UNIT-1: What are computers? The evolution of computers, Classification of computers, The control unit, computer organization & Block diagram representation, Decimal number system, binary number system, conversion of a binary number to decimal number, conversion of a decimal number to a binary number, addition of binary number, binary subtraction, hexadecimal number system, octal number system

UNIT-2: Storage devices, Input-Output devices, Low level and high level languages, assemblers, compilers, interpreters, linkers, algorithms, flow charting, decision tables, pseudo code, software, application software packages

UNIT-3: Operating system concepts, Different types of operating systems, structure of operating system, DOS/UNIX/LINUX commands, Data Processing, File systems and Database Management Systems, different types of Database Management System.

UNIT-4: 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), Communication protocols, Inter networking tools, Distributed Computing Systems.

Text/Reference Books:


NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-125 B: Software Lab I (Based on Paper BCA-105, Personal Computing Software and Hardware)
Bachelor of Computer Application (B.C.A.) Semester –I

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Students are required to attempt at least 10 exercises based on the syllabi of subject “Personal Computing Software and Hardware”.

HUM-503 B: ENGLISH PRACTICE LAB – I
Bachelor of Computer Application (B.C.A.) Semester –I

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OBJECTIVE
To enable students speak English comfortably in a wide variety of day-to-day situations.

COURSE CONTENT
Practice of short simple exchanges like introduction, greetings, requests, apologies; telephone talks and situational dialogues; Vocabulary improvement; Describing people, place, events and things; Composing an e-mail Message; Practice of reading with a purpose, locating main points, making inferences

NOTE: Conversation in English will be mandatory for all the students.

Students are put to practice English language through simulations and practice sessions with the help of language lab software, CDs and BBC’s online language learning modules. This drilling method would certainly give them a feel of real life situations and make them confident and comfortable with the basic use of English language.

RECOMMENDED READING

SCHEME OF END SEMESTER EXAMINATION (Practical)
An external Practical exam of 30 marks of 2 hour duration for the course will be conducted by an external examiner appointed by the university's Controller of Exams.

NOTE: Students will be tested for their oral and written communication competence making them participate in talks, formal exchanges, narrating people, places etc. They may be asked to infer, interpret selected extracts from audio-books/tracks. Students may also be evaluated through a viva conducted by an external examiner.
BCA-102 B: Digital Circuits and Logic Design
Bachelor of Computer Application (B.C.A.) Semester –II

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Class Work :25 Marks
Examination :75 Marks
Total :100 Marks
Duration of Exam : 3 Hrs.

UNIT - I
Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode.

UNIT - II
Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn diagram, Karnaugh Maps.

UNIT - III

UNIT - IV

Text/Reference Books:


NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-104 B: Programming in C  
Bachelor of Computer Application (B.C.A.) Semester –II

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UNIT-1: Problem analysis, need for programmed languages, introduction to algorithms, algorithmic representations, flow charts and decision tables, structured programming and modular programming.

**Elements of C:** C character set, identifiers and keywords, Data types: declaration and definition, Type conversion, Types of error, Preprocessor directives, ‘C’ macro and macro vs function.

**Data input/output.** Input/output: Unformatted & formatted I/O function in C, Input functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz. printf(), putch(), putchar(), puts().

UNIT-2: **Operators:** Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators and their hierarchy & associativity.

**Control statements:** Sequencing, Selection: if and switch statement; alternation, Repetition: for, while, and do-while loop; break, continue, goto.

**Functions:** Definition, prototypes, passing parameters, recursion, Standard library/user-defined functions.

UNIT-3: **Arrays and String:** defining and processing an array, one dimensional arrays, multidimensional arrays, passing arrays to functions, Handling of character strings

**Pointers:** Declaration, operations on pointers, array of pointers, pointers to arrays.

**Structure and Unions:** Defining and processing a structure, user defined data types, structure and Pointers, nested structure, self-referential structures, unions.

UNIT-4: **Program structure:** Storage classes, automatic, external, and static variables.

**Data files:** Opening, closing, creating, and processing and unformatted data field. File management in C.

**C-programming applications:** Sorting (Bubble sort, Selection sort), Searching (Binary search, Linear Search)

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**Text/Reference Books:**


**NOTE:** Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-106 B: Mathematics - II
Bachelor of Computer Application (B.C.A.) Semester –II

L T P Credits
3 1 - 4

Class Work : 25 Marks
Examination : 75 Marks
Total : 100 Marks
Duration of Exam : 3 Hrs.

Unit I


Relation and Functions: Ordered pairs, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, co-domain and range of a function. Real valued function of the real variable, domain and range of these functions.

Unit II

Determinants: Basic definition, Properties of determinants, Cramer Rule.

Matrices: Definition, addition, subtraction and multiplication of matrices. Computation of inverse (by matrix method).

Unit III

Differentiation: Elementary results on limits and continuity (without proof). Derivative of functions, product rule of differentiation, differentiation of implicit functions and parametric forms.

Integration: Integration of simple functions, integration by parts, integration by partial fraction, definite integration (simple problems only without properties).

Unit IV

Complex Numbers: Definition, Representation of Complex Numbers, Argand plane, Sum, subtraction, product and division of complex numbers, Magnitude, argument and square root of complex numbers.

Statistics: Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.

Text/Reference Books:

1. 11th & 12th NCERT Mathematics books.
2. Elementary Engineering Mathematics- B S Grewal

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-108 B: Desktop Publishing
Bachelor of Computer Application (B.C.A.) Semester –II

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Unit 1:
Introduction to the Print Medium

History of print and printing processes, Types of Printing, Letterpress printing, lithography, offset printing, different printing process

Unit 2:
Elements and Principles of Design and Visual Communication

Elements: line, shape, value, texture, color, Principles: harmony, variety, balance, movement, proportion Emergence of graphic design as visual communication

Unit 3:
Photoshop


Unit 4:
Corel Draw

An overview, menus and tools, Concepts of vector graphics, Color palate, Pasteboard, &. Print Page, Using ruler. Corel Tools (Pick, Shape, Knife, Eraser, Zoom, Freehand, Natural Pen, Dimensions, Ellipse, Polygon etc.). Transformations, Weld, Intersection of Objects, Snapping, Giving effects

Text/Reference Books:

2. Sams Teach Yourself HTML and CSS in 24 Hours Julie C. Meloni & Michael Morrison, Eighth Edition
4. HTML, XHTML and CSS All-In-One For Dummies Andy Harris, Second Edition
7. Dreamweaver CS5 For Dummies Janine C. Warner, Paperback Edition
8. Adobe Dreamweaver CS5 Bible Joseph Lowery, Paperback Edition
9. The Essential Guide to Dreamweaver CS4 David Powers

Websites:
1. www.w3schools.com
2. www.html.net
3. www.thesitewizard.com
4. www.learndreamweavertutorials.com

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
OBJECTIVE
To provide students with the opportunity to master the language skills necessary for different situations

COURSE CONTENT

UNIT I 20 Marks

SENTENCE
Clauses: conditional, relative, adverbial; Voice

UNIT II 20 Marks

WORD
Vocabulary of character description, behaviour, body language, hobbies, friends/enemies, computers.

UNIT III 20 Marks

SPEECH
Standard pronunciation; Familiarity with different accents: British, American and Indian; Accepting and declining invitations; Making short formal public speeches/talk shows; Making telephonic conversation

UNIT IV 15 Marks

SOUND
Implications of effective listening; Note-taking; review of TV/Radio talk shows; understand and appreciate the lyrics of a song/ dialogues in a movie in English.

RECOMMENDED READING


**SCHEME OF END SEMESTER EXAMINATION (MAJOR TEST) AND INSTRUCTIONS FOR THE EXAMINER**

**Theory**

1. The duration of the exam will be 3 hours.
2. The Question Paper for this theory course shall have four questions in all.
3. The student is required to attempt all the four questions.

4. Question no. 1 will be of 20 marks. It will be in the form of ‘Do as directed: trace the error, choose the correct alternative, supply the correct alternative/s, putting scrambled sentence/s into order or vice-versa’, MCQ etc. covering the Unit I of the syllabus. The emphasis would be on testing the basic conceptual understanding of students regarding Standard English grammar.

5. Question no. 2 covering the Unit II, will be of 20 marks. The question/parts of questions is/are to be designed to evaluate the vocabulary base of student. It may be in the form of ‘Do as directed: trace the root, give usage of the word/phrase given, explain meaning of word/s given through sentence construction, elaborate meaning of selective words/phrases from a passage given’ etc.

6. Question No 3 based on Unit III of 20 marks may have parts. It will test know how of spoken English such as difference in accents, pronunciation, do’s and don’ts of formal speech, structuring a talk etc. It could be through short answer questions to assess the students’ comprehension and ability to speak English. This question will be Question no 4 will be of 15 marks covering various components of the Unit IV. The question may have two/three parts with internal choice asking students to interpret the lyrics of a poem/song listened in recent past or to review a talk show/ lecture or theoretical aspect of listening.
BCA-124 B: Software Lab II (Based on Paper BCA-104)
Bachelor of Computer Application (B.C.A.) Semester –II

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1. Write a program to find the largest of three numbers. (if-then-else)
2. Write a program to find the largest number out of ten numbers (for-statement)
3. Write a program to find the average mail height & average female heights in the class (input is in form of sex code, height).
4. Write a program to find roots of quadratic equation using functions and switch statements.
5. Write a program using arrays to find the largest and second largest no. out of given 50 nos.
6. Write a program to multiply two matrices.
7. Write a program to read a string and write it in reverse order.
8. Write a program to concatenate two strings.
9. Write a program to sort numbers using the Quicksort Algorithm.
10. Write a program to check that the input string is a palindrome or not.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

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Students are required to attempt at least 10 exercises based on the syllabi of subject “Desktop Publishing”.

BCA-128 B: Software Lab III (Based on Paper BCA-108)
Bachelor of Computer Application (B.C.A.) Semester –II

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Students are required to attempt at least 10 exercises based on the syllabi of subject “Desktop Publishing”.

21
HUM- 505 B: ENGLISH PRACTICE LAB – II  
Bachelor of Computer Application (B.C.A.) Semester –II

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OBJECTIVE
To activate and extend students’ linguistic competence for speaking skills

COURSE CONTENT
Practice of self-introduction in standard pronunciation; politely accepting and declining invitations in English; making recommendations in English; Practice of informal discussion, mini formal talk, speeches; Practice of listening to speeches, English songs etc.

NOTE: Conversation in English will be mandatory for all the students.

Students are put to practice English language through simulations and practice sessions with the help of language lab software, CDs and BBC’s online language learning modules. This drilling method would certainly give them a feel of real life situations and make them communicate accurately and fluently.

RECOMMENDED READING


SCHEME OF END SEMESTER EXAMINATION (Practical)

An external Practical exam of 30 marks of 2 hour duration for the course will be conducted by an external examiner appointed by the university's Controller of Exams.

NOTE: Students will be tested for their oral communication competence making them participate in talks, formal exchanges, and self-introduction. They may be asked to infer, interpret speeches/songs in English. Students may also be evaluated through a viva conducted by an external examiner.
BCA-201 B: Programming Languages
Bachelor of Computer Application (B.C.A.) Semester –III

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**Unit-1: Introduction:** Syntactic and semantic rules of a Programming language, Characteristics of a good programming language, Programming language translators compiler & interpreters, Elementary data types – data objects, variable & constants, data types, Specification & implementation of elementary data types, Declarations, type checking & type conversions, Assignment & initialization, Numeric data types, enumerations, Booleans & characters.

**Unit-2: Structured data objects:** Structured data objects & data types, specification & implementation of structured data types, Declaration & type checking of data structure, vector & arrays, records Character strings, variable size data structures , Union, pointer & programmer defined data objects, sets, files.

**Subprograms and Programmer Defined Data Types:** Evolution of data type concept ,abstraction, encapsulation & information hiding , Subprograms ,type definitions, abstract data types.

**Unit-3: Sequence Control:** Implicit & explicit sequence control ,sequence control within expressions, sequence control within statement, Subprogram sequence control: simple call return ,recursive subprograms, Exception & exception handlers, co routines, sequence control .

**Data Control:** Names & referencing environment, static & dynamic scope, block structure, Local data & local referencing environment, Shared data: dynamic & static scope.

**Unit-4: Storage Management:** Major run time elements requiring storage ,programmer and system controlled storage management & phases , Static storage management , Stack based storage management, Heap storage management ,variable & fixed size elements.

**Programming Languages:** Introduction to procedural, non-procedural ,structured, functional and object oriented programming language, Comparison of C & C++ programming languages.

**Text Book:**
- Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan, 2002, TMH,

**Reference Books:**
- Fundamentals of Programming languages by Ellis Horowitz, 1984, Galgotia publications (Springer Verlag),
- Programming languages concepts by C. Ghezzi, 1989, Wiley Publications.,
- Programming Languages – Principles and Paradigms Allen Tucker , Robert Noonan 2002, T.M.H.

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.
UNIT – I The Multidisciplinary nature of environmental studies, Definition, scope and importance. Need for Public awareness

UNIT – II Natural Resources:
Renewable and non-renewable resources: Natural resources and associated problems.
a) Forest resources: Use and over-exploitation: deforestation, case studies, Timber exploitation, mining, dams and their effects and forests tribal people.
b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
d) Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources; case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
• Role of an individual in conservation of natural resources.
• Equitable use of resources for sustainable lifestyles.

UNIT-III Ecosystems:
• Concept of an ecosystem.
• Structure and function of an ecosystem.
• Producers, consumers and decomposers.
• Energy flow in the ecosystem.
• Ecological succession.
• Food chains, food webs and ecological pyramids.
• Introduction, types, characteristic features, structure and function of the following ecosystem:
a) Forest ecosystem.
b) Grassland ecosystem.
c) Desert ecosystem.
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT-IV Biodiversity and its conservations:
• Introduction – Definition: Genetic, species and ecosystem diversity.
• Biogeographically classification of India.
• Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
• Biodiversity at global, National and local levels.
• India as a mega-diversity nation.
• Hot-spots of biodiversity.
• Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
• Endangered and endemic species of India.

UNIT – V Environmental Pollution:
Definition, causes, effects and control, measures of:
da) Air pollution
db) Water pollution
c) Soil pollution
d) Marine pollution
e) Noise pollution
f) Thermal Pollution
g) Nuclear hazards

• Solid waste management: Causes effects and control measures of urban and industrial wastes.
• Role of an individual in prevention of pollution.
• Pollution case studies.
• Disaster management: Floods, earthquake, cyclone and landslides.

UNIT – VI Social issues and the Environment:

a) From unsustainable to sustainable development
b) Urban problems related to energy
c) Water conservation, rain water harvesting, watershed management
d) Resettlement and rehabilitation of people; its problems and concerns, case studies
e) Environmental ethics: Issues and possible solutions
f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust,
   Case studies
g) Wasteland reclamation
h) Consumerism and waste products
i) Environment Protection Act
j) Air (Prevention and Control of Pollution) Act
k) Water (Prevention and Control of Pollution) Act
l) Wildlife Protection Act
m) Forest Conservation Act
n) Issues involved in enforcement of environmental legislation
o) Public awareness

UNIT – VII Human population and the Environment,
Population growth, variation among nations,
Environment and human health.
Human Rights.
Value Education.
HIV/ AIDS.
Woman and Child Welfare.
Role of Information Technology in Environment and human health.
Case Studies.
Text/Reference Books:

7. Down to Earth, Centre for Science and Environment ®.

Note: Examiner will set eight questions taking at least one question from each unit. Students will be required to attempt five Questions. This paper is a qualifying examination.
BCA-203 B: Computer System Architecture  
Bachelor of Computer Application (B.C.A.) Semester –III

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Duration of Exam : 3 Hrs.


**Unit 2:** Basic Computer Instructions- Introduction to Instruction, Types of Instructions (Memory Reference, I/O Reference and Register Reference), Instruction Cycle, Instruction Formats (Direct and Indirect Address Instructions, Zero Address, One Address, Two Address and Three Address Instructions) Interrupt: Introduction to Interrupt and Interrupt Cycle. Design of Control Unit: Introduction to Control Unit, Types of Control Unit (Hardwired & Micro programmed Control Unit). Addressing Modes-Introduction & different types of Addressing Modes.

**Unit 3:** I/O Organization: I/O Interface Unit, types of ports (I/O port, Network Port, USB port, Serial and Parallel Port), Concept of I/O bus, Isolated I/O versus Memory Mapped I/O. I/O Data Transfer Techniques: Programmed I/O, Interrupt Initiated I/O, DMA Controller and IOP. Synchronous and Asynchronous Data Transfer: Concept of strobe and handshaking, source and destination initiated data transfer.


**Text/Reference Books:**


**NOTE:** Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-205 B: Fundamentals of Database Management Systems  
Bachelor of Computer Application (B.C.A.) Semester –III

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**Unit-1: Basic Concepts:** Data, Information, Records and files. Traditional file –based Systems-File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics ofDatabase Approach, advantages and disadvantages of database system, components of database system, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, DBMS users, Advantages and Disadvantages of DBMS, DBMS languages. Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users.


**Data Models:** Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling.

**Unit-3: Entity-Relationship Model:** Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams, abstraction and integration. Basic Concepts of Hierarchical and Network Data Model, Relational Data Model:-Brief History, Relational Model Terminology-Relational Data Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations.

**Unit-4: Database protection:** Recovery, concurrency, security, integrity and control.

**Distribute database:** Structure of distributed database, design of distributed databases.

**Text/Reference Books:**


**NOTE:** Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
UNIT-1: Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff.


UNIT-4: Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks. Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs.

TEXT BOOKS:


NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
UNIT – I

System Concept: Definition, Characteristics, Elements of system, Physical and abstract system, open and closed system, man-made information systems.

System Development Life Cycle: Various phases of system development, Considerations for system planning and control for system success. Role of system analyst.

UNIT – II

System Planning: Bases for planning in system analysis: Dimensions of Planning. Investigation: Determining user’s requirements and analysis, fact-finding process and techniques.

Tools of structured Analysis: Data Flow diagram, data dictionary, IPO and HIPO charts, Gantt charts, pseudo codes, Flow charts, decision tree, decision tables.

Feasibility study: Technical, Operational & Economic Feasibilities.

UNIT – III

Cost/Benefit Analysis: Data analysis cost and benefit analysis of a system. Input/Output and Form Design, File Organization and database design: Introduction to files and database, File structures and organization, objectives of database design, logical and physical view of data.

UNIT – IV

System testing: Introduction, objectives of testing, test planning, testing techniques. Quality assurance: Goal of quality assurance, levels of quality assurance

System implementation and software maintenance: primary activities in maintenance, reducing maintenance costs.

TEXT BOOKS:


REFERENCE BOOKS:


NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-225 B: Software Lab IV (Based on Paper BCA-205)
Bachelor of Computer Application (B.C.A.) Semester –III

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Students are required to attempt at least 10 exercises based on the syllabi of subject “BCA-205” e.g. Create a database and write the programs to carry out the following operation:

- Add a record in the database
- Delete a record in the database
- Modify the record in the database
- List all the records of database in ascending order.

BCA-227 B: Software Lab V (Based on Paper BCA-207)
Bachelor of Computer Application (B.C.A.) Semester –III

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Students are required to attempt at least 10 exercises based on the syllabi of subject “BCA-207”. List of few programs is as follows:

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using functions only
   a) Addition b) Subtraction c) Multiplication d) Transpose
4. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
5. Write a program for swapping of two numbers using ‘call by value’ and ‘call by reference strategies.
6. Write a program to implement binary search tree

UNIT – 2: **Process management**: Process concepts, Process states and Process Control Block. CPU Scheduling: Scheduling criteria, Levels of Scheduling, Scheduling algorithms, Multiple processor scheduling.

**Deadlocks**: Deadlock characterization, Methods for handling deadlocks.


**Storage Management**: memory management of single-user and multiuser operating system, partitioning, swapping, paging and segmentation, virtual memory, Page replacement Algorithms


**Device Management**: Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK.

**Text/Reference Books:**

2. William Stallings, "Operating Systems, "Internals and Design Principles".

**NOTE**: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-204 B: Relational Database Management System
Bachelor of Computer Application (B.C.A.) Semester –IV

L    T   P Credits  Class Work :25 Marks
3    1   - 4 Examination :75 Marks
Total :100 Marks
Duration of Exam : 3 Hrs.

UNIT – I

UNIT – II

UNIT – III
SQL: Data Definition and data types, Specifying Constraints in SQL, Schema, Change statement, Basic Queries in SQL, Insert, Delete and Update Statements, Views.

UNIT – IV
PL/SQL-Introduction, Advantages of PL/SQL, The Generic PL/SQL Block: PL/SQL Execution Environment, PL/SQL Character set and Data Types, Control Structure in PL/SQL, Cursors, Triggers

TEXT BOOKS:

REFERENCE BOOKS:

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-206 B: Introduction to Internet & Web Designing
Bachelor of Computer Application (B.C.A.) Semester –IV

L T P Credits
3 1 - 4

Class Work :25 Marks
Examination :75 Marks
Total :100 Marks
Duration of Exam : 3 Hrs.


Text/Reference Books:

1. World Wide Web Design with HTML, Xavier, TMH
2. The complete reference – HTML, TMH

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-208 B: Basic Accounting  
Bachelor of Computer Application (B.C.A.) Semester –IV 

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Unit I 

Unit II 

Unit III 

Unit IV 

Text/Reference Books:

1. Managerial Accounting, JawaharLal, First Edition
2. Financial Accounting, Dr. R.K. Mittal & M.R. Bansal
3. Basic Accounting, RajniSofat&PreetiHiro, Second Edition
5. Financial Accounting (Part I and Part II), R.L Gupta & V.K Gupta
6. Fundamental Accountancy, S.N. Maheshwari

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-210 B: Object Oriented Programming  
Bachelor of Computer Application (B.C.A.) Semester –IV

L   T   P   Credits  
3   1   -   4

Class Work :25 Marks  
Examination :75 Marks  
Total :100 Marks  
Duration of Exam : 3 Hrs.

Unit-1
Object Oriented Programming Concepts :Procedural Language and Object Oriented approach, Characteristics of OOP, polymorphism and encapsulation, user defined types.

Getting started with C++: syntax, data types, variables, strings, function, operators, recursion, array and pointer, structure.

Unit-2
Abstracting Mechanism: classes, private and public, Constructor and Destructor, memberfunction, static members.

Memory Management: new, delete, copy constructor, assignment operator

Unit-3
Inheritance and Polymorphism: Derived Class and Base Class, Different types ofInheritance, Overriding member function, Abstract Class, Public and Private Inheritance, Ambiguity in Multiple inheritance , Virtual function, Friend function, Static function, Operator Overloading, function overloading

Unit-4
Exception Handling: Exception and derived class, function exception declaration,unexpected exception, exception when handling exception.Template and Standard Template Library: Template classes, declaration, templateFunctions.

File Handling: Text versus Binary Files, Opening and Closing Files, File Pointers.

TEXT BOOKS:
3. Balagurustwamy: Object Oriented Programming and C++, TMH.
4. Johnston: C++ Programming Today, PHI.

NOTE:Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-224 B: Software Lab VI (Based on Paper BCA-204)
Bachelor of Computer Application (B.C.A.) Semester –IV

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Students are required to attempt at least 10 exercises based on the syllabi of subject BCA-204. The exercises should be relating with the experiments on Oracle/MySQL.

BCA-226 B: Software Lab VII (Based on Paper BCA-206)
Bachelor of Computer Application (B.C.A.) Semester –IV

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Students are required to attempt at least 10 exercises based on the syllabi of subject BCA-206. The exercises should be relating with the experiments on HTML/DHTML.

BCA-230 B: Software Lab VII (Based on Paper BCA-210)
Bachelor of Computer Application (B.C.A.) Semester –IV

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Students are required to attempt at least 10 exercises based on the syllabi of subject BCA-210. The exercises should be relating with the experiments on C++.
BCA-301 B: Principles of Software Engineering
Bachelor of Computer Application (B.C.A.) Semester –V

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UNIT – I
Software Crisis – problem and causes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models.
Software Project Planning: Cost estimation: COCOMO model, Putnam Resource Allocation Model, Risk management, project scheduling, personnel planning, team structure, Software configuration management, quality assurance, project monitoring.

UNIT – II
Software Design: Design fundamentals, problem partitioning and abstraction, design methodology, Cohesion & Coupling, Classification of Cohesiveness & Coupling.

UNIT – III
Coding: Programming style, structured programming.
Software Testing: Testing fundamentals, Functional testing: Boundary Value Analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Control flow based and data flow based testing, loop testing;

UNIT – IV
Software testing strategies: unit testing, integration testing, Validation testing, System testing, Alpha and Beta testing.
Software Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.

TEXT BOOKS:

REFERENCE BOOKS:

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-303 B: Computer Graphics
Bachelor of Computer Application (B.C.A.) Semester – V

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**Unit-1**


**Display devices:** Pixel, Resolution, Aspect Ratio, CRT, Refresh Rate and Interlacing; Frame Buffer, Video Controller, Raster-Scan Systems, Raster-Scan Display, Lookup Table, Color CRT monitors; Random-Scan Displays; Flat Panel Display: LCD, Plasma Panel; Graphics Monitors and workstations; Graphics Input Devices and Hard-Copy Devices

**Unit-2**

**Output Primitives:** Line Drawing Algorithms- DDA Algorithm, Bresenham’s Algorithm; Circle-Generating Algorithms, Bresenham’s Circle Drawing Algorithm; Ellipse-Generating Algorithms;

**Unit-3**

**2-D Geometric Transforms:** Translation, scaling, rotation, reflection and shear transformations, composite transformations.

**2-D Viewing:** The viewing pipeline, window to viewport coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

**Unit-4**

**3-D Geometric Transformations:** Translation, rotation, scaling, reflection and shear transformations, composite transformations.

**3-D Object Representation:** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Quadtree and octree data structure, rendering and animation.

**TEXT BOOKS:**


**NOTE:** Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-305 B: Data Communication & Networks
Bachelor of Computer Application (B.C.A.) Semester – V

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UNIT-1: Network Concepts: Goals and applications of Data Communication; Network Topologies; types of networks (LAN, MAN, WAN)

Data Communication Concepts: Components of a data communication system; transmission modes; transmission media - guided and wireless media; Transmission modes, multiplexing (frequency division and time division), Switching; Circuit switching, message switching, packet switching


Connection Oriented Networks: X.25, Frame Relay, ATM

Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways.

UNIT-3:Framing and Error Control: Framing techniques; Error control- error detection & correction: Hamming Method, CRC and checksum etc.

Data Link Control: Acknowledgments; Medium Access Control and LANs: Multiple Access protocols of MAC sub layer - ALOHA, 1-persistent, p-persistent and non-persistent CSMA, CSMA/CD, Collision free protocols, Limited contention protocols; IEEE Standard 802 for LANs.

UNIT-4: Routing: Deterministic and Adaptive routing; Centralized and distributed routing; shortest-path; Flooding; flow based; optimal; distance vector, link-state, hierarchical; routing for mobile hosts; broadcast and multicast routing.

Congestion control: Principles of congestion control; Traffic shaping; choke packets; load shedding; RSVP.

TEXT BOOKS:
1. Behrouz, Forouzan, Data communications and Networking, Tata Mc-Graw Hill.
3. Tannenbaum, Computer Networks, PHI.

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
Unit-1: The VB Integrated Development Environment: Menu Bar, Context Menus, Tool Bar, Project Explorer, Tool Box, Properties Window; Form Designer, Immediate window; Object Browser; Code Editor Window; Form Layout Window; Locals, and Watch Windows, Customizing the Environment.

The VB language and its elements: Variables, Constants, Arrays, Collections, Subroutines, Functions, Arguments, and Control Structures

Unit-2: Concepts of Object based Event Oriented Languages: Method, Statement, Properties and Event; Developing VB Project/ Application; Design the User Interface; User Input Event Handling; Comparison of Visuals and Non-Visuals Architectures.

Unit-3: Visual Basic Building Blocks And Default Controls: Forms, Using Controls, Exploring Properties, Methods and Events, Introduction to Intrinsic Controls, Working With Text, Working With Choices, Special Purpose Controls.

VB Advance Controls: Events, Menu bar, Popup Menus, Tool bar, Message Box, Built-in Dialog Boxes, Creating MDI, Working with Menus.

Unit-4: Visual Basic and Database Programming: Database Models Visual data manager, Data Control - methods, properties, connectivity with database, Data-Bound controls; Working With Remote Data Object (RDO), ActiveX Data Object (ADO) data control,

TEXT BOOKS:

2. Programming in Visual Basic - 6 by J C Bradley, A.C. Millspaugh, TMH
3. VB-6 The Complete Reference by Jerke, TMH

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-309 B: Web Technologies
Bachelor of Computer Application (B.C.A.) Semester –V

L  T  P  Credits  Class Work :25 Marks
3  1  -  4  Examination  :75 Marks

Total :100 Marks  Duration of Exam  : 3 Hrs.


Unit-2: Visual Studio.NET and its Major Components: Understanding Common Language Runtime(CLR), Common Type System(CTS) and Common Language Specification(CLS), Role of MSIL and Meta data, Managed Code & Unmanaged Code, Interoperability

Unit-3: C# Programming: Introduction to C#, Creating a C# program, Types in C#, Classes, Inheritance and Polymorphism, Methods, Statements and Control, Arrays and Strings, Interface, Abstract and Base Classes, Statements and Controls, Exception and Error Handling in C#.

Unit-4: ADO .NET: Comparison of ADO and ADO.NET, Architecture of ADO.Net,.Net Data provider, Data Adapter, Data Set, Data Row, Data Column, Data Relation, command, Data Reader, Introduction to Data Access with ADO .NET, Components of ADO.NET.

TEXT BOOKS:

1. C#- Ebalaguruswamy,TMH.
2. ASP.NET -Black Book-dreamtech Press
3. Asp.NET-Unleashed-Pearson

NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-327 B: Software Lab IX (Based on Paper BCA-307 & BCA-309)
Bachelor of Computer Application (B.C.A.) Semester – V

<table>
<thead>
<tr>
<th>L</th>
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<th>Credits</th>
<th>Class Work</th>
<th>20 Marks</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
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<td>Examination</td>
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<td>Duration of Exam</td>
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Students are required to attempt at least 10 exercises based on the syllabi of subject BCA-307 & BCA-309. The exercises should be relating with the experiments based on VB, ASP.Net.
BCA-302 B: E-Business
Bachelor of Computer Application (B.C.A.) Semester –VI

L  T  P  Credits  Class Work :25 Marks
3  1  -  4  Examination :75 Marks
  Total :100 Marks
  Duration of Exam : 3 Hrs.

Unit 1: E – Commerce

Unit 2: EDI
EDI vs Traditional Systems, EDI enabled procurement process, components of EDI system, EDIImplementation issues

Unit 3: Re – Engineering for Change
Business process re – engineering BPR, Methodology, Planning Methods for change to EC / EDI

Unit 4: Electronic Payment System
Electronic Payment Technology, Online Shopping, Limitations of Traditional Payment Instruments, Electronic or Digital Cash, Electronic Cheques, E-Vallet , Debit Card, Credit Card, Secure Electronic Transactions and Firewalls, Firewall security policies, emerging status of E – Commerce in India

Text/Reference Books:


NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-304 B: Java Programming
Bachelor of Computer Application (B.C.A.) Semester –VI

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</table>

Class Work :25 Marks
Examination :75 Marks
Total :100 Marks
Duration of Exam : 3 Hrs.


Object Oriented Concepts: Class and Objects—Class Fundamentals, Creating objects, Assigning object reference variables; Introducing Methods, Static methods, Constructors, Overloading constructors; This Keyword; Using Objects as Parameters, Argument passing, Returning objects, Method overloading.

Packages: Defining Package, CLASSPATH, Package naming, Accessibility of Packages, Using Package Members.

UNIT-3: Interfaces: Implementing Interfaces, Interface and Abstract Classes, Extends and Implements together.
Exceptions Handling: Exception, Handling of Exception, Using try-catch, Catching Multiple Exceptions, Using finally clause, Types of Exceptions, Throwing Exceptions

UNIT-4: Multithreading Programming: The Java Thread Model, Understanding Threads, the Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities.

Text/Reference Books:


NOTE: Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
BCA-306 B: System Administration
Bachelor of Computer Application (B.C.A.) Semester –VI

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**Unit 1:**
Introduction to Operating Systems, its needs and services, Simple batch Systems, Multiprogrammed batched systems, Time sharing systems, Parallel systems, Distributed systems and Real-time systems.

**Unit 2:**

**Unit 3:**
Administering UNIX Systems: Introduction to System Administration, Functional activities of System Administration - Starting up the system, Maintaining the Super User Login, Shutting down the system, recovering from system crash, Taking backups, Managing disk space, Mounting and Un-mounting file system, Adding and removing users, Changing groups and password, Maintaining security, Monitoring system activity, Accounting of system usage and billing, Setting up remote communication, Installing printers and peripheral devices.

**Unit 4:**
Shell Programming: Executing a shell program, Study of shell programming as a Language; Wild card characters, Type of statements and Reserved Words, Special Shell parameters. UNIX and Networking: Setting up of DNS, Mail, WWW servers under UNIX

**Text/Reference Books:**


**NOTE:**Eight questions will be set by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all taking at least one question from each unit.
Students will be required to complete an independent software project using their programming skills.

The primary objective of this course is to develop in students the professional quality of synthesis employing technical knowledge obtained in the field of Technology through a project work involving design, analysis augmented with creativity, innovation and ingenuity.

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher)
BCA-324 B: Software Lab X (Based on Paper BCA-304)
Bachelor of Computer Application (B.C.A.) Semester –VI

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<td>:3 Hrs.</td>
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Students are required to attempt at least 10 exercises based on the syllabi of subject BCA-304. The exercises should be relating with the experiments based on Java Programming.

BCA-326 B: Software Lab XI (Based on Paper BCA-306)
Bachelor of Computer Application (B.C.A.) Semester –VI

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<td>:20 Marks</td>
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<td>:50 Marks</td>
<td>:3 Hrs.</td>
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</table>

Students are required to attempt at least 10 exercises based on the syllabi of subject BCA-306. The exercises should be relating with the experiments based on System Administration specifically using Linux.