# CURRICULUM

(Scheme & Syllabi for First and Second semesters)

# FOR

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# UNDERGRADUATE DEGREE COURSE

# IN

# BACHELOR OF COMPUTER APPLICATIONS
# (B.C.A.)

# (3-years Under Graduate Programme)
# (w.e.f. Session 2020-21)

**Faculty of Computer Science & Information Technology**
**Deenbandhu Chhotu Ram University of Science & Technology,**
**Murthal (Sonepat)-131039, Haryana, India**
**2020**

*BCA 1st semester to 2nd semester : Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2020-21 & onwards.*

**Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)**

**SCHEME OF STUDIES & EXAMINATIONS**

**Bachelor of Computer Applications (BCA) 1st Year 1st Semester**

**Credit Based Scheme w.e.f. 2020-21**

| Sr. No. | Course No. | Course Title | Teaching Schedule | | | Marks of Class Work | Examination Marks | | Total | Credit | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Theory | Practical | | | |
| 1. | BCA101C | Introduction to Computer & IT | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 2. | BCA103C | Programming in 'C' | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 3. | MATHS111C | Mathematics-I | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 4. | HUM101BC | Communication Skill-I | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 5. | BCA121C | Software Lab-I (Based on BCA101C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| 6. | BCA123C | Software Lab-II (Based on BCA103C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| 7. | HUM121BC | Soft Skill Seminar I (Based on HUM101BC) | - | - | 2 | 25 | - | 75 | 100 | 1 | 3 |
| **TOTAL** | | | **12** | **0** | **10** | **175** | **300** | **225** | **700** | **17** | |

**Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)**
**SCHEME OF STUDIES & EXAMINATIONS**

**Bachelor of Computer Applications (BCA) 1st Year 2nd Semester**
**Credit Based Scheme w.e.f. 2020-21**

| Sr. No. | Course No. | Course Title | Teaching Schedule | | | Marks of | Examination Marks | | Total | Credit | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | Class Work | Theory | Practical | | | |
| 1. | BCA102C | Digital Design | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 2. | BCA104C | Data Structure using C | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 3. | BCA106C | Data Base Management System | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 4. | MATHS112C | Mathematics-II | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 5. | HUM202BC | Communication Skill -II | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 6. | BCA124C | Software Lab-III (Based on BCA104C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| 7. | BCA126C | Software Lab-IV (Based on BCA106C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| 8. | HUM222BC | Soft Skill Seminar-II (Based on HUM202BC) | - | - | 2 | 25 | - | 75 | 100 | 1 | 3 |
| **TOTAL** | | | **15** | **0** | **10** | **200** | **375** | **225** | **800** | **20** | |

**BCA101C – INTRODUCTION TO COMPUTER & IT**

**BCA Semester - I**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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## COURSE OBJECTIVE

This course is an introductory course in computer & information technology. Upon completion of this course the student should be able to:

1. Give students an in-depth understanding of why computer is essential in business, education, research and society.
2. The major hardware and software components of computer.
3. Demonstrate an understanding of different types of networks.
4. Usage of MS Office.

## COURSE CONTENT

### UNIT – I

Basics of Computer: 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 organization; Input, Process and Output; Memory, Units of measurement of storage; Input/Output devices; primary and Secondary storage devices.

### UNIT II

Operating system concepts, functions of an operating system, types of operating systems, structure of operating system,Generation of Languages; Translators - Interpreters, Compilers, Assemblers and their comparison.

Solving Problems using algorithms, flow charting, decision tables, pseudo code, Software, types of softwares application software packages.

### UNIT – III

Basic elements of a communication system, Data transmission modes, Data Transmission speed, Data transmission media, Digital and Analog Transmission, Network topologies, Internet: Network, Client and Servers, Host & Terminals, World Wide Web, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Internet Requirements, Web Search Engine.

### UNIT – IV

**Word Processor using Microsoft Word**

Creating work documents, formatting and managing text, formatting and managing paragraphs, Working with lists and tables, Inserting pictures, managing page layout and background, Using SmartArt, Checking spelling and grammar, Managing Header and Footer, Adding security passwords to word documents, printing word documents, Using Mail Merge.

**Presentation Software using Microsoft Powerpoint**

Understanding MS PowerPoint window and its Applications, Different views of PowerPoint window, Working with Slides and slide layout, Inserting text, picture, graphics, charts in slides, Inserting audio and video in slides, Managing slide transitions and Animation, Printing slides, handouts and notes.

**Spreadsheet using Microsoft Excel:**

Working with Work Sheets, Working with cells and cell range, Working with Excel formulae, Cell referencing, Using Conditional formatting,

Using Autofill options, Sorting and filtering of data, Working with charts and graphs, Managing page layouts and printing of excel sheets, managing worksheet header and footer, Adding security passwords to excel sheets,

**TEXT BOOKS/REFERENCE BOOKS:**


1. Rajaraman V, "Fundamental of Computers" (2nd edition), Prentice Hall of India, New Delhi. 1996.
2. Sanders, D.H. "Computers Today" McGraw Hill. 1988.
3. Trainer T., et al, "Computers" (4th edition) McGraw Hill, 1994.
4. Alex Leon and Mathews Leon, “Fundamentals of Information Technology”, Leon
5. Techworld, 2007.
6. P. K. Sinha and Priti Sinha, “Computer Fundamentals”, BPB Publications, 2007.Malvino and Leach, “Digital Principles and Application”, TMH, 1999.
7. Ramesh S. Gaonkar, "Microprocessor Architecture Programming and Application with 8085”, PHI, 2001.
8. Norton Peter, “Introduction to computers”, TMH, 4th Ed., 2006.
9. Simon Haykins, “Communication System”, John Wiley & Sons, 2006.
10. R. Gabriel Gurley,” A Conceptual Guide to OpenOffice.org3, 2nd Edition”.


**Note: Examiner will be required to set NINE questions in all. Question Number 9 will be compulsory (short-answer type questions), covering the entire syllabus and carrying 15 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus carrying 15 marks. Student will be required to attempt FIVE questions in all. Question Number 9 will be compulsory. In addition, student will have to attempt four more questions selecting one question from each Unit.**

**COURSE OUTCOMES**

By the end of the course the students will be able to:

1. Describe the components & usage of computers and why computers are essential components in business and society.
2. Understanding of basics of computer system.
3. Understanding of internet and different components of a computer networks.
4. Learning of MS- Office for office automation.

**BCA103C - PROGRAMMING IN C**
**BCA Semester - I**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## OBJECTIVE

This course aims to familiarize the students with basic concepts of computer programming and developer tools and teach students how to design, write and execute a Program in 'C'.

1. To teach the basic concepts of programming and basic of 'C'.
2. To understand conditional and iterative control statements for c programming.
3. To make students familiar with basic Computer Programming with Array and Functions.
4. To Design programs using Structures and Unions in C language

## COURSE CONTENT

### UNIT I

Programming language, Features of programming language, structured programming, modular programming Programming Process: Steps in developing of a program.
Overview of C Language: History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Operators in C, Hierarchy of Operators, Library Functions, Structure of a C program , Compilation and Execution.

### UNIT II

Managing Input and Output Operation: Formatted and Unformatted I/O Functions.
Decision Control Structure: if Statement, if–else statement, nesting of if-else statements, else–if ladder, switch statement .Loop Control Structure: While and do-while, for loop and Nested for loop, break, continue, and goto statements.

### UNIT III

Arrays: Defining and processing, Passing array to a function, Multi dimensional arrays.
Strings: Strings, operations on strings. Functions: Defining and accessing: passing arguments, Function prototypes, Recursion, Use of library functions, Storage classes: automatic, register, external and static variables.

**UNIT IV**

Structure and Unions: Defining and processing a structure, user defined data types, structure and Pointers, nested structure, unions,

Pointers: Declaration, operations on pointers.

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

**TEXT AND REFERENCE BOOKS:**


1. E. Balaguruswami, Programming in ANSI C, Tata Mcgraw Hill.
2. YashwantKanetker, Let us C, BPB Publications.
3. Gottfried, Programming with C, Tata McGraw Hill.
4. Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language, 2nd Ed., Prentice Hall ofIndia.
5. S.S. Bhatia and Vikram Gupta, Computer Fundamentals, Kalayani Publication.
6. Dennis P. Curtin, Kim Foley, KunalSen, Cathleen Morin, Information technology, TMH.
7. Hutchison, R., "Programming in C". McGraw Hill, New York, 1990.
8. Johnsonbaugh, R., and Kalin, M., "Applications Programming in C", Prentice Hall of India, 1989. Rajaraman, V, "Computer Programming in C", Prentice Hall of India, New Delhi, 1995.


**Note: Examiner will be required to set NINE questions in all. Question Number 9 will be compulsory (short-answer type questions), covering the entire syllabus and carrying 15 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus carrying 15 marks. Student will be required to attempt FIVE questions in all. Question Number 9 will be compulsory. In addition, student will have to attempt four more questions selecting one question from each Unit.**

**COURSE OUTCOME**

By the end of the course the students will be able to:

1. Illustrate the basic knowledge of C like identifiers, datatypes & operators
2. Develop conditional and iterative statements to write C programs
3. Inscribe C programs that use arrays and functions.
4. Trace the given C program manually and Write C program for simple applications of real life using Structures and unions.

## MATHS111C – MATHEMATICS-I

**BCA Semester - I**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

COURSE OBJECTIVES:

This course aims at providing the understanding of the basic concepts of mathematics and statistics. Upon completion of this course the student should be able to:

1. understand the basic concepts of sets & their applications.
2. develop an understanding of functions and relations.
3. understand matrices and operations on the matrices.
4. organize and analysis of data using basic theory of statistics.
5. understand sequence and series

**COURSE OUTCOMES:**

By the end of the course the students will be able to:

1. demonstrate an understanding of relations and functions and determine their properties and able to determine when a function is one to one, onto, many to many and so on.
2. learning of different types of sets and their applications.
3. determine patterns in sequences and series.
4. learn matrix operations.
5. describe the data in terms of mean, median and mode.

**COURSE CONTENT**

**UNIT I**

**SETS:** Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, De-Morgan's laws ,Cartesian Product, Equivalent sets, Countable and uncountable sets, Cardinality of a 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.

**UNIT II**

Chairman 13/3/2020
Deptt. of Mathematics
D.C.R. University of Sc. & Tech.
Murthal, Sonepat (Hr.)

**MATRICES:** Definition, Types of Matrices, Addition, Subtraction and Multiplication of Matrices, Adjoint, Inverse of a Matrix, solving system of linear equations using inverse of a Matrix.

**DETERMINANTS:** Definition, Minors, Cofactors, Properties of Determinants, Applications of determinant and Cramer's Rule.

**UNIT III**

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

**UNIT IV**

**Basic Statistics**: Measure of Central Tendency, Preparing frequency distribution table, **Mean**,**Median**: Methods of Calculating Median in case of Individual, Discrete series and continuous series, **Mode**: Methods of Calculating Mode in case of Individual Series, Discrete series and continuous Series, **Range:** Computation of Range, Inter Quartile Range, Computation of Inter Quartile Range, Percentile Range and Computation of Percentile Range. Mean Deviation, Standard Deviation.

TEXT/ REFERENCE BOOKS:

1. 11th& 12th NCERT Mathematics books.
2. Lipschutz, Seymour: Discrete Mathematics, Schaum's Series
3. Babu Ram: Discrete Mathematics, Vinayek Publishers, New Delhi.
4. Elementary Engineering Mathematics- B S Grewal

**Note: Examiner will be required to set NINE questions in all. Question Number 9 will be compulsory (short-answer type questions), covering the entire syllabus and carrying 15 marks. In addition to the compulsory question there will be four units, i.e., Unit-I to Unit-IV. Examiner will set two questions in each Unit. Students will be required to attempt FIVE questions in all, selecting one question from each of Unit I-IV and the compulsory question.**

Chairman (3/24/2020
Deptt. of Mathematics
D.C.R. University of Sc. & Tech.
Murthal, Sonepat (Hr.)

## HUM101BC –COMMUNICATION SKILL-I

### BCA Semester - I

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVE**

- To equip students with the essentials of communication in English.
- To train students for effective communicative skills

**COURSE OUTCOMES**

- By the end of the course the students will be able to:
- Communicate proficiently in English
- Demonstrate their critical thinking through simple and lucid writing
- Develop proficiency in reading along with sensitivity to the impact literacy texts can have on their minds/lives

**COURSE CONTENT**

**UNIT I**
**INTRODUCTION**
Communication: Definition, Characteristics of the communication, Process, Communication Models and Theories. Essentials of Good Communication, Principles of communication, Channels of Communication, Barriers of communication Verbal and Non-Verbal communication, Formal and Informal communication

**UNIT II**
**ORAL COMMUNICATION**
Principles, Importance of Oral Communication Art of listening: Nature, Principles & Importance. Barriers in listening

**UNIT III****
**LITERARY COMMUNICATION:**
1. Alice Walker: “Am I Blue”
2. Anton Chekov: “The Bet”
3. Leo Tolstoy: “Three Questions”

**NOTE:** ** From this unit, i.e. Unit III, two questions of 15 marks each based on literary texts prescribed in the unit will be set. Both the questions will have parts. A student will have to choose one question out of two. The questions may be in the form of comprehension passage, long/short answer question, explanation of lines/passage from the text with reference to the context or on the vocabulary and grammar items as prescribed in the Unit IV.

**UNIT IV**
**MECHANICS OF COMMUNICATION**
Usage: Verbs, adjectives, adverbs, pronouns, conjunctions Punctuation

**TEXT/REFERENCE BOOKS**


1. Bande Usha and Krishan Gopal, editors. The Pointed Vision. Oxford UP, 2009.
2. Bhatnagar, Nitin and Mamta Bhatnagar. Communicative English for Engineers and Professionals. Pearson Education, 2013.
3. Konar, Nira. English Language Laboratories: A Comprehensive Manual. PHI, 2011.
5. Ludlow, R., and F. Panton. The Essence of Effective Communication. PHI, 1995.
6. Rizvi, M. Ashraf. Effective Technical Communication. McGraw Hill Education, 2014


**SCHEME OF END SEMESTER THEORY EXAMINATION**

1. The duration of the exam will be 3 hours.
2. The Question Paper shall have nine questions.
3. Each question will be of 15 marks.
4. The student is required to attempt five questions in all.
5. Questions no. 1 to 8 will be set in such a manner that two questions is set from each unit of the syllabus. A student will have to attempt four questions selecting one question from each unit. The questions on Unit III may be in the form of comprehension passage, long/short answer question, explanation of lines/passage from the text with reference to the context or on the vocabulary and grammar items.
7. Question number 9 will be compulsory covering the entire syllabus and it will be in the form of short-answer type questions.

**BCA121C – SOFTWARE LAB-I**
**(Based on BCA101C)**
**BCA Semester - I**

| L | T | P | Credits |
|---|---|---|---|
| - | - | 4 | 2 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Practical Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

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**Topics to be covered:-**

Familiarizing with PC and Various options in MS WINDOWS. File creation, editing and directory creation, Learning to use MS office: MS WORD, use of database and spread sheet. Slide creation with PowerPoint.

Assignments should be given for each MS WORD, spread sheet and PowerPoint.

**BCA123C – SOFTWARE LAB-II**
**(Based on BCA103C)**
**BCA Semester - I**

| L | T | P | Credits |
|---|---|---|---|
| - | - | 4 | 2 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Practical Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

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**Topics to be covered:-**

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 n numbers (for-statement).
3. Calculate the salary of an employee given his basic pay, HRA = 10% of basic pay, TA=5% of his basic pay and deductions IT = 2.5% of his basic pay
4. Write a program to find the average mail height & average female heights in the class (input is in form of sex code, height).
5. Write a program to find roots of quadratic equation using functions and switch statements.
6. Write a program to multiply two matrices.
7. Write a program to implement bubble sort.
8. Write a program to implement selection sort.
9. Write a program to implement linear search.
10. Write a program to implement binary search.
11. Write a program to check that the input string is a palindrome or not.
12. Write a program to read a string and write it in reverse order.
13. Write a program to concatenate two strings.
14. Write a C program to swap two integers using pointers. You have to write a swap function that will accept the address of two integer and swap their values
15. Define a structure called student having the properties of student_id, student name and branch of the student with a sub structure of marks of 3 subjects. Write a Menu Driven C Program to
    a. Add new student detail.
    b. Delete a student detail.
    c. Display all student details.
    d. Display the student name with best mark.

**HUM121BC – SOFT SKILL SEMINAR I**
**BCA Semester - I**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| - | - | 2 | 1 | **Class Work** | **: 25 Marks** |
| | | | | **Practical Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE 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; Practice of informal discussion, formal talk, Role Plays, Speeches, Practice of listening to speeches, English songs etc.

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

**Students will be made 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**

1. Konar, Nira. English Language Laboratories: A Comprehensive Manual. PHI, 2011.
2. Sadannad, Kamlesh, and Susheela Punitha. Spoken English: A Foundation Course. Orient Longman, 2008

**SCHEME OF END SEMESTER EXAMINATION (Practical)**

An external Practical exam of 75 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 by 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 will also be evaluated through a viva-voce exam conducted by an external examiner.

## BCA102C – DIGITAL DESIGN
## BCA Semester - II

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVE**

A study of the subject matter presented in this course will enable the students to become familiar with:

1. To understand number representation & conversion b/w different representation.
2. To understand Boolean functions and its simplification.
3. To impart how to draw digital circuit using logic gates,.
4. Be able to analyze & design combinational circuits

**COURSE CONTENT**

**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**

Digital Logic: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates –XOR, XNOR etc. Combinational Logic – Characteristics, Design Procedures, analysis procedures.

**UNIT IV**

Combinational Circuits: Half-Adder, Full-Adder, Half- Subtractor, Full- Subtractor, Encoders, Decoders, Multiplexers, De multiplexers.

**Sequential Circuits**: Flip-flops S-R, D, J-K, T, Clocked Flip-flop, Race around condition, Master slave Flip-Flop, Realization of one flip-flop using other flip-flop.

**TEXT/REFERENCE BOOKS**


1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hallof India Pvt. Ltd.
3. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
4. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill
5. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation,
6. University Science Press (Laxmi Publications), New Delhi.


**Note: Examiner will be required to set NINE questions in all. Question Number 9 will be compulsory (short-answer type questions), covering the entire syllabus and carrying 15 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus carrying 15 marks. Student will be required to attempt FIVE questions in all. Question Number 9 will be compulsory. In addition, student will have to attempt four more questions selecting one question from each Unit.**

**COURSE OUTCOMES**

Upon successful completion of this course, the student will be able to:

1. Can convert different types of number representation used in computer.
2. Familiarization and drawing of logic circuits using AND, OR, NOT, NAND & NOR gates.
3. Understand Boolean algebra and its properties; able to simplify Boolean function.
4. Analyze and design combinational circuit and can differentiate combinational & sequential circuits.

**BCA104C – DATA STRUCTURE USING 'C'**

**BCA Semester - II**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVE**

This course is an introductory course in data structure. Upon completion of this course the student should be able to:

1. To understand step by step approach in solving problems with the help of fundamental data structures.
2. To understand basic concepts of linear data structure( array , stacks, queues. and linked list)and their applications.
3. To understand non linear data structure( Trees and graphs)and their traversal algorithms.
4. Sequential and linked representation of various data structures.

**COURSE CONTENT**

**UNIT I**

**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 II**

**Arrays:** Introduction, Linear arrays, Representation of linear array in memory, Address calculations, Traversal, Insertions, Deletion in an array, Searching(linear, Binary) , Sorting (Bubble, Selection, Insertion) , merging of arrays.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linear linked list, Overview of Header linked list, Circular linked list, Two-way linked list, Threaded lists, Garbage collection, Applications of linked lists.

**UNIT III**

**Stack:** Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.

**Queues:** Introduction, Array and linked representation of queues, Operations on queues, Applications of queues.

**UNIT IV**

**Tree:** Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks. Overview of Binary Search Tree.

**Graph:** Introduction, Graph theory terminology, Sequential and linked representation of graphs.BFS and DFS algorithms

**TEXT/REFERENCE BOOKS**


1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill.
2. An introduction to data structures and application by Jean Paul Tremblay & Pal G. Sorenson
3. R.L. Kruse, B.P. Leary, C.L. Tondo, Data structure and program design in C , PHI
4. R. B. Patel, Expert Data Structures With C, Khanna Publications, Delhi, India, 3rd Edition 2008.
5. Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
6. Data Structures and Algorithms by A. V. Aho, J. E. Hopcroft and T. D. Ullman, Original edition, Addison-Wesley,1999, Low Price Edition.
7. Fundamentals of Data Structure by Ellis Horowitz &Sartaj Sahni, Pub, 1983. AW
8. Data Structure and Program design in C by Robert Kruse, PHI


**Note: Examiner will be required to set NINE questions in all. Question Number 9 will be compulsory (short-answer type questions), covering the entire syllabus and carrying 15 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus carrying 15 marks. Student will be required to attempt FIVE questions in all. Question Number 9 will be compulsory. In addition, student will have to attempt four more questions selecting one question from each Unit.**

**COURSE OUTCOMES**

After completion of this course student will able to

1. Decide the appropriate data type and data structures for a given problem.
2. Write the algorithms for various operations on Arrays, Queues ,Stacks and linked list.
3. Implementation of tree traversal.
4. Understanding Sequential and linked representation of various data structure.

## BCA106C – DATA BASE MANAGEMENT SYSTEM

### BCA Semester - II

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVE**

This course is an introductory course in database management system. Upon completion of this course the student should be able to:

1. Understand the role of database in an organization.
2. Understand the basics of database concepts, architecture and data models.
3. Develop the logical design of data models.
4. To develop understanding of essential DBMS concepts such as database security, integrity and concurrency and basics of SQL.

**COURSE CONTENT**

**UNIT I**

**Basic Concepts:** Data, Information, Records and files. File Based Approach, Limitations of File Based Approach, Database Approach, Characteristics of Database Approach, advantages and disadvantages of database system, Database Management System (DBMS), Components of DBMS, DBMS Functions, Advantages and Disadvantages of DBMS, Database Languages – DDL, DML, DCL. Roles in the Database Environment: Data and Database Administrator, Database Designers, Applications Developers and Users.

**UNIT II**

**Database System Architecture**: Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances. Data Independence – Logical and Physical Data Independence. Classification of Database Management System, Centralized and Client Server architecture to DBMS.

**UNIT III**

**Database Models and Implementation**: Data Model and Types of Data Model, Relational Data Model, Hierarchical Model, Network Data Model, Object/Relational Model, Object-Oriented Model;

**Entity-Relationship Model:** Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams, abstraction and integration.

**RelationalData Model:** Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations.

**UNIT IV**

SQL: Data types, Basic Queries in SQL, Insert, Delete and Update Statements, Views,

Transaction management: ACID Properties, Transaction states,

Concurrency control: Concurrency Control –Overview, Concurrency control problems, Locks, Locking Protocols, Deadlocks.

**TEXT/REFERENCE BOOKS**


1. Korth, Silberschatz, Database System Concepts, 4th Ed., TMH.
2. Elmasri&Navathe: Fundamentals of Database Systems, 4th Ed., A. Wesley
3. Thomas Connolly Carolyn Begg, "Database Systems", 3/e, Pearson Education
4. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.


**Note: Examiner will be required to set NINE questions in all. Question Number 9 will be compulsory (short-answer type questions), covering the entire syllabus and carrying 15 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus carrying 15 marks. Student will be required to attempt FIVE questions in all. Question Number 9 will be compulsory. In addition, student will have to attempt four more questions selecting one question from each Unit.**

**COURSE OUTCOMES**

By the end of the course the students will be able to:

1. Describe the fundamental elements of DBMS.
2. Explain the basic concepts of relational data model, ER model.
3. Understand the concepts of database security, integrity and concurrency.
4. Can construct simple and moderate database queries using SQL.

## MATHS112C – MATHEMATICS-II

**BCA Semester - II**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVE**

Upon completion of this course the student should be able to:

1. understand basic concepts of limits and continuity and can solve quadratic equations.
2. describe how correlation is used to identify relationship between two variables.
3. understand how regression analysis is used to predict outcomes.
4. understand the basic concepts of dependent and independent events, probability and conditional probability.
5. apply distance formula to find the distance between two points.

**COURSE OUTCOMES**

By the end of the course the students will be able to:

1. apply concepts of probability and basic rules including Baye's theorem.
2. calculate and understand that correlation coefficient is a number that measure strength of association b/w two variables.
3. understand basics of limits and continuity and can solve quadratic equations.
4. understand the line of best fit as tool for summarizing a linear relationship & predicting future observed values.
5. plot the points in coordinate plane and easily apply distance formula to find the distance between two points

**COURSE CONTENT**

**UNIT I**

**Limits & Continuity:** Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity of a function at a Point, Continuity over an Interval, Sum, product and quotient of continuous functions, Type of Discontinuities.

**Quadratic Equations**: Solution of Quadratic Equations by factor method, completing square method, and Discriminant method, Relation between roots and coefficients

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**UNIT II**

**Probability:** Sample space and events, Probability, The axioms of probability, Addition theorem on probability & problems, Multiplication theorem, Conditional probability, Baye's theorem and related problems.

**UNIT III**

**Correlation Analysis:** Definition, Types of Correlation: Positive, Negative, Linear and Non-Linear. Need of Correlation Analysis, Techniques for Measuring Correlation: Scatter Diagram Method, Graphic Method, Karl Pearson's Coefficient of Correlation, Rank Correlation.

**Linear Regression:** Definition, Difference between Correlation and Regression, Types of Regression Analysis: Objectives of Regression Analysis, Methods of obtaining regression analysis: Regression Lines. Methods of obtaining regression lines: Normal Equations and Regression Coefficient, Properties of Regression Coefficient.

**UNIT IV**

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.

**TEXT/REFERENCE BOOKS**


1. 11th& 12th NCERT Mathematics books.
2. Grewal, B.S. :Elementary Engineering Mathematics
3. Gupta S.C. and Kapoor V.K. : Fundamentals of mathematical Statistics, Sultan Chand & Sons.
4. Gupta, S.P., 2003 : Statistical Methods, S. Chand.


**Note: Examiner will be required to set NINE questions in all. Question Number 9 will be compulsory (short-answer type questions), covering the entire syllabus and carrying 15 marks. In addition to the compulsory question there will be four units, i.e., Unit-I to Unit-IV. Examiner will set two questions in each Unit. Students will be required to attempt FIVE questions in all, selecting one question from each of Unit I-IV and the compulsory question.**

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**HUM202BC – COMMUNICATION SKILL - II**
**BCA Semester - II**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVE**

- To equip students with English language skills needed in academic and professional world
- To impart the correct practices of the strategies of effective business writing

**COURSE OUTCOMES**

By the end of the course the students will be able to:

- Enrich their vocabulary in different areas like academics, technology, sports etc.
- Understand professional and personal etiquettes.
- Prepare presentation using electronic media and face interview with confidence.
- Meet the challenges of the professional word.

**COURSE CONTENT**

**UNIT I**

**Vocabulary**

Language Skills: Words often confused, One Word Substitute, Antonyms, Synonyms, Vocabulary of academic world, technology, life stages, sports, emotions, greetings, apologies

**UNIT II**

**Soft Skills**

Nonverbal Communication: Body language, kinesic communication, proxemic communication, haptic communication, paralinguistic communication, chronomatic communication Business etiquettes, introduction etiquettes, email etiquettes, telephone etiquettes, telemarketing etiquettes, elevator etiquettes, dressing and grooming etiquettes, dining etiquettes

**UNIT III**

**Oral Presentation**

Presentations: Do's and Don'ts, Distribution of time (presentation, questions & answers, summing up), Oral & Visual presentation, Guidelines for using visual aids, Power Point Presentations
Job interviews: Preparing for the interviews and facing the interviews

**UNIT IV**

**Business Communication**

Significance of business communication
Writing Letters: Business letters, Office memorandum, Social 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

**TEXT/REFERENCE BOOKS**

1. Bhatnagar, Nitin, and Mamta Bhatnagar. Communicative English for Engineers and Professionals. Pearson Education, 2013.
2. Gowers, Ernest. The Complete Words. Penguin, 1973.
3. Konar, Nira. English Language Laboratories: A Comprehensive Manual. PHI, 2011.
4. Ludlow, R., and F. Panton. The Essence of Effective Communication. PHI, 1995.
5. Rizvi, M. Ashraf. Effective Technical Communication. McGraw Hill, 2014.
6. Sharma, Sangeeta, and Binod Mishra. Communication Skills for Engineers and Scientists. PHI, 2009.

**SCHEME OF END SEMESTER THEORY EXAMINATION**

1. The duration of the exam will be 3 hours.
2. The Question Paper shall have nine questions.
3. Each question will be of 15 marks.
4. The student is required to attempt five questions in all.
5. Questions no. 1 to 8 will be set in such manners that two questions are set from each unit of the syllabus. A student will have to attempt four questions selecting one question from each unit. The questions on Unit III may be in the form of comprehension passage, long/short answer question, explanation of lines/passage from the text with reference to the context or on the vocabulary and grammar items.
6. Question number 9 will be compulsory covering the entire syllabus and it will be in the form of short-answer type questions.

**BCA124C – SOFTWARE LAB-III**
**(Based on BCA104C)**

**BCA Semester - II**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| - | - | 4 | 2 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**Topics to be covered:-**

1. Operations on Data Structure – Traversing, Searching, Sorting and insertion-deletion in Array.
2. Application of Data Structure – Sparse matrix, postfix evaluation of expression
3. Operation on Stack and Queue using array and linked list.
4. Implementation of linear linked list(Traversing, insertion, deletion and searching).
5. Implementation of Tree traversal (preorder, inorder, postorder).

**BCA126C – SOFTWARE LAB-IV**
**(Based on BCA106C)**

**BCA Semester - II**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| - | - | 4 | 2 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**Topics to be covered:-**

Students are required to attempt at least 10 exercises based on the syllabi of subject "BCA106C" 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.
- Operations on views

**HUM222BC – SOFT SKILL SEMINAR- II**
**BCA Semester - II**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| - | - | 2 | 1 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVE**

- To hone up students' English Language competence for speaking skills

**COURSE CONTENT**

- Practicing tele-conferencing, video conferencing and web conferencing through mock situations; Conducting and participating in mock interviews; Group Discussions, Practice in public speaking, presentations

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

Students will be made 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**

1. Konar, Nira. English Language Laboratories: A Comprehensive Manual. PHI, 2011.
2. Sadannad, Kamlesh, and Susheela Punitha. Spoken English: A Foundation Course. Orient Longman, 2008.

**SCHEME OF END SEMESTER EXAMINATION (Practical)**

An external Practical exam of 75 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 by making them participate in formal presentations, group discussion, formal exchanges, and mock web, tele and video conferencing. Students will also be evaluated through a vivavoce conducted by the external examiner.

**Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)**
**SCHEME OF STUDIES & EXAMINATIONS**
Bachelor of Computer Application (BCA) 2nd Year 3rd Semester
Credit Based Scheme w.e.f. 2021-22

| Sr. No. | Course No. | Course Title | Teaching Schedule | | | Marks of Class Work | Examination Marks | | Total | Credit | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Theory | Practical | | | |
| 1. | BCA201C | Computer System Architecture | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 2. | BCA203C | Object Oriented Programming using c++ | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 3. | BCA205C | Operating System | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 4. | BCA207C | Web Technology | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 5. | | Elective –I | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 6. | BCA223C | Software Lab-V (Based on BCA203C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| 7. | BCA227C | Software Lab-VI (Based on BCA207C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| 8. | GES101C | Environmental Studies | 3 | - | | 25* | - | 75* | 100* | | 3 |
| **TOTAL** | | | **15** | **0** | **8** | **175** | **375** | **150** | **700** | **19** | |

***The Environmental studies GES-101 C is compulsory & qualifying course only. Elective-I**

| | |
|---|---|
| BCA251C | Basic Accounting |
| BCA253C | Organizational Behaviour |
| BCA255C | Critical thinking and problem solving |
| BCA257C | Management Concepts and Entrepreneurship |

**Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)**

**SCHEME OF STUDIES & EXAMINATIONS**

Bachelor of Computer Application (BCA) 2nd Year 4th Semester

Credit Based Scheme w.e.f. 2021-22

| Sr. No. | Course No. | Course Title | Teaching Schedule | | | Marks of Class Work | Examination Marks | | Total | Credit | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Theory | Practical | | | |
| 1. | BCA202C | Data Communication & Networking | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 2. | BCA204C | Programming Languages | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 3. | BCA206C | Relational Database Management System | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 4. | BCA208C | Core JAVA | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 5. | BCA210C | Software Engineering | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 6. | | Elective- II | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 7. | BCA226C | Software Lab-VII (Based on BCA206C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| 8. | BCA228C | Software Lab-VIII (Based on BCA208C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| **TOTAL** | | | **18** | **0** | **8** | **200** | **450** | **150** | **800** | **22** | |

# Elective-II

| | |
|---|---|
| BCA262C | Social Media Marketing |
| BCA264C | Multimedia Editing Software |
| BCA266C | Information Technology Trends |
| BCA268C | Open Source Programming |

**BCA201C – COMPUTER SYSTEM ARCHITECTURE**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - III**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVE**

This course is an introductory course in computer & information technology. Upon completion of this course the student should be able to:

1. To enable the students to learn the basic functions, principles and concepts of Computer Architecture.
2. To focus on processor design, control unit design techniques.
3. To study I/O interfacing
4. To understand memory organization.

**COURSE OUTCOMES**

By the end of the course the students will be able to:

1. Understood Computer Architecture.
2. Understood processor design, control unit design.
3. Understood I/O interfacing
4. Understood memory organization and different types of memories.

**COURSE CONTENT**

**Unit 1**

Introduction to Computer Organization: Introduction to Computer and CPU (Computer Organization, Computer Design and Computer Architecture), Stored Program Concept- Von Neumann Architecture.

Register Transfer Language, Register Transfer, Bus and Memory Transfers, Micro operations: Introduction to micro operations, Types of micro operations: Arithmetic microoperation, Logic Operations, Shift operations,

# 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), Addressing Modes. Difference between RISC and CISC.

**Design of Control Unit**: Introduction to Control Unit, Types of Control Unit (Hardwired & Micro programmed Control Unit).

## 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.

## Unit 4

**Memory Organization**: Memory Hierarchy, Main Memory (RAM and ROM chips, Logical and Physical Addresses, Memory Address Map, Memory Connection to CPU), Associative Memory, Cache Memory: Cache Memory (Initialization of Cache Memory, Writing data into Cache, Locality of Reference, Hit Ratio), Replacement Algorithms (LRU and FIFO). Cache Memory Mapping Techniques: Direct Mapping, Associative Mapping and Set Associative Mapping.

# TEXT/REFERENCE BOOKS:


1. Computer System Architecture, M.M. Mano, Third Edition, PHI
2. Computer Organization and Architecture, J.P. Hayes, Third Edition, TMH

3. Computer Organization and Architecture, Stallings, Eighth Edition, PHI

4. Computer Organization and Design, 2nd Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.


**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.**

**BCA203C – OBJECT ORIENTED PROGRAMMING USING C++**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester – III**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVES**

Upon completion of this course the student should be able :

1. To enable the students to understand principle of Object-Oriented approach.
2. To focus on analysis of Object-Oriented process.
3. To study programming skills in C++.
4. To implement small or large programs in C++.

**COURSE OUTCOME**

By the end of the course the students will be able to:

1. An understanding of the principles behind the Object-Oriented development process.
2. To analyze existing Procedure-Oriented Software's to Object Oriented based ones
3. To develop programming skills in C++ programming language
4. Competence in the use of Object-Oriented programming language in the development of small to medium sized application programs

**COURSE CONTENT**

**Unit 1**

**Introduction:** Introducing Object-Oriented Approach, Relating to other paradigms (Functional, Data decomposition). Features of Procedural and object oriented programming, Basic Concepts of Object-Oriented Programming, Benefits of OOP, Applications of OOP, Difference between C and C++.

**Getting started with C++:** Syntax, Data types, Variables, Strings, Function, Operators, Recursion, Array, Pointer and Structure .

# Unit 2

**Classes and Objects:** Encapsulation, Information Hiding, Abstract Data Types, Object & Classes, Attributes, Methods, C++ Class Declaration, Private And Public, This Pointer, Function Overloading, Constructors And Destructors, Instantiation Of Objects, Default Parameter Value, Dynamic Memory Allocation: New, Delete, Static Members

## Unit 3

**Inheritance:** Inheritance, Types of Inheritance, Derivation – Public, Private & Protected, Overriding Member Function, Abstract Class, Friend Function.

**Polymorphism :** Polymorphism, Categorization Of Polymorphism Techniques, Method Polymorphism, Polymorphism By Parameter, Operator Overloading, Virtual Function, Early v/s Late Binding

## Unit 4

**Generic Programming** – Introduction, Templates, Template Functions, Template Classes, Overloading of Templates.

**Exception Handling**: Exception, Types of Exceptions, Catching and Handling Exceptions, Exceptions And Derived Class, Exception when Handling Exception.

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

## TEXT/REFERENCE BOOKS:


1. Herbert Schildt: C++ - The Complete Reference, Tata McGraw Hill Publications
2.Balaguruswamy: Object Oriented Programming and C++, Tata McGraw Hill Publications.
3. Mahesh Bhave, "Object Oriented Programming with C++", Pearson Education.
4. R. Lafore, "Object Oriented Programming using C++", Galgotia Publications, 2004.
5. Olshevsky: Revolutionary Guide to Object Oriented Programming Using C++, SPD/WROX.
6. Schildt Herbert, "C++: The Complete Reference".


**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.**

**BCA205C – OPERTAING SYSTEM**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - III**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 4 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVE**

Upon completion of this course the student should be able :

1. To understand the services provided by operating system and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.

**COURSE OUTCOMES**

By the end of the course the students will be able to:

1. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
2. Identify the dead lock situation and provide appropriate solution.
3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.
4. Able to use operating systems effectively.

**COURSE CONTENT**

**Unit 1**

**Operating System Introduction**: Operating Systems Objectives and functions, System Components, Operating System Structure-Layered Approach, Virtual Approach, Kernal Approach, Client- Server Model, System calls, OS Services , Evolution of Operating Systems - Simple Batch, Multi programmed,Multiuser, Time shared, Parallel, Network ,Distributed Systems, Real-Time Systems, Mobile OS, Examples of OS and their characteristics- Windows, Unix/Linux, Android etc.

# Unit 2

**Process and CPU Scheduling-**
Process Concept, Process states, Process control Block, Threads, Process Scheduling: Types of scheduling: Preemptive, Non preemptive, scheduling queues, schedulers, Scheduling algorithms: FCFS, SJF, RR, Priority, Multilevel queue with feedback Scheduling, Comparative study of scheduling algorithms

**Deadlocks** - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

## Unit 3

**Concurrency Management** -Inter-process Communication ,Process Synchronization, The Critical section Problem, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization.

**Memory Management and Virtual Memory** - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Page Replacement Algorithms((FIFO, LRU, Optimal, Other Strategies), Thrashing, working set Model.

## Unit 4

**I/O Management and Disk Scheduling:** I/O Devices, I/O system,I/O Buffering,Disk organization, RAID structure, Disk Cache, Disk scheduling: FCFS, SSTF, SCAN,C-SCAN,LOOK, C-LOOK.

**File Management**: The concept of file, Access methods, Directory Structure, file protection. Allocation methods: Contiguous, linked and index allocation,free space management.

## TEXT/REFERENCE BOOKS:


1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press
3. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
5. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
6. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
7. Operating Systems, A. S. Godbole, 2nd Edition, TMH
8.Operating Systems: A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition


**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.**

**BCA207C – Web Technology**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - III**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVE**

Upon completion of this course the student should be able to:

1. Learn how to design and develop a web page using HTML and CSS.
2. Design and develop a web site using text, images, links, lists, and tables for navigation and layout.
3. Style your page using CSS.
4. Learn how to use web hosting.

**COURSE OUTCOMES**

By the end of the course the students will be able to:

1. List the various HTML tags and use them to develop the user friendly web pages.
2. Define the CSS with its types and use them to provide the styles to the web pages atvarious levels.
3. Develop the modern web pages using the html and CSS features with different layoutsas per need of applications.
4. Host website on server using different tools.

**COURSE CONTENT**

**Unit 1**

Introduction to HTTP, HTML, Basic HTML Tags, Body Tags, Coding Style, Modifying & formatting Text, Lists – Unordered, Ordered, Definition, Insert Links -Linking to another Document, Internal Links, Email Links, Relative and Absolute Links, Insert Images - Referencing Images, Clickable Images, Image Placement and Alignment, Image Size, Image Margins, Image Formats, Image Maps- Defining an Image Map, Advanced Coloring Body Content, Working with tables - Basic Tables, Table Attributes, Table Cell Attributes, Table Row Attributes, Tables Inside of Tables, Invisible Spacers, Working with Frame-Based Pages- Creating Windows, Single Window Frames, Creating Column Frames, Creating Row Frames, Creating Complex Frames.

# Unit 2

HTML Forms, forms control, New and emerging form elements , Separating style from structure with style sheets: page and site design considerations. Cascading Style Sheet (CSS) – Introduction, creating style, using inline and external CSS, Creating Div with ID style, Creating Tag& Class style, creating borders, Navigation links, creating effects with CSS.

## Unit 3

Client-side scripting, Introduction to client-side scripting JavaScript – Introduction, use of JavaScript in web pages. Understand JavaScript event model, use some basic event and control webpage behavior. Variable declaration, Operators, , Control Statements, Error Handling, Understanding arrays, Function Declaration, Built In Functions, Standard Date and Time Functions, Working with Objects, Call method in JavaScript.
Server-side scripting, Introduction to server-side scripting languages, Input/Output Statements, Decision Statements, Looping Statements, Functions/Subroutines, Server side

## Unit 4

Web Design and Technology: Requirements of intelligent websites; Website planning process; Website organization; Useful and attractive web pages; Website and page development tools; Testing and maintaining a website; Evaluating web site performance. Web hosting - domain registration, webhosting, how to get a web hosting, host your website on web server.

## TEXT/REFERENCE BOOKS:


- HTML and CSS, Jon Duckett, John Wiely, 2012
- Achyut S Godbole and AtulKahate, "Web Technologies", Tata McGraw Hill
- Gopalan N P, Akilandeswari "Web Technology: a Developer S Perspective", PHI
- H.M. Deitel, P.J. Deitel, a.B. Goldberg-Internet & World Wide Web How to Program,Pearson Education, 3rd Edition,
- C. Xavier, "Web Technology &Design ", Tata McGraw Hill.
- Ivan Bay Ross, "HTML,DHTML,JavaScript,Perl CGI", BPB.
- Web Technologies, Black Book, Dreamtech Press


**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.**

**BCA251C – BASIC ACCOUNTING**
**Bachelor of Computer Application (B.C.A.)**
**BCA semester -III**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVE**

This course aims to familiarize the students with basic concepts of accounting and enable them to apply the essential numerical skills required for accounting.

1. To understand basic accounting concepts and main elements of financial accounting information – assets, liabilities, revenue and expenses
2. To understand the recording transactions in the appropriate ledger accounts using the double-entry book keeping system
3. To introduce the basic concepts and principles of accounting for preparing the financial statements such as income statement (financial performance) and balance sheet (financial position)
4. To make the students aware of how the computer is used in basic accounting operations so that students can use technology to automate accounting processes.

**COURSE OUTCOME**

By the end of the course students will be able to

1. Develop the ability of using accounting information as a tool in applying solutions for managerial problems
2. To prepare Financial Statements in accordance with Generally Accepted Accounting Principles.
3. To improve their basic knowledge of computers and computerized accounting software.
4. Identify short term and long term funding sources, instruments and markets.

**COURSE CONTENT**

**Unit 1**

Basic Accounting Concepts: Background of Accounting, Introduction, importance and scope, Accounts – Types and classification; basic terms– Capital, Income, Expenditure, Expenses, Assets, Liabilities and application to Problems., Accounting Equation, Double Entry System. Generally accepted accounting principles

# Unit 2

Journal and Ledger- Journal and recording of entries in journal with narration; Ledger – Posting from Journal to respective ledger accounts. Basic concepts of purchase book, sales book and cashbook. Trial Balance: Need and objectives; Application of Trial Balance; different types of errors escaped, trial Balance preparation.

## Unit 3

Final Accounts: Final Accounts without adjustments. Bank Reconciliation Statement: Bank transactions, Preparation of simple bank reconciliation statement.

## Unit 4

Sources of raising of capital in corporate undertaking: working Capital and Long term Capital. Application of computers in accounting.

## 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
4. Accounting for management, Bhattacharya & Deaden, Paperback Edition, Vikas 1986
5. Financial Accounting (Part I and Part II), R.L Gupta & V.K Gupta
6. Fundamental Accountancy, S.N. Maheshwari
7. Accounting Principal, Antony & Reece, Sixth Edition.


**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.**

**BCA253C – ORGANIZATIONAL BEHAVIOUR**

**Bachelor of Computer Application (B.C.A.)**

**BCA semester -III**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVES**

Upon completion of this course the student should be able:

1. To provide students with a better understanding of behavioural processes and thereby enable them to function more effectively in their future roles as managers of human resources.
2. To enable students to describe how people behave under different conditions and understand why people behave as they do.
3. To provide the students to analyze specific strategic human resources demands for future action.
4. To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.

**COURSE OUTCOME**

By the end of the course students will be able:

1. Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
2. Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
3. Analyze the complexities associated with management of the group behavior in the organization.
4. Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.

**COURSE CONTENT**

**Unit 1**

Introduction: Definition and concept of Organizational Behaviour, nature and scope of OB, elements of OB, contributing disciplines to OB, challenges for OB, evolution of OB.

# Unit 2

Individual processes: Attitudes, Values; Perception – concept, process and applications; Personality - concept, determinants, theories and applications; Learning – concept and theories of learning, reinforcement.

## Unit 3

Team processes: Motivation – concept and theories of motivation; Group behaviour – concept, types of group, group development, group dynamics; Teams - types, creating effective teams; Conflict – concept, sources, types, management; Organizational power and politics.

## Unit 4

Organizational processes and Stress management: organizational structure – elements of organizational structure; organizational culture; organizational change – concept, resistance to change, managing resistance to change, Lewin's three- step model of change; Stress – sources, consequences and management, Emotional intelligence.

## TEXT/REFERENCE BOOKS:


1. Robbins Judge and Vohra, Organizational Behaviour, Pearson, New Delhi.
2. Khanka S S, Organizational Behavior, S.Chand& Company Pvt. Ltd., New Delhi.

Reference Books:

1. Greenberg Jerald, Behavior in Organizations, PHI, New Delhi.
2. Parikh and Gupta, OrganisationalBehaviour, Mc Graw Hill, New Delhi.
3. PareekUdai, Understanding Organizational Behaviour, Oxford University Press, New Delhi.
4. Aswathappa K., OrganisationalBehaviour, Himalaya Publishing House, New Delhi.
5. Luthans, F. Organizational Behavior, McGraw Hill Education.
6. Hersey Paul, Blanchard, Kenneth H and Johnson Dewey E. Management of Organizational Behavior: Leading Human Resources, Pearson Education


**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.**

**BCA255C – CRITICAL THINKING & PROBLEM SOLVING**
**Bachelor of Computer Application (B.C.A.)**
**BCA semester -III**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVES**

Upon completion of this course the student should be able:

1. To understand and explain the importance and concept of critical thinking
2. To Construct a logically sound and well-reasoned argument
3. To apply problem solving steps and tools To Identify appropriate solutions using specific approaches
4. To avoid common decision-making mistakes and the best technique for making decisions

**COUSE OUTCOMES**

Completion of the course the student will be able to:

1. Define and explain critical thinking and its need
2. Identify and analyze relevant arguments (reasons, claims, pros and cons, etc.) and Predict implications and consequences
3. Implement problem solving approaches, tools with well-reasoned view point
4. Demonstrate the understanding of deductive and non-deductive reasoning and the applications of various problem solving approaches

**COURSE CONTENT**

**Unit 1**

Thinking and reasoning : Introduction, Thinking as a skill ; Critical Thinking: Introduction, Solutions not problems ,Claims, assertions, statements , Judging claims, Argument - Identifying arguments - Analyzing arguments - Complex arguments , Conclusions - Reasons - Assumptions - Flaws and fallacies

# Unit 2

Problem solving Basics: Problem, problem solution, Selecting and using information ,Processing data , Finding methods of solution , Solving problems by searching, Recognizing patterns , Hypotheses, reasons, explanations and inference ,Spatial reasoning ,Necessity and sufficiency , Choosing and using models , Making choices and decisions

# Unit 3

Advanced problem solving , Combining skills – using imagination , Developing models , Carrying out investigations , Data analysis and inference , Using other mathematical methods , Graphical methods of solution ,Probability, tree diagrams and decision trees.

## Unit 4

Critical Thinking Application, Inference, Explanation, Evidence, Credibility, Critical thinking and science, Introducing longer arguments, Applying analysis skills, Critical evaluation Advanced Critical Reasoning, Conditions and conditionals, Soundness and validity, Non-deductive reasoning, Reasoning with statistics, Decision making, Principles

## TEXT/REFERENCE BOOKS:


- John Butterworth and Geoff Thwaites, Thinking Skills : Critical Thinking and Problem Solving, Cambridge University Press, 2nd Edition
- Robert Arp and Jamie Carlin Watson, Critical Thinking: An Introduction to Reasoning Well, Bloomsbury Academic, 2nd Edition
- Joe Y. F. Lau, An Introduction to Critical Thinking and Creativity: Think More, Think Better, Wiley, ISBN: 9780470195093
- Brooke Noel Moore and Richard Parker, Critical Thinking,, ISBN: 978-007- 338667-6 , TMH, 12th
- .Fisher, A. E. Critical Thinking: An Introduction. Cambridge: CUP.
  Oxford Advanced Learner's Dictionary of Current English. Eighth Edition. Oxford: OUP.
  Leech, G. N., & Jan Svartvik. A Communicative Grammar of English. London: Longman.


**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.**

**BCA257C –MANAGEMENT CONCEPTS AND ENTREPRENEURSHIP**
**Bachelor of Computer Application (B.C.A.)**
**BCA semester -III**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVES**

Upon completion of this course the student should be able:

1. To expose the students to basic concepts of management and to enable them to gain appreciation for emerging ideas, techniques, procedures and practices in the field of management.
2. To provide them tools and techniques to be used in the performance of the managerial job.
3. To expose the students to the growth of entrepreneurship in developing countries and acquaint with the establishment and running of a new enterprise.
4. To understand the role of women entrepreneurship in different facets of society and elucidate the role of various developmental schemes supporting women entrepreneurship.

**COURSE OUTCOMES**

1. The students will be able to have clear understanding of managerial functions like planning, and have same basic knowledge on various aspect of management.
2. The student will understand the basic tenets of management - will acquaint himself with management process, functions and principles.
3. The student will be able to identify entrepreneurial opportunities and leverage managerial & leadership skills for founding, leading & managing startups as well as professionalizing.
4. The student will be able to develop basic understanding of entrepreneurship. Inculcating analytical skills in order to identify business opportunities, enabling to identify the elements of success of entrepreneurial ventures. To demonstrate knowledge in women entrepreneurship development.

**COURSE CONTENT**

**Unit 1**

**Management Concepts:** Definition, nature, functions, levels of management, Types of managers, managerial roles, managerial skills and competencies, Evolution and various schools to management thought, continuing management themes – quality and performance excellence, global awareness, learning organization, characteristics of 21st century executives, Social responsibility of managers.

## Unit 2

**Functions of Management:** Planning: Meaning and nature of planning, types of plans, steps in planning process; : Organizing: Organizing as managerial function – organization structures, Leading and Controlling: Leading as a function of management, Leadership styles, Controlling: control function in management, the basic control process, and types of control – feed forward, concurrent and feedback controls, Control techniques.

## Unit 3

**Entrepreneurship:** Concept and nature; Classification and Types of Entrepreneurs; Entrepreneurship's Challenges; Myths concerning Entrepreneurship; Factor affecting Entrepreneurial Growth – Economic &Non Economic Factors; Development in India ,Process of setting up a business enterprise; feasibility and preparation business plan , Why Business plan Fails, Specimen of Project Report.

## Unit 4

Developments of Entrepreneur: Micro, Small and Medium Enterprises: Concept & definitions; Role & Importance; MSMED Act 2006. Women Entrepreneurship: Role & Importance, Profile Women Entrepreneur, Problems of Women Entrepreneurs, Women Entrepreneurship Development in India.

## TEXT/REFERENCE BOOKS:


- Robbins, S.P., Coulter, M., Cenzo, D., Fundamental of Management, Pearson Education
- Dr. R.K. Singla Management Process and Organizational Behavior , VK Publications
- Vasant Desai, "Entrepreneurial Development and Management", Himalaya Pub. House, New Delhi.
- Roy Rajeev, Entrepreneurship 2/e, Oxford University Press.


**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.**

**BCA223C – SOFTWARE LAB-V**
**(Based on BCA203C)**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester – III**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 0 | 0 | 4 | 2 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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## List of Practical

1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value. Use a default argument of 2 for p, so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.
2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates.
3. Write a program that uses a structure called point to model a point. Define three points, and have the user input values to two of them. Then set the third point equal to the sum of the other two, and display the value of the new point. Interaction with the program might look like this:

   Enter coordinates for P1: 3 4
   Enter coordinates for P2: 5 7
   Coordinates of P1 + P2 are : 8, 11

4. Create a class "Bank_Account" that contains Depositor_Name , Acc_No , Acc_type, Balance as its data members. Also create member functions for account creation, deposit, withdraw and balance inquiry for class. Demonstrate its use in main.
5. Define a class "Time" that contains following data members and member functions. Data members: 1. Hours 2. Minutes 3. Seconds
   Member Functions:

   1. To get time from user.
   2. To display time on the screen
   3. To calculate sum of two time objects

   Write a program that can read values of Time for two objects T1 and T2, calculate sum and display sum using defined member functions .
6. Create class "Sales" having following data members and member functions: Data Members: 1. Name of Salesman 2. Sales of Salesman
   Member functions to calculate commission :
   - Commission is Rs. 10 per thousand if sales are at least Rs. 25000 or more
   - Commission is Rs. 5 otherwise

   Write a program that calculate and print name and sales of salesman.

7. Write a program to count number objects created for particular class using constructor.
8. Create class "Person" having a two data members as person name and nationality. Also create two constructors for this class in which one has two arguments and second has one argument.
9. Write a program to declare two classes, each one have one int data member. Find the sum of data members of both classes using friend function. Create suitable objects and functions
10. Create Class complex number having real and imaginary part as data member, constructor and member function to read complex number. Class should overload + operator to add to find sum of two complex numbers.
11. Program to implement inheritance.
12. Imagine a tollbooth with a class called toll Booth. The two data items are
    - a type unsigned int to hold the total number of cars, and
    - a type double to hold the total amount of money collected.

    A constructor initializes both these to 0. A member function called payingCar( ) increments the car total and adds 0.50 to the cash total. Another function, called nopayCar( ), increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals.

    Include a program to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the ESC kay should cause the program to print out the total cars and total cash and then exit.
13. Make a class Employee with a name and salary. Make a class Manager inherit from Employee. Add an instance variable, named department, of type string. Supply a method to toString that prints the manager's name, department and salary. Make a class Executive inherit from Manager. Supply a method to String that prints the string "Executive" followed by the information stored in the Manager superclass object. Supply a test program that tests these classes and methods.
14. Consider the following class definition

    ```
    class father {
    protected :int age; public;
    father (int x) {age = x;} virtual void iam ( )
    { cout<< "I AM THE FATHER, my age is : "<< age<< end1:}
    };
    ```

    Derive the two classes son and daughter from the above class and for each, define iam ( ) to write similar but appropriate messages. You should also define suitable constructors for these classes.

    Now, write a main ( ) that creates objects of the three classes and then calls iam ( ) for them. Declare pointer to father. Successively, assign addresses of objects of the two derived classes to this pointer and in each case, call iam ( ) through the pointer to demonstrate polymorphism in action.
15. Write a function called reversit ( ) that reverses a string (an array of char). Use a for loop that swaps the first and last characters, then the second and next to last characters and so on. The string should be passed to reversit ( ) as an argument.
    Write a program to exercise reversit ( ). The program should get a string from the user, call reversit( ), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase, "Able was I ere I saw Elba)".
16. Program to read and write object in a file.

# BCA227B-Software Lab-VI (Based on BCA207C)

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester – III**

| L | T | P | Credits |
|---|---|---|---|
| 0 | 0 | 4 | 2 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

1. Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
2. Create your resume using HTML tags also experiment with colors, text , link , size and also other tags you studied
3. Create your class timetable using table tag.
4. Create user Student feedback form (use textbox, text area , checkbox, radio button, select box etc.)
5. Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
6. Design a web page of your home town with an attractive background color, text color, an Image, font etc. (use internal CSS).
7. Use Inline CSS to format your resume that you created.
8. Use External CSS to format your class timetable as you created.
9. Use External, Internal, and Inline CSS to format college web page that you created.
10. Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript
11. Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.
12. Create HTML Page that contains form with fields Name, Email, Mobile No , Gender , Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked. Implement Validation in above Feedback Form.

# GES – 101 B: ENVIRONMENTAL STUDIES

**Bachelor of Computer Application**
**(B.C.A.) Semester –III**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | 0 | 0 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVE :**

**The objective of this course is**

1. .To develop the sense of awareness among the students about environment and its various problems.
2. To help the students to recognize the interconnectedness of multiple factors in environmental challenges
3. To develop proper skill required for the fulfillment of the aims of environmental education and educational evaluations.
4. To develop required curiosity among the students for the realization of environmental problems so that they would be inspired to work for the solution of such problems .

**COURSE OUTCOME :**

**The course will empower the undergraduate students by:**

1. Gaining in-depth knowledge on natural processes that sustain life and govern economy.
2. Predicting the consequences of human actions on the web of life, global economy and quality of human life.
3. Developing critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.
4. Acquiring values and attitudes towards understanding complex environmental economic-social challenges, and participating actively in solving current environmental problems and preventing the future ones.

**COURSE CONTENT**

**Unit 1**

Environmental studies – The Multidisciplinary nature of environmental studies, Definition, scope and importance. Need for Public awareness. natural resources – renewable and nonrenewable resources, use and over-exploitation/over-utilization of various resources and consequences; role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles.

## Unit 2

Ecosystems – concept, structure and function of an ecosystem; energy flow in the ecosystem; ecological succession; food chains, food webs and ecological pyramids; various types of ecosystem – forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystems, Biodiversity and its conservation. man- wildlife conflicts. Endangered and endemic species of India.

## Unit 3

Social issues and the environment – Sustainable development, urban problems related to energy, water conservation, rain water harvesting, climate change, global warming, acid rain, ozone layer depletion, Wasteland reclamation. Environmental Pollution – Definition, cause, effects and control measures of different types of pollutions, role of an individual in prevention of pollution.

## Unit 4

Environmental legislation – Environment Protection Act. Air (prevention and control of pollution) Act. Water (prevention and control of pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness. Environmental movements: Chipko, Appiko, Silent valley, Bishnois of Rajasthan, Tehri Dam Conflict

## TEXT/REFERENCE BOOKS:


1. Agarwal, K.C. 2001, Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha, Franch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India
. 3. Brunner R.C. 1989, Hazardous Waste Incineration, Mc. Graw Hill Inc. 480p.
4. Clark R.S., Marine Pllution, Slanderson Press Oxford (TB).
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai. 1195p.
6. De A.K., Environmenal Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment ®.
8. Gleick, H.P., 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env.Institute, Oxford Univ., Press 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bomaby Natural History Scociety, Bombay (R).
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment.Cambridge Univ. Press 1140p.
11. Jadhav, H &Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Helhi 284p.
12. Mckinney, M.L. &Schoch, RM 1996, Environmental Sciences Systems & Solutions, Web enhanced Edition 639p.
13. Mhaskar A.K., Mater Hazardous, Tekchno-Sciences Publications (TB).
14. Miller T.G. Jr. Environmental Science, Wadsoworth Publishing Co. (TB).


**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.**

**BCA202C – DATA COMMUNICATION AND NETWORKING**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - IV**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVES:**
In this course student will learn about:

1. Building an understanding of the fundamental concepts of computer networking.
2. Understand the lower two layer DLL and Physical layer.
3. Understand the Networking layer and Transport layer
4. Understand the upper 3 layer of OSI model and Internet.

**COURSE OUTCOMES**:

At the end of this course students should be able to

1. Familiar Data Communications System and its components. Different types of network topologies and protocols.
2. Familiarize with Local Area Network and its protocols.
3. Enumerate and explain the layers of the OSI model and TCP/IP model.
4. Able to study further like cloud computing and implement it in programming like Java

**COURSE CONTENT**

**Unit 1**

**Networking Basics:** Introduction to Computer Networks, Application of Computer Network, Network Topologies, LAN, WAN, MAN, OSI reference model, Functions, Services and Protocols on each layer of OSI model, TCP/IP model, Networking Devices and Transmission media, Broadcasting, Multicast, Unicast, transmission mode,

# Unit 2

**Physical and Data Link Layer:** IEEE 802 standards for LAN, Ethernet, Token Ring, Peer-To-Peer network, Framing, Physical Address, NIC Card CSMA/CD,CDMA/CA, Flow Control, Error Detection and Error Correction, Hamming Distance, CRC, Checksum, Multiplexing

# Unit 3

**NETWORK LAYER** : Packets, Switching, Routing, Logical addressing : IPV4, Subnetting, Introduction to IPV6, ARP protocol, Routing protocols: Static & Dynamic, Distance vector

routing, Link state routing. **TRANSPORT LAYER** : Process to Process Delivery, User Datagram Protocol, Transmission Control Protocol, Congestion Control.

## Unit 4

**APPLICATION/PRESENTATION/SESSION LAYER :** Session Management, Introduction to Cryptography and Compression, Working of Email and Email protocol, www, FTP, HTTP, HTTPS, web browser, Internet**,** how internet work, Internet Infrastructure, ISP

# TEXT/REFERENCE BOOKS:


- Forouzan, "Data Communication and Networking", TMH, 5th Edition, 2017
- A.S. Tanenbaum, "Computer Networks", PHI, 5th Edition, 2013
- W. Stallings, "Data and Computer Communication", Macmillan Press.
- Comer, "Computer Networks and Internet", PHI.
- Comer, "Internetworking with TCP/IP", PHI.
- W. Stallings, "Data and Computer Communication", McMillan.
- J. Martin, "Computer Network and Distributed Data Processing", PHI.
- W. Stallings, "Local Networks", McMillan.
- M.Schwertz, "Computer Communication Network Design and Analysis", 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-204 C: PROGRAMMING LANGUAGES**
**Bachelor of Computer Application (B.C.A.)**
**Semester –IV**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVES:**
Upon completion of this course the student should be able :

1. To understand the significance of an implementation of a programming language in a compiler or interpreter.
2. To Specify the concrete and abstract syntax of a programming language.
3. To understand sequence control and scope of declaration.
4. To chose appropriate programming languages for certain classes of programming problems.
5.

**COURSE OUTCOMES**:
At the end of this course students should be able:

1. To explain significance of an implementation of a programming language
2. To understand the syntax and semantics of programming language.
3. To analyze implicit & explicit sequence control and scope of data in a program.
4. To design program in different language paradigms and evaluate their relative benefits

**COURSE CONTENT**

**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/REFERENCE BOOKS:


- Programming languages Design & implementation by T.W. .Pratt, 1996, Prentice Hall Pub.
- Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan, 2002, TMH.
- 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 Pradigms Allen Tucker , Robert Noonan 2002, T.M.H.


**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 C: RELATIONAL DATABASE MANAGEMENT SYSTEM**

**Bachelor of Computer Application (B.C.A.)**

**Semester –IV**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVES:**

In this course student will learn about to:

1. Understand the fundamental concepts of RDBMS.
2. Understand the how to make data more readable and usable to remove redundancy.
3. Understand the practical aspect of SQL.
4. Understand the PL/SQL practically.

**COURSE OUTCOMES**:

At the end of this course students should be

1 Familiar with the relational data base management.
2. Familiarize with normalization in RDBMS.
3. Able to work on SQL and implement the concept of RDBMS in database.
4. Able to work in PL/SQL to implement logics on SQL query.

**COURSE CONTENT**

**Unit 1**

**RDBMS BASICS**: Relational Model Concepts Table, Relation, Tupple, Keys, Records, Schema, Metadata, Codd's Rules for Relational Model, Relational Algebra: Selection, Projection, Union, Set Operation, introduction to relational calculus. Role of RDBMS in software/application development. Introduction to various RDBMS software available in the market.

# Unit 2

**Functional Dependencies and Normalization**:-Purpose, Data Redundancy and Update Anomalies. Functional Dependencies:-Full Functional Dependencies and Transitive Functional Dependencies, Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF).

## Unit 3

**SQL:** Queries: Select, Create, Alter, Insert, Update, Delete, Various types of Constraints in SQL, Specifying and Removing constraints, Views, Sorting & Indexing, Types of Join and its implementation in SQL.

## Unit 4

**PL/SQL**-Introduction, Advantages of PL/SQL, PL/SQL Block, writing and running PL/SQL, variables declaration, input and output statements, control statement, using SQL queries in PL/SQL block, procedure and function, cursor, triggers.

# TEXT/REFERENCE BOOKS:


- Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.
- Ivan Bayross, "SQL, PL/SQL-The Programming Language of ORACLE", BPB Publications 3rd edition.
- C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.


**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.**

**BCA208C – CORE JAVA**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - III**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVE**

The objectives of this course are-

1. To understand the basics of Java Programming.
2. To implement the object oriented concept in Java.
3. To understand the new object oriented concept Java.
4. To understand multithreading and GUI programming in Java

**COURSE OUTCOMES**

By the end of the course the students will be able to:

1. Do programming in Java.
2. Compare the object oriented concept of Java with other languages like C++ .
3. Handle exception and use the inbuilt library provided by the language
4. Able to make GUI interface and multiple thread

**COURSE CONTENT**

**Unit 1**

**Language Basics** : Introduction to Java, Features of Java, compiling and running a Java program, data types, String, control statements, keywords, command line argument, introduction to inbuilt packages, class, method, java.lang, java.util, Input using Scanner class, arrays, user defined methods, Jdk, bytecode, working of JVM and JRE.

# Unit 2

**Object Oriented Concept**:Class and object in Java, method overloading, constructor, constructor overloading, object as parameter, returning object, using multiple classes, Inheritance, overriding, access control, abstract class, static, this, super and final keyword, **Package**: User defined package, accessibility of package and its members,

# Unit 3

**Interface:** creation, implement, comparison of interface and abstract class, implement and extends together. **Exception Handling:** try-catch, finally, Checked & Unchecked exception, exception classes, throw and throws keywords.

## Unit 4

**Multithreading:** Introduction and application, main thread, creating a thread, handling multiple threads, Thread class and Runnable Interface, Thread Priority **GUI Programming in Java** : Introduction to awt and swing, comparison of awt and swing, various components of swing.
Core Java Applications and Comparison of Java with C++.

# TEXT/REFERENCE BOOKS:


1. E. Balaguruswami, Programming with Java, 6th Edition edition, McGrawHill.
2. Herbert Schildt, The Complete Reference Java 2, 11th edition, Tata McGrawHill.


**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 210C –SOFTWARE ENGINEERING**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - IV**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

**COURSE OBJECTIVE**

Upon completion of this course the student should be able to:

1. To understand the importance, limitations and challenges related with software development process.
2. To gain knowledge of various software models.
3. Give students an in-depth understanding of various software design activities.
4. To learn cost estimation, Software testing, implementation and maintenance activities.

**COURSE OUTCOMES**

By the end of the course the students will be able to:

1. Implement the various innovative models for Software development process.
2. Able to use various data analysis and design tools.
3. Understand various testing strategies, levels and techniques.
4. Learn maintenance and implementation process along with reliability and quality factors.

**COURSE CONTENT**

**Unit 1**

**Introduction:** Software Crisis, problem and causes, software Processes & Characteristics, **Software life cycle models:** Traditional SDLC, Waterfall, Prototype, Evolutionary and Spiral models.
**Software Requirements analysis & specifications:** Requirement engineering, requirement elicitation techniques like FAST, QFD, Requirements analysis, Behavioral and non-behavioral requirements, , Requirements documentation, Nature of SRS, Characteristics & organization of SRS.

# Unit 2

**Project Planning & Management Concepts:** The Management spectrum, The People, personnel planning, team structure, The Problem, The Process, The Project, project scheduling, project monitoring, Risk management,
**Cost estimation:** COCOMO model, Putnam Resource Allocation Model, Software configuration management,

**Software Design:** Design fundamentals, problem partitioning and abstraction, design methodology, Cohesion & Coupling, Classification of Cohesiveness & Coupling, Data Flow Diagram, Data dictionaries & ER Diagrams

## Unit 3

**Coding:** Programming style, structured programming, Coding the procedural design, Good coding style, and review of correctness and readability.
**Software Testing:** Testing fundamentals, Objectives of Testing, Nature and Limitations of Testing, Software testing strategies: unit testing, integration testing, System testing, Validation testing, Alpha and Beta testing.
**Software Testing Techniques:** Functional testing: Boundary Value Analysis, Equivalence class testing, Cause effect graphing and Decision table testing, Structural testing: Control flow based and data flow based testing, loop testing.

## Unit 4

**Software Implementation:** Relationship between design and implementation, Implementation Methods, Implementation issues and programming support environment,
**Software Maintenance:** Reason for Maintenance, Type of Maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics. Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.
**Software Quality and Quality Assurance:** Software Product and Process Quality, Software Quality factors, Quality Assurance Process and activities, Hardware and Software Reliability.

# TEXT/REFERENCE BOOKS:


1. Jalote P., "An Integrated approach to Software Engineering", Narosa Publication House.
2. K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International, 2005.
3. Rajib Mall, "Fundamental of Software Engineering", 3rd Edition, PHI Learning Private Limited
4. N.S.Gill, "Software Engineering"
5. Sommerville, "Software Engineering", 9th Edition, Pearson Edu.
6. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.
7. James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons.
8. Jibitesh Mishra and Ashok Mohanty, "Software Engineering", Pearson
9. Sommerville, "Software Engineering", Addison Wesley.
10. R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001.
11. James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach", John Wiley & Sons.


**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.**

**BCA262 C: SOCIAL MEDIA MARKETING**
**Bachelor of Computer Application (B.C.A.)**
**Semester –IV**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVES:**
Upon completion of this course the student should be able

1. To understand about the Social Media and its importance for marketing success.
2. To understand the process of integration of different digital media and its role in marketing strategy.
3. To understand the importance of digital promotion on social media.
4. To understand the concept of e-payment system and its security services related to social media marketing.

**COURSE OUTCOMES**:
At the end of this course students should be able

1. To identify importance of the Digital marketing.
2. To explain about Social Media, its various channels of operations, and create marketing content.
3. To develop content and Ad campaigns for digital promotion on social media.
4. To identify security issues and different secure e-payment methods.

**COURSE CONTENT**

**Unit 1**

Digital marketing overview- what is Digital Marketing , traditional marketing vs. Digital Marketing, understanding traffic, categorization of digital marketing for the business, Legal and Ethical issues, search engine optimization (SEO)- on page optimization, off page optimization. Goals:learn how to use dozens of proven digital marketing strategies.

# Unit 2

Social Media overview- Social Media features, social media tools and platforms, Social Media monitoring, Hashtag, viral content. Social media marketing - SMM vs. SMO benefits of using SMM social media strategy, Email marketing

## Unit 3

Social media marketing - Facebook marketing-profiles and pages, business categories, Facebook page custom URL, invite page likes, scheduling posts, Facebook events, Facebook insights reports, competitor's Facebook page, connect with twitter. Facebook ad campaigns- ad objective, performance matrix, ad components, Facebook ad structure, Facebook insights, Facebook page promotion, video promotion. Goals: develop a Facebook campaign for the product concept.

## Unit 4

Content Marketing and security, Security for SMM, Social Media Privacy, Secure Payments and Website Encryption, Cookies, VPN, Digital Certificate, E-Governance, E-wallet,. Goals: Understand security issues related to social media and digital marketing

# TEXT/REFERENCE BOOKS:


- Ryan Deiss, Russ Henneberry (2017) Digital Marketing for Dummies, John Wiley & Sons.
- Ahuja Vandana (2015) Digital Marketing, Oxford University Press.
- Ira Kaufman, Chris Horton (2014) Digital Marketing: Integrating Strategy and Tactics with Values, A Guidebook for Executives, Managers, and Students, Routledge,
- Matt Chiera (2018) Digital Marketers Sound Off: Tips, Tactics, Tools, and Predictions from 101 Digital Marketing Specialists, Matt Chiera,
- Puneet Bhatia (2017) Fundamentals of Digital Marketing, Pearson India, ISBN 9352861418, 9789352861415
- Dan Zarrella (2011) The Social Media Marketing Book, O'Reilly Media.
- Krista Neher (2013) Visual Social Media Marketing: Harnessing Images,Instagram, Infographics and Pinterest to Grow Your Business Online, Boot Camp Digital.


**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.**

**BCA264 C: MULTIMEDIA EDITING SOFTWARE**

**Bachelor of Computer Application (B.C.A.)**

**Semester –IV**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVES:**

Upon completion of this course the student should be able

1. To provide students with a basic understanding of multimedia systems and its components.
2. To impart skills of photo editing using Photoshop.
3. To acquire skill of video editing techniques using Openshot
4. To learn using Audacity software for sound recording & editing.

**COURSE OUTCOMES**:

At the end of this course students should be able

1. To understand the technical aspect of multimedia systems and its components.
2. To use Photoshop proficiently for photo editing.
3. To do video editing using Openshot software application.
4. To use Audacity software for sound recording & editing.

**COURSE CONTENT**

**Unit 1**

Introduction to multimedia : needs and areas of use, development platforms for multimedia identifying multimedia elements text, images, sound, animation and video., Various file format for image, sound and video, standard format, Compression, lossless and lossy, raster and vector graphics, concept of pixel, Introduction& feature of various multimedia software: Photoshop, OpenShot, Audacity , Installation of these software.

# Unit 2

Photoshop : Working with various tools : selection, transformation, pen tool, drawing tool, editing tool, color tool. Concept of layers, Applying a layer style, About Smart Objects and filters. Creating and Editing Smart Objects, Filter Gallery, Applying and using various filters, Performing Photo merge in Photoshop, Creating a 3D Shape, Editing 3DShape,Animation in Photoshop.

## Unit 3

Video Editing with OpenShot: OpenShot Video Editor, Features,Download and install openshort, main tool bar, Tracks & Layers, introduction to profiles, Files- Import Files, File Menu, Add File to Timeline, Cutting & Slicing, Audio effects, audio mixing and editing, Import &Export.

## Unit 4

Audio Editing using Audacity: Audacity Tools Tool Bar Use , Correct Recording Settings- Microphone Volume and Playback, Recording, Play Recording, Stop Recording., Noise Removal, Removing Breaths, Removing Plosives/Snaps, Crossfades In & Out, Multiple Individual Tracks.

# TEXT/REFERENCE BOOKS:


- Ramesh Bangia-Introduction to Multimedia- Laxmi Publications Pvt. Ltd.
- Tay Vaughan-Multimedia: Making It Work,TataMc-Graw Hill
- Adobe Photoshop CS4 for Photographers: A professional Image Editors Guide By Martin Evening(2006)
- Photoshop CS4 in Simple Steps by Kogent Learning Solutions Inc. Published by dremtechpress(2008)
- Photoshop CS4 The Missing Manual By Lesa Snider King; Publisher: O'Reilly Media, December 2008
- Jesse Russell, Ronald Cohn “Openshot Video Editor” Publisher- “Book on Demand”, 2012 ISBN 5512282816, 9785512282816
- The book of audacity record, edit, mix, and master with the free audio editor by carlaschroderpublisher: starch press
- 'Audacity' by 'Melanie Crowder', Publisher: Penguin Young Readers Group, ISBN: 9780147512499


**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.**

**BCA266C: INFORMATION TECHNOLOGY TRENDS**

**Bachelor of Computer Application (B.C.A.)**

**Semester –IV**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVES:**

In this course student will learn about to:

1. To make students understand E Governance and E Commerce system.
2. To understand the electronic payment gateways.
3. To Make them aware of basics of cellular transmission.
4. To aware with distributed system ,artificial intelligent system, , IOT, Cloud and Big Data.

**COURSE OUTCOMES**:

At the end of this course students should be able

1. To use Government initiative for citizen on E Platforms and E Commerce with security.
2. To identify different types of electronic payment systems in e-commerce.
3. To define the basics of cellular transmission systems.
4. To understand the application of advances in Computer Science area AI, IOT, Cloud and Big Data.

**COURSE CONTENT**

**Unit 1**

E-governance, e-democracy, Government efforts to encourage citizen participation, PPP model, E-governance websites & services, MPONLINE services, E-governance mobile apps like UMANG, digital locker, digital library. Various site for E-governance. National E-Governance Plan (NeGP). Introduction to cyber crime, types of attacks like Spyware, Malware, Spam Mail, Logic bombs, Denial of Service, Types of Cyber Crime: Email Fraud, Phishing, Spoofing, Hacking, Identity Theft.

# Unit 2

E-Commerce- Introductions, Concepts, Advantages and Disadvantages, Technology in E-Commerce, Benefits and Impact of E-Commerce Electronic Payment Systems: Introduction, Types of Electronic Payment Systems, RTGS, IMPS, NEFT, Payment Gateway, Internet Banking, UPI, BHIM. Digital Marketing concept.

## Unit 3

Introduction to Wireless Communication, Blue Tooth, WiFi, WiMax, LiFi, Mobile Technology, 2G, 3G, 4G, 5G services, IMEI, SIM, IP Telephony, Soft Phone, Voice Mail, Adhoc & Sensor Networks, GIS, ISP, Mobile Computing, Cellular System Cell, Mobile Switching Office, Hands off, Base Station. Mobile OS (Symbian/Blackberry/Windows/Android/iPhone), Features and limitations, Types of Mobile apps.

## Unit 4

Artificial Intelligence and Expert system-Concepts of AI & Expert Systems, Merits and Demerits of Expert system, Application of Expert system and AI. Cloud Computing– Introduction, Types, Application, Services, Google Play Store, Apple Store, Need of Cloud Computing, Concept of Virtualization, Cloud Types, Cloud Services IOT– Introduction, Application & Use, Machine Learning: Introduction and Uses. Big data– Introduction, Application & Use.

# TEXT/REFERENCE BOOKS:


- Fundamentals of Information Technology by Alex Leon & Mleon, Vikas Publications.
- Frontiers of Electronic Commerce, by- Kalakota, Ravi; Stone, Tom.
- E-Commerce an Indian Perspective (Second Edition) by Pt Joseph, S.J. Prentice-Hall Of India.
- Recent Magazines of Computers and Communication.
- Information Technology & Computer Applications by V K. Kapoor, Sultan Chand & Sons, New Delhi.
- IT Trends & Technologies by Narendra Tiwari Publisher: Narendra Publication
- The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future by Kevin Kelly Publisher: Viking
- Information Technology: Emerging Trends by Sunil V.K. Gaddam Publisher: Vitasta Publishing Pvt. Ltd.


**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.**

**BCA268 C: OPEN SOURCE PROGRAMMING**
**Bachelor of Computer Application (B.C.A.)**
**Semester –IV**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

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**COURSE OBJECTIVES:**
In this course student will learn about to:

1. To explore open source software, licenses.
2. To analyze various open source languages.
3. To understand the open source database MySQL
4. To provide an exposure to develop various real time applications using PHP and Python

**COURSE OUTCOMES**:
At the end of this course students should able be

1. To understand about the basics of free and open source softwares.
2. To gather information about Free and Open Source Software projects from software releases and from sites on the internet.
3. To analyze the importance of database connectivity using MySQL with various open source softwares
4. To analyze requirements of software systems for the purpose of determining the suitability of implementing in PHP or Python.

**COURSE CONTENT**

**Unit 1**

**Introduction:** History of open source, OSD-Compliance, Open Source vs Closed Source – Copyright vs Copyleft – Open Source vs Free Software – FOSS, GNU. Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copy lefts Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization.

# Unit 2

Open Source programming languages: Introduction, features, Installation and various programming languages and its IDE and compiling and running simple program in Java, Python, R, Ruby, PHP, Kotlin etc. Introduction to Scripting language JavaScript.

## Unit 3

**Open Source Database –MySQL:** Introduction – Setting up account –Starting, terminating and writing your own SQL programs -Record selection Technology-Working with strings- –Date and Time – Sorting Query Results – Generating Summary – Working with metadata – Using sequences –MySQL and Web.

## Unit 4

Intro to Python Data types-data structures- Subroutines-Python-files-object oriented Programming using Python. PHP Language: PHP – variables, operations- constants- control structures arrays- functions- classes – handling files. Open CMS tool : Joomla, Magento etc.

# TEXT/REFERENCE BOOKS:


1. Eric Tiggeler, Joomla 2.5: Beginner's Guide, 2012, Packt Publishing Limited.
2. Larry Ullman, PHP and MySQL for Dynamic Web Sites: Visual QuickPort Guide, 2011, 4th Edition, Peachpit Press.
3. Dr. Martin Jones, Python for complete beginners, 2015, First edition, Create Space Independent Publishing Platform.


**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.**

**BCA226C- Software Lab-VII**
**(Based on BCA206C)**
**BCA Semester – IV**

| L | T | P | Credits |
|---|---|---|---|
| 0 | 0 | 4 | 2 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

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At least 10 Programs on the basis of topics of SQL and PL/SQL

# BCA228C- Software Lab-VIII (Based on BCA208C)

## BCA Semester – IV

| L | T | P | Credits |
|---|---|---|---|
| 0 | 0 | 4 | 2 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

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**List of Practicals**

1. Steps to install JDK in Windows and Linux.
2. Compiling and running a "hello world" program in Windows and Linux.
3. Write a program to calculate the prime number from n1 to n2. n1 and n2 are entered through keyboard.

   **Test Point: Scanner Class, Loop, Nested Loop, break, if..else**

4. Write a program to concatenate two strings. One string is obtained from command line and other from keyboard.

   **Test Point: Command Line Arguments, String class**

5. Write a program to convert string into integer and integer into string.

   **Test Point : Conversion functions**

6. Write a program to find the 2nd maximum number from an integer array.

   **Test Point: Array, loop, if..else**

7. Write a program to accept the input in variables of all data type from keyboard and display these on the screen.

   **Test Points : Scanner class and its functions.**

8. Write a program to check whether a string is empty, length of string, remove the white spaces, compare two string, convert the upper case string to lower case.

   **Test Points: String and String Functions**

9. Write a program to multiply two matrix of 3 X 3 and print the result in matrix format.

   **Test Points: 2D Array, loop, nested loops**

10. Write a program to calculate the area of various shapes with the function name 'Area' in class name 'CalculateArea'.

    **Test Points : Method overloading**

11. Write a program to initialize the private integer variable of a class with the value enter through keyboard and print the value of this variable.

# Test Point: Private Variables, use of public functions.

12. Write a program to initialize the private variable of a class without the use of public functions. Print the value of the variable also.

## Test Points : Constructor.

13. Write a program in which there is a display function in class Test. Display function print the value of private variable i and j of Test class. Value of i and j should be 0 when we call display by object obj1 of Test class, Value of i should be 10 and j remain 0 when we call it by object obj2 of Test class, Value of i and j should be 20 and 30 when we call it by object obj3 of Test class.

## Test Point : Constructor Overloading, default constructor

14. Write a program to count the number of object created of a class. Hint : No use of loop.

## Test Point : static variable

15. Write a program to add the value of variable i & j of two object obj1 and obj2 respectively and store the addition of both variable in object obj3. All three objects are part of a same class and i & j are private variables.

## Test Points: Method with object as parameter and return type.

16. There is a class A which have one default, one private, one protected and one public variable and there is a public method AccessAll() which store and print the value in all variable. Derive class A into another class B. Also write here a public function in class B which access all 4 variable of class A. Make the object of Class A and Class B in main and see the result. Write the output and discuss the reasons.

## Test Points : Inheritance, access modifier.

17. Write a program which have an abstract class Abst with abstract function, calculate with two integers as parameter. Define this calculate function, in the derived class Divide of Abst, which divide two numbers. Also define calculate function, in another derived class Multiply of Abst, which multiply two numbers. Object name should be Calculator. No other object is required.

## Test Points : Abstract class, Function Overriding.

18. Create a package pkg1, which contain a public class Pkg1Class, which have integer variables of type private, default, public, protected each one for each. Write another package pkg2, which have a class Pkg2Class. Pkg2Class extends the Pkg1Class of pkg1 package. Pkg2Class also have main function. Try to access all the variables declared in Pkg1Class in the main function of Pkg2Class with the object of Pkg1Class and Pkg2Class and observe the result. Write down your findings.

## Test Points : Package and inheritance

19. Write a simple program of exception handling in which you handle 1 checked and 1 unchecked exception.

## Test Points : Exception Handling

20. Write a program for multithreading using Thread class and another program using Runnable interface.

# Test Points: Multithreading, Thread Class and Runnable Interface

**DeenbandhuChhotu Ram University of Science & Technology, Murthal (Sonepat)**

**SCHEME OF STUDIES & EXAMINATIONS**

Bachelor of Computer Application (BCA) 3rd Year 5th Semester

Credit Based Scheme w.e.f. 2022-23

| Sr. No. | Course No. | Course Title | Teaching Schedule | | | Marksof Class Work | Examination Marks | | Total | Credit | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Theory | Practical | | | |
| 1. | BCA301C | Advance Java | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 2. | BCA303C | Software Project Management | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 3. | | Elective –III | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 4. | | Elective –IV | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 5. | | Open Elective | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 6. | BCA321C | Software Lab-IX (Basedon BCA301C) | - | - | 4 | 25 | - | 75 | 100 | 2 | 3 |
| 7. | BCA305C | Minor Project - I | - | - | 4 | 25 | - | 75 | 100 | 3 | 3 |
| **TOTAL** | | | **15** | **0** | **8** | **175** | **375** | **150** | **700** | **20** | |

**Elective-III**

| | |
|---|---|
| BCA351C | Internet of Things |
| BCA353C | Design and Analysis of Algorithm |
| BCA355C | Cloud Computing |
| BCA357C | Multimedia Technologies |
| BCA359C | .Net framework with c# Programming |

**Elective-IV**

| | |
|---|---|
| BCA371C | Soft Computing |
| BCA373C | Foundation of Block Chain Technology |
| BCA375C | Cyber Security |
| BCA377C | Artificial Intelligence |
| BCA379C | System Administration |

**Open Elective**

| | |
|---|---|
| BBA102B | Principle of Management |
| BBA101B | Business Organization |
| BBA108B | Disaster Management |
| MBA202C | Entrepreneurship |
| CHE459C | Nanoscience and Nanotechnology |
| MGT402C | Human Values, Ethics And IPR |

**NOTE:**Students will be permitted to opt for any one elective each from the list of Program Elective-III, Program Elective-IV and Open Elective. The minimum strength of the students should be 20 to run an elective course.

**DeenbandhuChhotu Ram University of Science & Technology, Murthal (Sonepat)**

**SCHEME OF STUDIES & EXAMINATIONS**

Bachelor of Computer Application (BCA) 3rdYear6th Semester Credit Based Scheme w.e.f. 2022-23

**Group-A**

| Sr. No. | Course No. | Course Title | Teaching Schedule | | | Marksof Class Work | Examination Marks | | Total | Credit | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Theory | Practical | | | |
| 1. | BCA302C | Python Programming | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 2. | BCA304C | Introduction to Data Science | 3 | 0 | - | 25 | 75 | - | 100 | 3 | 3 |
| 3. | BCA326C | Minor Project -II | - | 0 | 4 | 50 | - | 100 | 150 | 9 | 3 |
| **TOTAL** | | | **6** | **-** | **-** | **100** | **150** | **100** | **350** | **15** | |

**Group-B**

| Sr. No. | Course No. | Course Title | Teaching Schedule | | | Marksof Class Work | Examination Marks | | Total | Credit | Exam Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Theory | Practical | | | |
| 1. | BCA328C | Professional Training | - | - | - | 100 | - | 250 | 350 | 15 | 3 |
| **TOTAL** | | | | | | **100** | **-** | **250** | **350** | **15** | |

# NOTE:

1. Gr. A students will have to do project in the department under the supervision of faculty member along with two subjects at sr. no. 1 and 2.
2. Gr. B students will have to undergo Professional Training of at least one semester from the industry, institute, research lab, training center etc. Students who have CGPA of minimum 6.0 till IV sem. with no backlog will only be permitted to proceed for Professional Training.
3. Each student will be allotted a supervisor from the department for both project as well as professional training.
4. Internal evaluation of Project –II and Professional Training will be carried out four times in a semester.
5. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examinations.

**TOTAL CREDITS**

**B.C.A. = 159 (including first year)**

| Semester | 1 | 2 | 3 | 4 | 5 | 6 | Total |
|---|---|---|---|---|---|---|---|
| Credit | 17 | 20 | 19 | 22 | 20 | 15 | 113 |

# BCA301C – ADVANCE JAVA

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To familiar with concept of advanced java application and the design and development of GUI application using Swings.
2. To connect data structure and database with the Java Project.
3. To develop web application by creating client and server pages using servlet.
4. To practice the alternate of servlet i.e. Java Server Pages.

## COURSE

## CONTENT UNIT

## I

**Basics of Advanced Java:** Comparison between console application, GUI application and Web Application in Java. Advanced java features. Importance of Core Java while using advanced java features. Introduction to various kind of project of Advanced Java. Installation and use of Java, Java editor Netbeans, Eclipse etc. Role of Jar files in Java.

**Java GUI Programming:**Difference between AWT Controls & Swing Controls, various Swing Component and Container classes, Event Driven Programming using swing. GUI Project in Netbeans and Eclipse editors.

## UNIT-II

**Data Structure in Java:**Role of data structure in software project, Java Collection, ArrayList, LinkedList, Stack, ArrayDeque, HashSet. Java Stream Classes,
**Database Connectivity:** Role of Database in Java Application**,** JDBC basics**,**JDBC classes and interfaces, database connectivity and query execution,

## UNIT-III

**Web Application Development:**Client Server Technology, Request and Response on client and Server, Installation of Server like Tomcat etc.

**Client & Server Programming**: Creation of html pages/client pages, HTML form, Server Programming : Servlet, Lifecycle of a Servlet. Type of servlet : Servlet, GenericServlet&HTTPServlet classes,

Connectivity of HTML and HTTPServlet : Post and Get method, web.xml file. Servlet Request & Response classesin HTTPServlet,

## UNIT-IV

**Java Server Pages** : JSP Architecture, JSP Life Cycle, comparison of JSP and Sevlet, basic structure of JSP code file, JSP & HTML, JSP Scriptlet, JSP Implicit Object, JSP page directive, include directive.

Creation of complete application using JSP, servlet and database.

## TEXT/REFERENCE BOOKS:


- Dietel and Nieto: Internet and World Wide Web – How to program?, PHI/Pearson
- Education Asia.
- Patrick Naughton and Herbert Schildt: The Complete Reference Java, Tata McGraw-Hill.
- Hans Bergstan: Java Server Pages.
- Bill Siggelkow, S P D O‟Reilly: Jakarta Struts, Cookbook.
- Murach: Murach‟s beginning JAVA JDK 5, SPD.
- Wang-Thomson: An Introduction to Web Design and Programming.
- Knuckles: Web Applicat ions Technologies Concepts- John Wiley.
- Sebesta: Programming world wide web, Pearson.
- Building Web Applications-NIIT,PHI.4. JAVA 2(1.3) API Documentations


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Design and Develop GUI application and event driven programming using Swings.
2. Analyze the use of data structure in software and Design and develop database application.
3. Develop and design web application in Java using Servlet.
4. Develop and Design commercial web application using JSP.

# BCA303C – SOFTWARE PROJECT MANAGEMENT

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To explain needs for software specifications and to study different types of software requirements gathering techniques.
2. To convert the requirements model into the design model and demonstrate use of software and user interface design principles.
3. To justify the role of SDLC in Software Project Development and to study risks associated with a project.
4. To generate project schedule and can construct, design and develop network diagram for different type of Projects.

## COURSE

## CONTENT UNIT

## I

**Introduction to Software Project Management (SPM):**Definition of a Software Project (SP), categorizing SPs, SP Vs. other types ofprojects, Fundamentals of Software Project Management (SPM), activities covered by SPM, Project Management Cycle, SPM Objectives, project as asystem, management control, requirement specification, information and control in organization,
**Stepwise Project planning:**selecting a project, identifying project scope and objectives, identifyingproject infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, identifying activity risk, allocate resources, review/ publicize plan.

## UNIT II

**Project Evaluation & Estimation:-** Cost benefit analysis, cost benefit evaluation techniques, Selection of an appropriate project report, choosing technologies, choice of process model, structured methods, rapid application development, water fall-, V-process-, spiral-models. Prototyping, delivery. **Project Scheduling:-** Objectives of activity planning, project schedule, projects and activities, Identifyingactivities, sequencing and scheduling

activities, network planning model, Network Diagrams, CPM**,** representation of lagged activities, identifying critical path,

**Risk Management**:- Introduction, the nature of risk, managing risk, risk identification, risk analysis,reducing the risks, evaluating risks to the schedule.

# UNIT III

**Resource allocation &monitoring the control**: nature of resources, identifying resource requirements, scheduling resources, PERT, Gantt Charts, Error Tracking, Software Reviews, and Types of Review: Inspections, Desk checks, Walkthroughs, Code Reviews, and Pair Programming.

**Managing contracts and people**: types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures,

# UNIT IV

**Software quality Assurance and Testing:-** Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Verification & validation, Concept of Software Quality, Software Quality Attributes, , SQA Activities, CASE Tools

**Software quality:** theimportanceofsoftwarequality,definingsoftwarequality, measures, product versus process quality management, external standards, techniques to helpenhance softwarequality.

# TEXT/REFERENCE BOOKS:


- Software Project Management (2nd Edition), by Bob Hughes and Mike Cotterell, 1999, TMH
- Software Engineering – A Practitioner‟s approach, Roger S. Pressman (5th edi), 2001, MGH
- Software Project Management, Walker Royce, 1998, Addison Wesley.
- Project Management 2/c. Maylor
- Managing Global software Projects, Ramesh, 2001, TMH.
- S. A. Kelkar, Software Project Management, PHI Publication**.**


*** Latest and additional good books may be suggested and added from time to time**

**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.**

# COURSE OUTCOMES

By the end of the course the students will be able to:

1. Explain needs for software specifications and different types of software requirements gathering techniques.
2. Convert the requirements model into the design model and demonstrate use of software and user interface design principles.
3. Justify the role of SDLC in Software Project Development and identify the risks associated with a project.
4. Generate project schedule and can construct, design and develop network diagram for different type of Projects.

# BCA351C – INTERNET OF THINGS

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. Understand the Internet of computer and Internet of things.
2. Compare M2M and IoT communication.
3. Understand and analyze the architecture in various IoT Layer
4. Analyze various protocols and its usage in communication.

## COURSE

## CONTENT UNIT

## I

**Introduction to Internet of Things** –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT protocols:-Wireless communication protocols: Wifi, IPV4/IPV6, 6LOWPAN, ZigBee(IEEE802.15.4), Bluetooth, Bluetooth Low Energy(BLE),Application layer protocols: MQTT/MQTTS, CoAP, REST/HTTP,XMPP, SCADA Authentication Protocols; IEEE 802.15.4., comparison of the different IoT protocols, advantages and disadvantages of these IoT protocols.

## UNIT II

**IoT enabledTechnologies**–Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems.

**IoT Architecture:** Architecture Reference Model- Introduction-Reference model and architecture-IoT reference model-IoT Reference Architecture-Introduction-Functional View-Information view-Deployment and operational view-Other relevant architectural views.

## UNIT III

**IoT and M2M** Software defined networks, network function virtualization, difference between SDN and NFV for IoT -Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, and SNMP NETOPEER.

## UNIT IV

**Applications of IoT And Research Perspective**: IoT Strategic Research and Innovation Directions , Domain specific applications of IoT, Home automation, Surveillance applications, Industrial IoT,IoT in Energy, IoTin Healthcare, Internet of Robotic Things, Green IoT, home, infrastructures, buildings, security, Industries, Home appliances,Internet of Nano Things,IoT application in Drones, Internet of Vehicles(IoV),Internet of Everything(IoE)

## TEXT/REFERENCE BOOKS:


1. The Internet of Things in the Cloud: A Middleware Perspective - Honbo Zhou – CRC Press.
2. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles- (Eds.) – Springer.
3. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press.
4. The Internet of Things: Applications to the Smart Grid and Building Automation by – Olivier Hersent, Omar Elloumi and David Boswarthick – Wiley.
5. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. RecognizeanddescribetheInternetofcomputerandInternetofThings
2. ClassifyIoTarchitecturebasedontheirapplicability.
3. Identifythedifferentprotocolsused indifferentlayer.
4. ExpresstheIoTapplicationinvariousrealtimeproblems

# BCA353C – DESIGN AND ANALYSIS OF ALGORITHM

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To analyze worst-case running times of algorithms based on asymptotic analysis
2. To apply the algorithms and design techniques to solve problems.
3. To explain the major graph algorithms and their analyses and to employ graphs to model engineering problems.
4. To understand the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

## COURSE

## CONTENT

## UNIT-I

**Introduction:** Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and spacetrade-offs. Analysis of various searching and sorting algorithms in terms of Time.

## UNIT-II

**Fundamental Algorithmic Strategies:** Brute-Force, Greedy,Dynamic Programming, Branch- and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving, Knapsack, TSP. Heuristics-characteristics and their application domains.

## UNIT-III

**Graph and Tree Algorithms:** Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.

## UNIT-IV

**Tractable and Intractable Problems:** Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard.Cook‟s theorem,Standard NP-complete problems and Reduction techniques.

## TEXT/REFERENCE BOOKS:


1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.
3. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
4. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
5. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
2. Apply the algorithms and design techniques to solve problems;
3. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems,
4. Understand the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

# BCA355C – CLOUD COMPUTING

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To understand basic concept of cloud and its application.
2. To learn different cloud computing services & Model.
3. To learn how to do virtualization.
4. Describe the key components of Amazon web Service and security issue involve in cloud computing.

## COURSE

## CONTENT UNIT

## I

**Cloud Computing Fundamentals**: Cloud Computing definition, Characteristics of Cloud Computing, Cloud Computing Benefits and Limitations, Cloud Architecture; Cloud computing vs. Cluster computing vs. Grid computing; Applications: Technologies and Process required when deploying Web services.

## UNIT II

**Cloud Computing Model and Services** : Cloud Computing Deployment model, Cloud Computing service models: Introduction to Cloud Services: : SaaS, IaaS, PaaS; Storage As a Service, Communication As a Service; Cloud-based big data/real time analytics, Understanding SOA; Improving Performance through Load Balancing.

## UNIT III

**Virtualization**: Virtualization Basics: Objectives, Benefits of Virtualization, Emulation, Virtualization for Enterprise, VMware, Server Virtualization, Data Storage Virtualization, hypervisors, types of hypervisors, distributed management of virtual infrastructures.

## UNIT IV

**Cloud vendors and Service Management & Security**: Amazon cloud, AWS Overview, Installation of AWS, Google app engine, azure cloud, Salesforce. Service Management in Cloud Computing: Service Level Agreements (SLAs), Comparing Scaling Hardware: Traditional vs. Cloud, Security Concepts: Cloud security challenges

## TEXT/REFERENCE BOOKS:


- Cloud Computing: A Practical Approach by Anthony T. Velte Toby J. Velte, Robert Elsenpeter, the McGraw-Hill.
- Cloud Computing: SaaS, PaaS, IaaS, Virtualization and more. by Dr. Kris Jamsa.
- Tim Mather, SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, O‟ReillyMedia Inc.
- Cloud Computing Bible, Barrie Sosinsky, Wiley-India.
- Cloud Computing: Principles and Paradigms, Editors: RajkumarBuyya, James Broberg, Andrzej M. Goscinski, and Wile.
- Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
- Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India. Note: Latest and additional good books may be suggested and added from time to time


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Compare cloud from cluster and grid based on their architecture.
2. Design the cloud by proposing different services provided by a cloud: SaaS, IaaS and PaaS.
3. Develop and design the virtualization of server etc.
4. Develop and design the cloud on various cloud vendors and analyses of security issues in cloud computing.

# BCA357C – MULTIMEDIA TECHNOLOGIES

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

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## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To understand basic concept of Multimedia
2. To learn different component of multimedia : text and audio
3. To learn the basic concept of image.
4. To learn the basic concept of video and animation.

## COURSE

## CONTENT UNIT

## I

**Introduction to Multimedia**: definition, benefits of multimedia over traditional media, applications of multimedia, role of multimedia in internet world, Components of multimedia, Transition from conventional media to digital media. Various software and languages to design and develop multimedia application. Compression technique: lossy and loss less.

## UNIT II

**Text & Audio**: text fonts, outline fonts, bitmap font‟s International character sets and hypertext, Digital font‟s techniques. **Audio**: fundamentals and representations. Digitization of sound, frequency and bandwidth, decibel system, data rate, audio file format, Sound synthesis, MIDI, wavetable, Compression and transmission of audio on Internet, Audio software and hardware

## UNIT III

**Image** : Image basics, pixels, Color Science, Colour Models, Colour palettes, Dithering, 2D Graphics, Image Compression and File Formats :GIF, JPEG, JPEG 2000, PNG, TIFF, EXIF, PS, PDF, Use of image editing software : Photoshop.

## UNIT IV

**Video and Animation**: Video Basics, Analog video, Digital video, Video Recording and Tape formats, Video Compression and File Formats. Video compression based on motion compensation, MPEG-1, MPEG-2, MPEG-4, MPEG-7, MPEG-21, Animation: Cell Animation, Computer Animation, Morphing. Multimedia Authoring. Multimedia Authoring Basics, Some Authoring Tools.

## TEXT/REFERENCE BOOKS:


- Tay Vaughan, "Multimedia making it work", Tata McGraw-Hill, 2008.
- Rajneesh Aggarwal & B. B Tiwari, "Multimedia Systems", Excel Publication, New Delhi, 2007.
- Li & Drew, "Fundamentals of Multimedia", Pearson Education, 2009.
- Parekh Ranjan, "Principles of Multimedia", Tata McGraw-Hill, 2007
- AnirbanMukhopadhyay and Arup Chattopadhyay, "Introduction to Computer Graphics and Multimedia", Second Edition, Vikas Publishing House.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Analysis and study of application of multimedia.
2. Able to design and develop the text and audio application.
3. Able to edit and design images using software like Photoshop.
4. Able to design and develop the video and animation application.

# BCA359C –.NET FRAMEWORK WITH C# PRORAMMING

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

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## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. Understand the .NET FRAMEWORK fundamentals
2. Understand and implement object oriented features in C # programming language to solve the problem.
3. Explain & depict the Windows application development in .NET with C#programming.
4. Comprehend the .NET Framework components related with database objects.

## COURSE

## CONTENT UNIT

## I

**.Net framework and c#:** Evolution of the .NET Framework , Overview of the .Net Framework , .NET Features,.net framework Architecture, Role of CLR,CLS,CTS,variables, constants and expressions: Value Types and Reference Types – VariableDeclarations and Initializations, Value Data Types ,Reference Data Types , Boxingand Unboxing – Arithmetic Operators

## UNIT II

**Control statements, methods and arrays**: types of methods – one dimensional array, multi-dimensional arrays – jagged arrays. String and string builder classes, classesdefinition and usage of a class – constructor overloading, copy constructor, instance and shared class members, operator overloading and method overloading.

## UNIT III

**Inheritance and polymorphism**: virtual methods – abstract class and abstract methods – sealed classes. **Interfaces**:

definition of interfaces – multiple implementations of interfaces –interface inheritance, access modifiers. Delegates.

**Exception handling:** default exception handling mechanism – user defined exception handling mechanism – throw statement – custom exception.

## UNIT IV

**Multithreading**: usage of threads – thread class, start (), abort (), join (), and sleep () methods, suspend () and resume () methods, thread priority
**Database connectivity**: advantages of ado.net, managed data providers, developinga simple ado.net based application, creation of data table, retrieving data from tables, table updating, and disconnected data access through dataset

## TEXT/REFERENCE BOOKS:

- By the end of the course the students will be able to: Balaguruswamy, " Programming with C#(TMH)
- Wiley,"Beginning Visual C# 2008",Wrox
- ShibiParikkar," C# with .net Framework"Firewall Media
- "C# Programming Black Book "Kogent Learning Solutions Inc.
- Joseph Albahari , Ben Albahari ," C# 9.0 in a Nutshell: The Definitive Reference"Oreilly

*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Understand .Net framework and architecture.
2. Create console application using c# language.
3. Build window application with event handling
4. Design and implement a database application using ADO.net

# BCA371C – SOFT COMPUTING

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. Understand Soft Computing concepts, technologies, and applications.
2. To understand the artificial neural network and its applications.
3. To learn fuzzy logic and its applications.
4. To solve single-objective optimization and its applications using GAs.

## COURSE

## CONTENT UNIT

## I

**Overview of Soft Computing**Difference between Soft and Hard computing, Brief descriptions of different components of soft computing including Artificial intelligence systems Neural networks, fuzzy logic, genetic algorithms. Artificial neural networks Vs. Biological neural networks, ANN architecture, Basic building block of an artificial neuron, Activation functions, Introduction to Early ANN architectures (basics only)-McCulloch & Pitts model, Perceptron, ADALINE, MADALINE.

## UNIT II

**Back propagation Neural Networks** - Kohonen Neural Network, Learning Vector Quantization Hamming Neural Network, Hopfield Neural Network, Bi-directional Associative Memory,Adaptive Resonance Theory Neural Networks, Support Vector Machines, and Spike Neuron Models.

## UNIT III

**Introduction to Fuzzy Logic**: Classical Sets and Fuzzy Sets, Classical Relations and Fuzzy Relations, Membership Functions, Defuzzification, Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning, Introduction to Fuzzy Decision Making.

## UNIT IV

**Genetic algorithms**: Basic Concepts- Working Principles, Encoding, Fitness Function Reproduction, Inheritance Operators , Cross Over, Inversion and Deletion ,Mutation Operator Bit-wise Operators, Convergence of Genetic Algorithm**.**

## TEXT/REFERENCE BOOKS:


- N.P.Padhy, S.P.Simon, "Soft Computing with MATLAB Programming", Oxford University Press, 2015.
- S.N.Sivanandam,S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt.Ltd. 2nd Edition, 2011.
- S.Rajasekaran, G.A.VijayalakshmiPai, "Neural Networks, Fuzzy Logic and Genetic Algorithm, Synthesis and Applications ", PHI Learning Pvt.Ltd. 2017.
- KwangH.Lee, ―First course on Fuzzy Theory and Applications‖, Springer, 2005.
- George J. Klir and Bo Yuan, ―Fuzzy Sets and Fuzzy Logic-Theory and Applications‖, Prentice Hall, 1996.
- James A. Freeman and David M. Skapura, ―Neural Networks Algorithms, Applications, and Programming Techniques‖, Addison Wesley, 2003.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Evaluate and compare solutions by various soft computing approaches for a given problem.
2. Understand the artificial neural networks and its applications.
3. Apply fuzzy logic and reasoning to handle uncertainty and solve various problems.
4. Apply genetic algorithms to combinatorial optimization problems.

# BCA373C –FOUNDATIONS OF BLOCKCHAIN TECHNOLOGY

**Bachelor of Computer Application (B.C.A.)**

**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To introduce basic concepts of Blockchain.
2. To understand abstract models for Blockchain technology.
3. To learn about usage of Blockchain technology in financial services.
4. To visualize the scope of Blockchain& its role in futuristic development.

## COURSE

## CONTENT UNIT

## I

**Introduction to Block chain:-** Overview of block chain, need for blockchain, history of centralized services, trusted third party, Distributed consensus in open environments, Distributed Vs. Decentralized Network, 51 % attack theory, Public blockchains, Private blockchains, Blockchain Architecture and working, Mining, Limitations of blockchain, Applications of blockchain

## UNIT- II

**Models for block chain**:- GARAY model, RLA Model, Proof of Work (PoW), HashcashPoW, PoW Attacks and the monopoly problem, Proof of Stake(PoS), hybrid models(PoW+PoS), Proof of Burn and Proof of Elapsed Time.

## UNIT- III

**Permissioned Blockchain:-** Permissioned model and use cases, Design issues for Permissioned blockchains, State machine replication, Consensus models for permissioned blockchain, Distributed consensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem, Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT over Asynchronous systems.

## UNIT- IV

**Blockchain in Financial Service:-** Digital Currency,Cross border payments, Steller and Ripple protocols, Project Ubin, Know Your Customer (KYC), Privacy Consents, Mortgage over Blockchain, Blockchain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, Insurance.

## TEXT/REFERENCE BOOKS:

- Blockchain: Blueprint for a New Economy, by Melanie Swan.
- Blockchain: The blockchain for beginners guide to blockchain technology and leveraging blockchain programming, by Josh Thompsons
- Blockchain Basics by Daniel Drescher, Apress

*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Recognizing goals of Blockchain.
2. Smart Contracts, transactions in Blockchain and Permissioned Blockchain.
3. Analyzing usage of Blockchain in finance.
4. Security issues in Blockchain.

# BCA375C – CYBER SECURITY

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. Identify the main typologies, characteristics, activities, actors and forms of cybercrime.
2. Understand the fundamental concepts of Cyber space and cyber security, to familiarize various cyber threats, attacks, vulnerabilities, defensive mechanisms, security policies and practices.
3. To explain the fundamental concepts of Cyber Law and IT Act 2000.
4. To explore current digital forensics software and hardware tools and to understand recent trends in cyber forensics.

## COURSE

## CONTENT UNIT

## I

**Cybercrimes and Cyber Attacks:** Definition of Cyber Crime, Classification of Cyber Crimes, Planning of attacks, social engineering: Human based, Computer based: Cyberstalking, Cybercafe and Cybercrimes Types of Attacks (Active/passive), Attacks: Phishing, Password cracking, Keyloggers and Spywares, DoS and DDoS attacks, SQL Injection attacks; Identity Theft (ID); Cyber Terrorism, Characteristics and examples.

## UNIT II

**Cyber Space and Security:**Cyberspace, Goals for Security, Security threat and vulnerability, Cyber security models, social network sites security, attack prevention passwords, protection against attacks in social media, securing wireless networks, security threats.

Malicious Software and Prevention: Viruses, Worms, Information Theft, Key loggers, Phishing, Spyware, Backdoors, Rootkits, Distributed Denial of Service Attacks.

## UNIT III

**Cyber Law and Indian IT Act:** Emergence of cyber space, Need for Cyber Law, Cyber Law in India Cyber Jurisprudence at International and Indian Level, Cyber ethics. Overview of IT Act 2000, Amendments and limitations of IT Act, Cyber Defamation, Different Types of Civil Wrongs under the IT

Act, 2000. **Intellectual property rights**- definition, categories of intellectual property, rights protected under intellectual property, copyright, patent and trademark, design, design law in India

## UNIT IV

**Cyber Security Policies and Digital Forensics:** What security policies are: determining the policy needs, writing security policies, Internet and email security policies, Compliance and Enforcement of policies, Review.

**Introduction to Digital Forensics** Forensic Software and Hardware; Computer Forensics and Law Enforcement, Indian Cyber Forensic, Forensic Technology and Practices - Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Forensics of Handheld devices.

## TEXT/REFERENCE BOOKS:


- Cyber Security, Understanding cyber crimes, computer forensics and legal perspectives, Nina Godbole,SunitBelapure, Wiley Publications
- Writing Information Security Policies, Scott Barman, New Riders Publications, 2002
- Cybersecurity for Dummies, Brian Underdahl, Wiley, 2011
- Allan Friedman and P. W. Singer, Cyber Security and Cyber war: What Everyone Needs to Know by Published Oxford University
- Don Franke, Cyber Security Basics: Protect Your Organization by Applying the Fundamentals by Publisher CreateSpace Independent Publishing Platform, 2016
- MayankBhushan, Fundamental of Cyber Security
- Thomas Halt, Adam M. Bossler and Kathryn C.SeigfriedSpellar(2017), "Cybercrime and Digital Forensics: An Introduction", Routledge Taylor and Francis Group
- William, Stallings. (2018). Effective Cyber security: A Guide to Using Best Practices and Standards, Addison - Wesley Professional Publishers, 1st Edition.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Describe the basic concepts the various ideas about cybercrime.
2. Realize the cyber threats, attacks, vulnerabilities and its defensive mechanism.

3. Explain and practice the Cyber Law, Ethics, and Intellectual Property Rights, Patent and Trademark and Design Law.
4. Evaluate the strengths and weaknesses of cyber forensics toolsand Recognize the features of Cyber Forensics to apply in real time scenarios

# BCA377C – ARTIFICIAL INTELLIGENCE

**Bachelor of Computer Application (B.C.A.)**

**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To understand the importance of AI, the basic concepts and applications.
2. To become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
3. To understand the various search algorithms and able to apply various search algorithms.
4. To investigate applications of AI techniques in expert systems, artificial neural networks and other models.

## COURSE

## CONTENT UNIT

## – I

**Artificial Intelligence**: Introduction, Historical Perspective, AI applications areas, current Trends in AI.
**Search strategies**: Defining the problem as a State Space Search, Production Systems, search-data driven and goal driven search; Search algorithms-uninformed search (depth first, breadth first, depth first with iterative deepening) and informed search (Hill climbing, best first, A* algorithm, mini-max etc.),Constraint Satisfaction.
**Game Playing**: The Mini-max search Procedure, Alpha-beta cutoffs

## UNIT – II

Knowledge Representation:Propositional & Predicate Logic : Syntax and semantics for prepositional logic, Syntax & semantics of First Order Predicate Logic (FOPL), Properties of well-formed formula (wff), Conversion to clausal form, Inference rules, The resolution principle, unification.
Structured Knowledge Representations: Semantic Nets, Frames, Conceptual Dependencies and Scripts, Representing Knowledge Using Rules: Procedural versus Declarative Knowledge, Forward Versus Backward Reasoning

## UNIT – III

**Handling Uncertainty: Handling Inconsistent and Incomplete Knowledge:** Truth Maintenance Systems, Reasoning Techniques, Concept of Uncertainty, Bayes „Theorem, Certainty Factors and Rule-Based Systems, Bayesian Networks, Dempster-Shafter Theory
**Fuzzy Logic:Fu**zzy Sets, Fuzzy Operators & Arithmetic, Membership Functions, Fuzzy Relations

## UNIT – IV

**Knowledge Acquisition: Different forms of** learning: learning from examples, learning by analogy, Discovery as learning, explanation based learning, Rote learning, neural learning, learning by induction, Genetic Algorithm.

**Applications of Artificial Intelligence** Natural Language Processing, Expert Systems, Neural Networks, Intelligent Agents.

## TEXT/REFERENCE BOOKS:


- Artificial Intelligence by Elaine Rich, Kevin Knight and Nair ISBN-978-0-07- 008770-5, TMH,
- Artificial Intelligence by SarojKausik ISBN:- 978-81-315-1099-5, Cengage Learning
- Artificial Intelligence and Intelligent Systems by Padhy, Oxforfd University Press,
- S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach (2nd ed.), Pearson Education, 2005.
- Nils J Nilson, Artificial Intelligence: A New Synthesis, Morgan Kaufmann Publishers, Inc., San Francisco, California, 2000.
- R. Akerkar, Introduction to Artificial Intelligence, Prentice-Hall of India, 2005
- Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Prentice Hall of India, 2006


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Demonstrate fundamental understanding of artificial intelligence (AI) and its applications.
2. Demonstrate awareness of search and exploration methods.
3. Explain about AI techniques for knowledge representation and uncertainty Management.
4. Develop knowledge of decision making and learning methods

# BCA379C – SYSTEM ADMINISTRATION

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To understand UNIX operating system, its architecture and shell features
2. To become familiar with various Unix commands and utilities.
3. To understand various administration commands
4. To give overview of shell Programming.

## COURSE

## CONTENT UNIT

## I

**Operating System Introduction**: Introduction to operating system, Functions of operating system, Types of operating system

**Introduction to unix and file system** : A brief history of UNIX, The UNIX Architecture and Command structure usage, Basic Characteristics of UNIX, comparison between Unix and Windows ,System startup and shutdown , The Unix File Hierarchy ,UNIX File System – Boot block, super block, Inode table, data block.

## UNIT II

**Commands and Utilities**: GENERAL PURPOSE UTILITIES - cal, date, man, echo, bc, clear, script, tty, passwd, who,.FILE and Directory HANDLING UTILITIES - pwd, cd, mkdir, rmdir, cat, cp, ls, wc, rm, mv, nl, pg, more, chmod, chown, chgrp DISK UTILITIES – du, df, mount, umount wait NETWORKING UTILITIES – ping, telnet, rlogin, ftp, arp, finger, Absolute and relative pathnames, communication commands ,editor , PROCESS UTILITIES – ps, fg, bg, kill, stop

**Introduction To Shells**: UNIX Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Background processing .

## UNIT – III

**System administration**: Role of system administrator, Functional activities of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying

group attributes, Temporary disable user‟s accounts, creating and mounting file system, checking and monitoring system performance ,Maintaining Security, Getting System Information, becoming super user using su. Backup and restore files Configure X-windows desktop, starting & using X desktop.

## UNIT – IV

**Shell programming**: Basic of shell programming, comparisons between various shells, Special shell parameters , wild card characters , Types of statement, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords.

**FILTERS**: Filters, concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, uniq, comm, pr , diff and cmpFilters using regular expressions - grep, egrep and sed

## TEXT/REFERENCE BOOKS:


- Sumitabha Das, "Unix Concepts And Applications", 4thEdition. TMH, 2006
- Behrouz A. Forouzan, Richard F. Gilbery, "Unix and Shell Programming", Cengage Learning India, 2003.
- Graham Glass, King Ables, "Unix for Programmers and Users", 3rdEdition, Pearson Education, 2009.
- N.B Venkateswarlu, "Advanced Unix programming", 2ndEdition, BS Publications, 2010.
- YashwanthKanitkar, "Unix Shell programming", 1stEdition, BPB Publisher, 2010.
- Maurice J. Bach, Design of the UNIX Operating System, Prentice Hall, 1986


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Describe Basic architecture of Unix operating system
2. Use a variety of common Unix commands and utilities
3. Demonstrate the role and responsibilities of a UNIX system administrator
4. Develop shell scripts to perform task

# BBA-102-B – PRINCIPLES OF MANAGEMENT

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To expose basic concepts of management and to enable them to gain appreciation for emerging ideas, techniques, procedures and practices in the field of management.
2. To explain how managers align the planning process with company mission, vision, and values and explain the process and techniques of individual and group decision-making.
3. To identify common organizational structures and gain knowledge towards organizational processes.
4. To study the system and process of effective controlling in the organization.

## COURSE CONTENT

### UNIT I

**Introduction** – nature and process of management, principles and functions of management, basic managerial roles and skills, approaches to management – classical, human relations and behavioral, systems and contingency approaches; contemporary issues and challenges

### UNIT II

**Planning and decision making** – concept, purpose and process of planning, types of plans, strategic planning, tactical planning and operational planning, goal setting, MBO; decision making – nature and process, behavioral aspects of decision making, forms of group decision making in organizations.

### UNIT III

**Organizing and leading**: elements of organizing – division of work, departmentalization, distribution of authority, coordination; organization structure and design; leadership – nature and significance, leadership styles, behavioral and situational approaches to leadership.

### UNIT IV

**Motivation**; concept and nature; need hierarchy and „motivation-hygiene" theories of motivation Management control – nature, purpose and process of controlling, kinds of control system, prerequisites of effective control system, controlling techniques.

# TEXT/REFERENCE BOOKS:


- Heinz Weihrich& Harold Koontz, Management A global prospective, McGraw Hill Education.
- Robbins, S.P. and Decenzo, D.A. Fundamentals of Management, Pearson Education. PravinDurai, Principles of Management, Pearson Education.
- Deepak Kr. Bhattacharya, Principles of Management: Text and Cases: Pearson Education.
- Hellregel, Management, Cengage Learning.
- Stoner, Freeman, Gilbert, Management, Pearson Education.
- Robbins & Coulter, Management, Pearson Education.
- SatyaRaju, Management- Text & cases, PHI Learning Pvt. Ltd
- Richard L. Daft, Management, Thomson south-Western.
- Anil Bhatt & Arya Kumar, Management: Principles, Processes and Practices. Oxford University Press.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

# COURSE OUTCOMES

By the end of the course the students will be able to:

1. Describe the influence of historical forces on the current practice of management and Identify and evaluate social responsibility and ethical issues involved in business situations
2. Have clear understanding of managerial functions like planning, and have knowledge on Organizational decision making
3. Understand the concept of organization.
4. Demonstrate the ability to directing, leadership and communicate effectively and to analysis isolate issues and formulate best control methods

# BBA-101-B – BUSINESS ORGANIZATION

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To learn about the various forms of business organization and the process of setting a new venture entity under a country‟s legal-economic structure, and Students would understand the concept of commerce, trade and industry.
2. To differentiate between various forms of business organizations.
3. To prepare with the knowledge of financing the business from various sources.
4. To understand the role of government in business and various prospects or risk Management.

## COURSE

## CONTENT UNIT

## I

Business – Nature, purpose and scope; Business as a system; Objectives of business; Structure of business – Classification of business activities; Social responsibility of business & business ethics; Business and economy, Business and environment interface, Distinction between trade, commerce and business.

## UNIT II

Forms and formation of business enterprises (meaning, characteristics, formation, merits and demerits of each type): Sole proprietorship, Partnership, Joint Hindu Family, Joint Stock Company, Cooperative societies, and Different types of companies. Entrepreneurship: Concept and nature; process of setting up a business enterprise; choice of a suitable form of business organization, feasibility and preparation business plan.

## UNIT III

Formation of a company: Promotion, Certificate of Incorporation, Memorandum of Association, Articles of

Association, and Prospectus. Sources of business finance: Short term, medium term and long term sources of finance.

## UNIT IV

Management of Risk and Insurance; Role of Government in business: As promoter, as financer and as regulator; Emerging formats of business organization: Franchising, Sub-contracting, Strategic Alliance, Outsourcing, Joint Ventures; Mergers, Acquisitions and Take-overs.

## TEXT/REFERENCE BOOKS:


- Tulsian, P.C., Business Organization and Management, Pearson Education.
- Talloo, Thelman J., Business Organizational and Management, McGraw Hill Education.
- Kanagasabapathi, P., Indian Models of Economy, Business and Management, PHI Learning Pvt. Ltd.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Understand the basics of Business and Business Organization. Understand the Forms of business organizations: Understand and evaluate Partnership Firm. Remember and understand the concept of Company
2. Understand and analyze the components and objectives of Business, Role of business in the present-day Society, Trade, Industry and Commerce. Remember and understand the concepts of joint Hindu family and Sole proprietorship .Analyze and apply requisites of an Ideal Form of Business Organization
3. Understand creating Memorandum of Association, Articles of Association and Prospectus Remember and understand the Co-operative Society. Analyze and applying sources of Business Finance in small business models.
4. Understand the importance and role of government in Business Combinations and explore the Emerging formats of business organization.

# BBA-108-B– DISATER MANAGEMENT

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To provide basic conceptual understanding of disasters and its relationships with development.
2. To gain understand approaches of Disaster Risk Reduction (DRR) and the relationship between vulnerability, disasters, disaster prevention and risk reduction and explain the Applications of Science and Technology for Disaster Management .
3. To explain Relief, Rehabilitation, Recovery, Mitigation and enhance awareness of Disaster Risk Management institutional processes in India and to build skills to respond to disasters.
4. To explain Applications and Future of Disaster management and polices of disaster management

## COURSE

## CONTENT UNIT

## I

**Introduction:** Definition of disaster; general effects of disaster; causal factors, disasters and development (cause and effect) meaning of disaster management; types of disasters/hazards: natural, anthropogenic, sociological technological, transport, climate change; social and psychological dimensions of disasters, coping with stress, anxiety and fears; technology and disaster management and latest technological equipment‟s; Disaster Response: Reasons for concern, objectives.

## UNIT II

**Disaster Management**: Disaster management agencies and their functions; disaster Risk management: definition, need, obstacles, disaster relief and factors, international approach to integrated disaster risk management; risk mitigation strategies, participatory assessment of disaster risk, disaster reduction; communicable diseases occurring after natural disasters, their prevention. Mass casualty management, technology and disaster management and latest technological equipment to combat disasters.

## UNIT III

**Relief, Rehabilitation, Recovery**: Relief, rehabilitation, displacement and development, priorities and opportunities in rehabilitation and reconstruction, relevance of mitigation and its techniques, mitigation measures, people's participation, disaster recovery: business continuity planning, role of NGOs in managing disasters.

## UNIT IV

**Applications and Future of Disaster management:** Bio-terrorism: meaning, threat assessment, GIS and epidemiology, advantages of GIS and its applications in health; India's natural disaster's proneness, management of disasters in India: institutional and policy framework; disaster planning, significance of disaster risk reduction, Government policies on the same, strategies presently being adopted; A brief overview of the disaster management act.

## TEXT/REFERENCE BOOKS:


- M. Saravana Kumar, Disaster Management, Himalaya Publishing House
- SatishModh, Introduction to Disaster Management, Macmillan
- SatishModh, Citizen's guide to Disaster Management, Macmillan
- Tushar Bhattacharya, Disaster Science and Management, McGraw Hill Education.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Differentiate the types of disasters, causes and their impact on environment and society
2. Know the Disaster damage assessment and management, Awareness of institutional processes in the country and to develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live.
3. Assess vulnerability and various methods of risk reduction measures as well as mitigation, understanding the role of NGO‟s
4. Applications and Future of Disaster management, complete preparedness, response and recovery in order to reduce the impact of disasters.

# MBA -202-C –ENTREPRENEURSHIP

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To expose the students to the growth of entrepreneurship in developing countries and acquaint with the establishment and running of a new enterprise.
2. To apply the theories and techniques for business development - new business formation (measuring start-up activity, new entrepreneurs and social networks), business growth and sustainability
3. To understand Indian Models in Entrepreneurship context with social and women entrepreneurship and problems faced by entrepreneurs.
4. To understand fundamental aspects of small business startup are explored including creativity, initial funding, organizing, marketing, and financially controlling a small business

**COURSE CONTENT**

**UNIT I**

**Introduction to Entrepreneurship** Meaning and concept of entrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development, Myths about entrepreneurs, agencies in entrepreneurship management and future of entrepreneurship types of entrepreneurs. Entrepreneurship‟s Challenges; Factor affecting Entrepreneurial Growth – Economic &Noneconomic Factors; Entrepreneurship Process; EDP Programmes.

## UNIT II

**Innovation Technology Management:** Identification of Business opportunities; recognition of a good business opportunity; Models of Opportunity Evaluation: RAMP Model & Seven-domain Framework; Generation of Business Idea; Approach & techniques of Business Idea. Business Plan : Purpose of Business Plan; Contents of Business Plan; Presenting of Business Plan; Why Business plan Fails; procedure for setting up an Enterprise. Project Report Preparation; Specimen of Project Report.

## UNIT III

**Indian Models in Entrepreneurship:**Social Entrepreneur: Introduction; Characteristics, Need, Types and

Motivations of Social Entrepreneur; Benefits of Social Entrepreneur; Supporting Social Entrepreneur; Evaluating Social Performance. Women Entrepreneurship: Role & Importance, Profile Women

Entrepreneur, Emerging EcoSystem for Women Entrepreneur; Problems of Women Entrepreneurs, Women Entrepreneurship Development in India.

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## UNIT IV

**Developments of Entrepreneur**: Micro, Small and Medium Enterprises: Concept & definitions; Role & Importance; MSMED Act 2006, Current Scheme of MSME- Technology Up-gradation Scheme ,Marketing Assistance Scheme ,Certification Scheme, Credit- rating scheme , Problems facing MSME. Financing the venture: Introduction, Different stages of Money, Sources of Finance, Seed Funding, Venture Capital Funding, Funding from Banks & Lease Financing.

## TEXT/REFERENCE BOOKS:


- Roy Rajeev, Entrepreneurship 2/e, Oxford University Press.
- Charantimath, Poornima, "Entrepreneurship Development and Small Business Enterprises", Pearson Education, New Delhi.
- Norman M. Scarborough, "Essentials of Entrepreneurship & Small Business Management", PHI, Delhi
- Vasant Desai, "Entrepreneurial Development and Management", Himalaya Pub. House, New Delhi.
- Kumar Arya, "Entrepreneurship: creating and leading an entrepreneurial organization", Seventh Impression, Pearson Education. 6. Holt, "Entrepreneurship: New Venture Creation", Prentice Hall, New Delhi


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. To understand the nature of entrepreneurship and have the ability to discern distinct entrepreneurial traits.
2. To identify personal attributes that enable best use of entrepreneurial opportunities also know the parameters to assess opportunities and constraints for new business ideas
3. To understand the systematic process to select and screen a business idea and write a business
4. To explore entrepreneurial leadership and management style & design strategies for successful implementation of ideas.

**CHE459C : NANOSCIENCE AND NANOTECHNOLOGY**

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

Course Objectives:

1. To initiate the student in the area of development of new materials / nanomaterials for novel applications and devices.
2. To impart foundational knowledge of nanoscience and related fields.
3. To make the students acquire an understanding of the analytical techniques in nanoscience and nanotechnology fields.
4. To help them understand in broad application areas of nanoscienceand nanotechnology in engineering.

# UNIT-I

Types of materials; bonding in materials; crystal structures and defects; amorphous materials; origins of properties of materials; Effect of nanostructures on properties of materials.
The science of materials – materials science; Historical use of nanoparticles; discovery of the carbon nanotubes; fullerenes; nanostructured materials

# UNIT-II

Particle-wave duality; de-Broglie waves; Schrodinger equation in 1-Dimension; Superposition; Energy eigenstates; Interpretation of wave function; Fermions and Bosons; Electron density of states; Energy bandgaps; Fermi energy; Excitons and Bohr radius.

# UNIT-III

AFM; STM; Transport in nanostructures; 0,1 and 2 dimensional nanostructures; Bandgap engineering; Molecular motors; MEMS and NEMS devices. Biomaterials and nano-biotechnology.

# UNIT-IV

Synthesis of Nanomaterials – ZnO and Fe3O4. Characterization of phases and quantification of phases. Applications of Nanomaterials: In textile industry, in catalytic operations, in energy generation, in energy storage, in environmental remediation and in sensors and devices.

## TEXT BOOKS/ REFERENCE BOOKS


1. NANO:The Essentials Understanding Nanoscience and Nanotechnology, T. Pradeep, Tata McGraw Hill Publishing Company Limited, 2007, 0-07-154830-0.
2. Material Science and Engineering, 7thed. , William D. Callister, Johan Wiley & Sons, Inc.
3. Nanostructured Materials and Nanotechnology, Hari Singh Nalwa, Academic Press, 2002.
4. Nanostructures and Nanomaterials, synthesis, properties and applications., Guozhong Cao, Imperial College Press, 2004.
5. Introduction to Nanoscience, S.M. Lindsay, Oxford University Press, 2010, ISBN: 978–019–954421–9 (Pbk).
6. Nanoscience, Hans-Eckhardt Schaefer, Springer, 2010, ISBN 978-3-642-10558-6.
7. Chemistry of nanomaterials: Synthesis, Properties and applications. C.N.R. Rao, Achim Muller, A.K. Cheetham, Wiley-VCH, 2004.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

After completing this course, students will be able to:

1. Learn about the background on nanoscience and give a general introduction to different classes of nanomaterials.
2. Develop an understanding of the science behind the nanomaterial properties.
3. Apply their learned knowledge to study and characterize nanomaterials.
4. Familiarize themselves with the variety of nanotechnology applications, and know how to approach the synthesis of nanomaterials with a set of desirable properties.

**MGT402C HUMAN VALUES, ETHICS AND IPR**

**Bachelor of Computer Application (B.C.A.)**

**BCA Semester - V**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

**Course Objectives:**

To help the students appreciate the essential complementarities between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.

To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

**Unit-I**

Human Values: Understanding the need, basic guidelines, Self Exploration - its content and process; „Natural Acceptance‟ and Experiential Validation, Continuous Happiness and Prosperity- Human Aspirations, Right understanding, Relationship and Physical Facilities, Understanding Happiness and Prosperity correctly.

**Unit-II**

Different kinds of value: Understanding human being as a co-existence of the sentient „I‟ and the material „Body‟ Understanding the needs of Self („I‟) and „Body‟ - Sukh and Suvidha. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.

**Unit-III**

Modern approach to the study of values: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship Understanding harmony in the Family, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman).

**Unit-IV**

Professional Ethics & IPR: Values in Work-life, Professional Ethics and Ethos, Code of conduct, Whistle Blowing, Corporate Social Responsibility.IPR: meaning, nature, scope and relevance of IPR. Kinds of IPR: Copyright, Patents, Trademark, Geographical Indication, Industrial design, Plant Variety. Benefits, Emerging dimensions and Rational for protection of IPR.

**Suggested Readings:**


1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics, Excel Books, New Delhi
2. A.N. Tripathy, 2003, Human Values, New Age International Publishers.

3. E G Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
4. M Govindrajan, S Natrajan& V. S Senthil Kumar, Engineering Ethics ( including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
5. S. B. Gogate, Human Values & Professional Ethics, Vikas Publishing House Pvt. Ltd., Noida.

**Reference Books**

6. A Nagraj, 1998 JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.
7. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
8. Prof. A.R.Aryasri, DharanikotaSuyodhana, Professional Ethics and Moral, Maruthi Publications.
9. A. Alavudeen, R.Kalil Rahman and M. Jayakumaran, Professional Ethics and Human Values, University Science Press.
10. Prof.D.R.Kiran, 2013, Professional Ethics and Human Values, Tata McGraw-Hill
11. Jayshree Suresh and B. S. Raghavan, Human Values And Professional Ethics, S.Chand Publications

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**Course Outcomes:**

At the end of the course:

1. Students will be able to understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Understand and can distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature.
4. Students will be aware of the significance of Intellectual Property as a very important driver of growth and development in today‟s world and to be able to statutorily acquire and use different types of intellectual property in their professional life.

**BCA321C – SOFTWARE LAB – IX**

**(Based on BCA301C)**
**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - V**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 0 | - | 3 |

| | |
|---|---|
| **Class Work** | **: 25 Marks** |
| **Examination** | **: 75 Marks** |
| **Total** | **: 100 Marks** |
| **Duration of Examination** | **: 03 Hours** |

# COURSE CONTENT

Practical will be based on the Paper Advance Java Programming on whole Syllabus.

# BCA302C – PYTHON PROGRAMMING

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - VI**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

Upon completion of this course the student should be able :

1. To familiar with basic concept of python and its programming fundamental
2. To learn how to use and make functions
3. To learn the object oriented programing and exception handling in python
4. To learn the use open source library for GUI and web development

## COURSE

## CONTENT UNIT

## I

**Introduction:** Introduction to Python, Features of Python, comparison of Python with C, C++ and Java, Python run time environment, Python Byte code, Application of Python, Installing Python, IDLE, Python editors. **Programming Fundamental:** input/output statements, indentation, Control statements, List, Tuples, Dictionaries, Sequence & Files,

## UNIT II

**Functions:** Python built in functions and their use, library in python, Function Definition, Function Call, Return, Function Argument: default, keyword, arbitrary, function pass by object & reference, Lambda function, special variable __name_, comparison between filter(), map(), reduce() functions. **Modules:** inbuilt and user defined module, importing a module, packages.

## UNIT III

**Object Oriented Programming:** Python objects and other object oriented languages, Classes & objects, class methods, Inheritance **Exception handling:** exception handling in python, try, except, finally statements, built-in exception classes, handling multiple exceptions, **File handling:** File creation, open, reading and writing.

## UNIT IV

**Advanced Concept:** Text Manipulation: Basic String Manipulation and Regular Expressions,Multithreading in Python, NumPyLibrary : Installing, array, processing an array, SciPy library, Developing user interface with TKinter, Web Development : writing HTML pages,

## TEXT/REFERENCE BOOKS:


1. Core Python Programming by R Nageswar Rao, Dream Tech Publication.
2. Beginning Programming with Python For Dummies, 2ed by John Paul Mueller, Wiley Publication
3. Let us Python by YashvantKenetkar, Aditya Kanetkar, BPB Publication
4. Python: The Complete Reference by Martin C Brown, McGraw Hill Publication
5. KamthaneKamthane, Programming and Problem Solving with PYTHON, Tata McGraw-Hill Education.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able to:

1. Design and Develop basic python program using list, tuple and dictionary
2. Design and develop functional and modular application in python
3. Develop and design object oriented application with exception handling
4. Analyze the use of open source library of python.

# BCA304C – INTRODUCTION TO DATA SCIENCE

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - VI**

| L | T | P | Credits | | |
|---|---|---|---|---|---|
| 3 | 0 | - | 3 | **Class Work** | **: 25 Marks** |
| | | | | **Examination** | **: 75 Marks** |
| | | | | **Total** | **: 100 Marks** |
| | | | | **Duration of Examination** | **: 03 Hours** |

## COURSE OBJECTIVE

This course is an introductory course in computer & information technology. Upon completion of this course the student should be able :

1. To understand the basic concepts of Data science.
2. To enhance skills and knowledge in preparing data for analysis, including cleaning data, manipulating data, and dealing with missing data
3. To understand the role of machine learning techniques and basic concepts of clustering and classification techniques
4. To understand the Big Data Platform and its Use cases

## COURSE

## CONTENT UNIT

## I

**Introduction to Data Science**: Definition, benefits and uses of data science and big data.Facets of Data: Structured data, unstructured data, natural language, machine generated data,Network data, audio, images and video streaming data, Introduction to data science tools.

## UNIT II

**Data Science Processes**: Six steps of data science processes, define research goals, data retrieval, data preparation: cleansing data, correct errors as early as possible, integrating – combine data from different sources, transforming data, data exploration, Data modelling, presentation and Automation.

## UNIT III

**Machine Learning**: Definition, Applications of machine learning in data science, Types of Machine Learning (Degree) - supervised learning, semi supervised learning, un-supervised learning, Classification Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification ,Cluster Analysis : Basic Concept and Methods Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods

## UNIT IV

Big data:-Introduction to Big data, big data technologies, management of big data, four V‟s in big data, Drivers for Big data, Big data analytics, Big data applications, designing dataarchitecture, Big data Vs. data warehouse.

## TEXT/REFERENCE BOOKS:


1. Davy Cielen Arno D. B. Meysman Mohamed Ali “Introducing data Science, ”
2. Rachel Schutt and Cathy O‟Neil, “Doing Data Science”
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to DataMining”, Person Education, 2007.
4. K.P. Soman, ShyamDiwakar and V. Ajay “, Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2016.
5. Gupta, “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
6. Dr. Anil Maheshwari, “Data Analytics”, McGraw Hill Education (India) Private Limited.


*** Latest and additional good books may be suggested and added from time to time**

**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.**

## COURSE OUTCOMES

By the end of the course the students will be able:

1. To understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists.
2. To explain how data is Pre-processed in data science.
3. To apply mining techniques on data using clustering and classification techniques.
4. To Identify Big Data and its Business Implications.

# BCA328 C – PROFESSIONAL TRAINING

**Bachelor of Computer Application (B.C.A.)**
**BCA Semester - VI**

# DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE AND TECHNOLOGY GUIDELINES FOR PROJECT

**(BACHELOR OF COMPUTER APPLICATIONS - Sixth Semester)**

# GUIDELINES FOR PROJECT WORK TO BE CARRIED OUT IN AN INDUSTRY/RESEARCH LAB

- The Department/Training and Placement (T&P) officer of the Institution will arrange training slots for the students, however, the student in consultation with the Department /T&P cell can arrange for industrial training slot in reputed Industry/Research labs.
- At least one faculty member from the Department is to be associated with each student and designated as teacher-in-charge.
- The student is required to send his/her joining report, duly signed by the industry coordinator, to the Department, to his/her teacher-in-charge within two weeks of joining.
- The teacher-in-charges will visit the industries at least twice in the semester. First visit is to be made within first two months of the commencement of Project work. The second visit is to be made in the last month of the Project duration.

# GUIDELINES FOR PROJECT REPORT

**1. Project Report (BCA -328)**

- **The project proposal should be prepared in consultation with your guide.** The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken. **The project work should compulsorily include the software development.** The project proposal should contain complete details in the following form:

- Synopsis of the project proposal (15-20 pages) covering the following aspects may be prepared:
  - **(i)** Title of the Project
  - **(ii)** Introduction and Objectives of the Project
  - **(iii)** Project Category

- Technology Used: (RDBMS/OOPS/Networking/Multimedia/Artificial Intelligence/Expert Systemsetc)

- Tools/Platform, Hardware and Software Requirement specifications

**(iv)** Introduction &Description about the organization

**(v)** Training Letter from the organization

**2.** A project proposal, once approved, **is valid for one year.** In case, a student is unable to submit her/his project report within one year, she may be given another chance for submission of the project report subject to validity of his/her registration.

**3.** A **photocopy of the complete Project Proposal** submitted to, should be retained by the student for future reference.

**4.** The evaluated project proposal proforma along with the details of Approved/Disapproved will be sent to the student within 4-6 weeks after the university/Institute receives the proposal. In case if it is disapproved, the suggestions for reformulating the project will be communicated to the student. Revised project proposal proforma, should be sent along with the original copy / photocopy of the non-approved proforma of the earlier project proposal, to theUniversity.

**5.** The project is a part of your final Year curriculum.

**6.** Violation of the project guidelines will lead to the rejection of the project at anystage.

## PREPARATION FOR THE PROJECT REPORT

**1. Project ReportFormulation:**

The project report **should** contain the following:

i) Projectdocumentation

ii) A CD consisting of the executable file(s) of the complete project should be attached on the last page of the project report. In no case, it should be sentseparately.

**2.** The **project documentation** may be about 100 to 125 pages (excluding coding). The project documentation details should not be too generic in nature. Appropriate project report documentation should be done, like, **how you have done the analysis, design, coding, use of testing techniques / strategies, etc.*, in respect of your project*.** To be more specific, whatever the theory in respect of these topics is available in the reference books should be avoided as far as possible. **The project documentation should be in respect of your project only.** The project documentation should include the topics given below. Each and every component shown below carries certain weightage in the project reportevaluation.

- Cover Page / Title Page
- Training Certificate issued from college
- Training completion certificate from company
- Acknowledgement
- Table of Contents / Index with pagenumbering
- List of Tables
- List of Figures
- List of Symbols, Abbreviations and Nomenclature
- Introduction
  - About the Organisation
  - Aims / Objectives of Organisation
- Project Selection: About Project
- System Study/ Analysis
  - Identification ofNeed
  - Preliminary Investigation
  - FeasibilityStudy

- ProjectPlanning
- ProjectScheduling
- Software requirement specifications(SRS)
- Software Engineering Paradigmapplied
- Data model, Control Flow diagrams, state Diagrams/Sequence diagrams ERD‟s/Class Diagrams/CRC Models/Collaboration Diagrams/Use-case Diagrams/Activity Diagrams depending upon your projectrequirements.

- Project Monitoring system
  - Pert Chart / Gantt chart
- Requirement Specification
  - System Requirement (System analysis)
  - Software Req.
  - Hardware Requirement
- System design
  - Database design
  - System flowchart design
  - DFD / UML Modelling /Design
  - Program Design
  - Screen Design
  - Report Design
- System Testing
  - Test Data Preparation
  - Type of testing applied
  - Implementation of Testing
- System Implementation
  - In what manner system will be implemented.
- Documentation
  - Operational Document
  - User Manual
- Further Scope of project-Where the project can be further extended
- Bibliography & references
  - List of references at the end of a text, whether cited or not. It will include texts you made use of, not only texts you referred to, but your own additional background reading, and any other articles that proved helpful in exploring the project.

**Note: Students need to make 3 copies of Project Report– all should be hard bound (Spiral binding will not be accepted)**

**Attach a copy of the CD containing the executable file(s) of the complete project**

**3.** The project report should normally be printed with 1.5 line spacing on A4 paper (one side only). All the pages, tables and figures must be numbered. Tables and figures should contain titles.

**4.** If any project report is not according to the guidelines, it will be summarily rejected and returned to the student forcompliance.

**5.** **Two copies of the original project report** in the bound form along with the CD (containing the executable file(s) of the project should be enclosed in the last page) is to be submitted to the College. **One photocopy** of the same Project Report and the CD containing the executable file(s) must be retained by the student, which should be produced before the examiner at the time ofviva-voce.

**6.** A photocopy of the project report is **not acceptable** for submission.

**7.** Title of the project should be kept the same throughout theproject.

## GUIDELINES FOR PROJECT EVALUATION

Each component of the project work carries its own weightage, so the student needs to concentrate on all the sections given in the project report formulation.

In this section, we have given a few general parameters as checkpoints for the assessment of any software development project. You can note these points and emphasize them during the project report preparation and examination. Assessment will be based on the quality of your report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual effort, you have put into the project. Project execution is concerned with assessing how much work you have put in.

### Project Evaluation

The Project Report is evaluated for 250 marks. A student in order to be declared successful in the project (BCA-328C) must secure **40% marks**

| **Course No.** | **Title** | **Marks of Class Work** | **Examination Practical** | **Total** | **Credit** | **Exam Duration** |
|---|---|---|---|---|---|---|
| BCA 328C | Professional Training | 100 | 250 | 350 | 15 | **3** |

The University will appoint external examiner to conduct the viva-voce examination and the Practical marks will be awarded on the basis of project report, presentation and project execution during the conduct of Practical examination in the institute as per given weightage scheme is

| | |
|---|---|
| **Project Report** | **30%** |
| **Presentation** | **30%** |
| **Execution** | **40%** |

### Unfair means

Projects copied from other students will be considered to have used unfair means. If two projects are found identical, zero marks will be awarded to both of them. In such a case the projects will have to be resubmitted on new topic**.**

**(To be Printed on Letter Head of the Institute /College)**

To

_____

_____

_____

Dear Sir/Madam

We take this opportunity to introduce ourselves as a pioneer institute imparting full time course Bachelor of Computer Application affiliated to DCRUST, Murthal

As a part of this course the students of BCA can undertake the training in the industries. We shall be highly obliged if you facilitate our students under your valuable guidance.

We hope that this would be a healthy and fruitful experience for the students and the organization as well. We are enclosing herewith the resume of ……..……and Roll No for your kind consideration.

We shall be highly indebted by your support in this regard. Any further queries in this regard shall be highly appreciated.

Thanking you Sincerely

Director/ Principal/ Training & Placement Head

# PROJECT
# REPORT ON

# (Project Name)

**Submitted in the partial fulfillment of requirement for the award of degree of Bachelor of Computers Applications**
**Session (_____)**

**Under supervision of**
***(Name of Faculty)***
***(Designation)***

**Submitted by:-**
***(Student Name)***
***(University Roll no)***

**DEPARTMENT OF COMPUTER SCIENCE**
**DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE AND**
**TECHNOLOGY**
**MURTHAL, SONIPAT**