| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 1** |
| **Type of Course** | Skill Enhancement Courses | |
| **Prerequisite** | Basic knowledge of English | |
| **Course Objective** | 1. To understand the process of e-mail communication minutes of meeting.<br>2. To make aware about barriers to communication with ethical context.<br>3. To make effective and impressive communication.<br>4. Better presentation and communication using proper body language. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 2 | 0 | 0 | 2 | 25 | 25 | | 50 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Fundamentals of grammar**<br>Parts of Speech (Noun, Pronoun, Adjective, Verb, Adverb, Conjunction, Preposition, Interjection) Article. Tense: Application of tenses with respect to time, All tenses & theirSub-divisions Forming of Sentences & Clauses, "WH's Concepts,Understanding Sentences, Punctuation I, Degree of comparison I (Positive, Comparative & Superlative), Tenses ( Introduction & Usage) Vocabulary ( Roots, Prefix, Suffix, Homonyms, Synonyms & Antonyms) Auxiliaries, Modal Verbs | **12** | **25** |
| 2 | **Listening**<br>Introduction, Definition of Listening, Listening vs Hearing, Process of Listening, Problems Students Face in Listening, Strategies of Listening, Barriers to Listening, Listening in the Workplace, Activities That Help you to become better listeners. | **11** | **25** |
| 3 | **Reading**<br>Introduction, The Reading Process, Reading and Meaning, Methods to improve Reading, Strengthening your Vocabulary, Understanding Graphics and Visual Aids, Previewing, Reading in thought Groups, Avoiding the Re-reading of the same phrases, Barriers to Reading, Skills for Speed Reading, Sub-Skills of Reading, Skimming, Scanning, Extensive Reading, Intensive Reading, Reading E-Mail, E-Books, Blogs and Web Pages | **11** | **25** |
| 4 | **Letter writing**<br>Formal and informal; CV; Report Writing; Presentation as a skill?Elements of Presentation Strategies – Audience – Objectives – Medium - Key Ideas, Structuring The Material, Organizing Content, Audio -Visual Aids – Handouts - Use of Power Point | **11** | **25** |
| | **Total** | **45** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Understanding | Analyze | Evaluate | Create |
|---|---|---|---|---|
| **Weightage** | 25 | 25 | 25 | 25 |

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*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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**Course Outcomes**

| | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | to understand and execute the English Grammar and Vocabulary in an effective manner. |
| CO2 | to be aware about barriers to communication with ethical context and can get the benefits of listening skills. |
| CO3 | to make effective and impressive communicative skills by proper reading process. |
| CO4 | to perform better presentation and communication using proper body language and several writing skills. |

**Reference Books**

| | |
|---|---|
| 1. | **High School English Grammar & Composition (TextBook)**<br>By Wren & Martin \| Blackie |
| 2. | **Learn English vocabulary at a Glance**<br>By Dr. Rakesh Bharadwaj \| Dr. Rakesh Bharadwaj |
| 3. | **Kenneth, Anderson, Tony Lynch, Joan Mac Lean. (TextBook)**<br>By Study Speaking. \| New Delhi: CUP |
| 4. | **Effective Business Communication**<br>By Asha Kaul \| Prentice Hall – Economy Edition |
| 5. | **Writing with a purpose (TextBook)**<br>By Champa Tickoo and Jaya Sasikumar \| oxford University Press, Mumbai |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 1** |
| **Type of Course** | Skill Enhancement Courses | |
| **Prerequisite** | A basic understanding of science and mathematics. | |
| **Course Objective** | 1. Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.<br>2. Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.<br>3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.<br>4. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 2 | 0 | 0 | 2 | 25 | 25 | | 50 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction**<br>The multidisciplinary nature of environmental studies. Environmental Science – definition, scope & importance, Evolution of the universe, origin of the earth; solar system; atmosphere of the primitive earth, abiotic component of environment, Environmental balance**,** balance in O2 and CO2 in air; thermal balance; balance in predator and prey population. | **15** | **25** |
| 2 | **Ecology**<br>Ecology & its branches, scope of Ecology and its relation to other divisions of sciences; autecology and synecology, Concept and structure of ecosystem, functions of ecosystem, Types of Ecosystems, Concept of habitat; Significance of ecological adaptation; ecological adaptation in plants and animals. | **15** | **25** |
| 3 | **Ecosystem**<br>Concept and scope of environmental chemistry, chemical toxicology, hazardous chemicals, carcinogens, occupier, effluent etc. The natural cycles of the environment, Ozone depletion –causes and effects; Global warming – major greenhouse gases, causes and effects; Acid rain –causes and effects, Acid – base reactions in water | **15** | **25** |
| 4 | **Biogeochemical cycles and Environmental Pollution**<br>**Biogeochemical cycles:** Carbon cycle**,** Nitrogen cycle**,** Oxygen cycle**,** Water cycle<br>**Environmental Pollution**: Types of Environmental Pollution, Water Pollution, Air Pollution, Land and Noise Pollution Current Issues in environment sciences | **15** | **25** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Understanding | Analyze | Evaluate | Create |
|---|---|---|---|---|
| **Weightage** | 25 | 25 | 25 | 25 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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**Course Outcomes**

| | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions. |
| CO2 | Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving. |
| CO3 | Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems |
| CO4 | Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world. |

**Reference Books**

| | |
|---|---|
| 1. | **Textbook of Environmental (TextBook)**<br>By Erach Bharucha \| Universities Press (India) Private Ltd, Hyderabad. \| Second edition, Pub. Year 2013 |
| 2. | **Environmental Sciences**<br>By Daniel B Botkin & Edward A Keller \| John Wiley & Sons. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 1** |
| **Type of Course** | General Elective Courses | |
| **Prerequisite** | Basic knowledge of Maths | |
| **Course Objective** | 1. Student will be able to solve problems based on set theory.<br>2. Student will able to explain relations and functions.<br>3. Student will able to solve problems based on matrix and determinant.<br>4. Able to compute limits, derivatives, and integrals.<br>5. Able to remember formulas based on differentiation. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 2 | 0 | 0 | 2 | 25 | 25 | | 50 |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| **1** | **Set theory**<br>Introduction, Definition, Sets and their representation, The empty set, Finite and infinite set, Equal set, Subsets and supper set, Intervals, Power set, Venn diagram, Union of sets, Intersection of sets. | **7** | **28** |
| **2** | **Relation and function**<br>Cartesian product of the sets, relations, Functions, Types of functions, algebra of functions, Examples | **12** | **26** |
| **3** | **Matrix and determinants**<br>Introduction of matrices, Definition of different matrices, Determinants ofmatrix, minors, cofactors, determinant ofmatrix. Adjoint of matrix, Inverse of the matrix | **8** | **18** |
| **4** | **Limit Differentiation and integration**<br>Limit, Concept of limit, some standard limit, continuity of function, Definition ofderivative, rules of derivative, Standard formulae and examples based on standard forms. | **13** | **28** |
| | **Total** | **40** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Understanding | Analyze | Evaluate | Create |
|---|---|---|---|---|
| **Weightage** | 25 | 25 | 25 | 25 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

**Course Outcomes**

| **At the end of this course, students will be able to:** | |
|---|---|
| CO1 | Student will be able to solve problems based on set theory. |
| CO2 | Student will able to explain relations and functions. |
| CO3 | Student will able to solve problems based on matrix and determinant. |
| CO4 | Able to compute limits, derivatives, and integrals. |

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| | |
|---|---|
| CO5 | Able to remember formulas based on differentiation. |



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| Reference Books | |
|---|---|
| 1. | **Class XI Mathematics NCERT book (TextBook)**<br>By NCERT \| NCERT |
| 2. | **Basic mathematics**<br>Atul Prakashan |
| 3. | **Business Mathematics (TextBook)**<br>By V.K.Kapoor. \| S. Chand and sons, New Delhi. |
| 4. | **Elementary Engineering mathematics**<br>By B.S. Grewal \| Khanna Publication |

| List of Tutorial | |
|---|---|
| 1. | Examples on representation of sets |
| 2. | Examples on Cartesian product. |
| 3. | Examples on power set. |
| 4. | Examples on inverse of matrix. |
| 5. | Examples on derivative. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 1** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | Basic knowledge of computer fundamentals | |
| **Course Objective** | 1.Formulate algorithm/flowchart for given arithmetic and logical problem<br>2.Translate algorithm/flowchart into C program using correct syntax and execute it.<br>3,Write a program using branching ,looping, iteration and recursion. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 4 | 0 | 0 | 4 | 50 | 50 | | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| **1** | **Introduction Fundamental of Computer**<br><br>Basic block diagram of Computer components, hardware, software, memory, generation of computer, Flowcharts, and algorithms<br><br>**Overview of C** Introduction, Importance of C, Sample C programs, Basic structure of C programs, Programming style, Executive a C program.<br><br>**Constants, Variables, and Data Types** Introduction, Character Set, C tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of Variables, assigning values to variables, Defining symbolic constants.<br><br>**Operators and Expression** Introduction, Arithmetic of Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bit-wise Operators, Special Operators, Arithmetic Expressions, Evaluation of expressions, Precedence of arithmetic operators, Some computational problems, Type conversions in expressions, Operator precedence and associatively, Mathematical function | **15** | **25** |
| **2** | **Management Input and Output Operators, Loop and arrays Decision Making Looping**<br><br>Introduction, reading a character, writing a character, formatted input, formatted output, structure of c program input-output function<br><br>**Decision-Making statement** Introduction, Decision making with IF statement, Simple IF statement, the IF ELSE statement, Nesting of IF … ELSE statements, The ELSE IF ladder, The switch statement, the turnery (? :) Operator, the GOTO statement. Introduction, the WHILE statement, the DO statement, The FOR statement, Jump in loops Break and continue.<br><br>**Array** Introduction, One-dimensional arrays, Two-dimensional arrays, Initialization of two-dimensional arrays, Concept of Multidimensional arrays | **15** | **30** |
| **3** | **Handling of Character strings** | **15** | **25** |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| | Introduction, Declaring and initializing string variables, reading string from the terminal, writing string to screen, Arithmetic operations on characters, Putting string together, String Operations String Copy, String Compare, String Concatenation and String Length, String Handling functions.<br><br>**User-Defined Functions** Introduction, Need for user-defined functions, The form of C function, Return values, and their types, Calling a function, category of functions, No arguments and no return values, Arguments with return values, Handling of non-integer functions, Nesting of functions, Recursion, Functions with arrays, The scope and Lifetime of variables in functions, ANSI C functions. | | |
| 4 | **Structures and Unions**<br><br>Introduction, Structure definition, giving values to members, Structure initialization, Comparison of structures, Arrays of structures, Arrays within structures, Structures within Structures, Structures and functions, Unions, Size of structures, Bit fields.<br><br>**Pointers** Introduction, understanding pointers, Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointer, Pointer expressions, Pointer increments and scale factor, Pointers and arrays, Pointers and character strings, Pointers and Functions, Pointers, and structures. Dynamic memory allocation<br><br>**File Management in C** Introduction, Defining files and their Operations, Error handling during I/O operations, Random access files, Command line arguments. | | |
| | **Total** | **45** | **80** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| Level | Remembrance | Understanding | Application | Analyze |
|---|---|---|---|---|
| **Weightage** | 10 | 30 | 30 | 30 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

**Course Outcomes**

| At the end of this course, students will be able to: | |
|---|---|
| CO1 | Formulate algorithm/flowchart for given arithmetic and logical problem |
| CO2 | Translate algorithm/flowchart into C program using correct syntax and execute it. |
| CO3 | Write a program using branching ,looping, iteration and recursion. |
| CO4 | Implement simple program using Structure , Pointer and Union. |
| CO5 | Implement simple program using array and pointer. |

**Reference Books**


| | |
|---|---|
| 1. | **Let Us C (TextBook)**<br>By Yashwant Kanetker \| BPB Publication |
| 2. | **Programming in ANSIC**<br>By E Balaguru swami \| McGraw Hill Education India Private Limited |


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| List of Practical | |
|---|---|
| 1. | Write a program to display “Hello Computer” on the screen. |
| 2. | Write a C program to display Your Name, Address and City in different lines. |
| 3. | Write a C program to find the area of a circle using the formula: Area = PI * r. |
| 4. | Write a C program to swap a variable value of no1 and no2. |
| 5. | Write a C program to print the multiply, addition, division & subtraction value of two accepted numbers. |
| 6. | Write a program to find a maximum from given two numbers. |
| 7. | Write a program to find a minimum from given two numbers. |
| 8. | Write a program to find a maximum from given three numbers. |
| 9. | Write a program to find a minimum from given three numbers. |
| 10. | Write a C program to print a multiplication table from 1 to 12. |
| 11. | Write a C program to find addition of 45 to 65 using loop. |
| 12. | Write a C program to check whether a number is prime or not. |
| 13. | Write a C program to show month using Switch statement. |
| 14. | Write a C program to print the 3x3 array. |
| 15. | Write C program to print range of 101 to 130 using array. |
| 16. | Write a C program to find the length of the given string. |
| 17. | Write a C program to copy one string into another string. |
| 18. | Write a C program to concate (merge) the two strings. |
| 19. | Write a C program to print the following shape. |
| 20. | Write a C program to find the addition of two values using a function. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 1** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | Basic knowledge of Computer | |
| **Course Objective** | 1.Learn basics about computer hardware, software and Operating system.<br>2.Learn about Networks and data communication.<br>3.Learn about Enterprise systems and functions. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 3 | 0 | 2 | 4 | 50 | 50 | | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Computer Hardware System**<br><br>Concepts and generation of computer, CPU, Basic Logic Gates, Computer Memory and Mass Storage Devices, Computer Hierarchy, Input and Output Technologies. | **10** | **15** |
| 2 | **Operating Systems and Application, System Software Application and System Software**<br><br>Application and System Software, Compilers and Interpreters, Process of Software Development, Data Analysis using Spreadsheets<br>Operating Systems<br>Functions of Operating Systems, Types of Operating Systems (Batch Processing, Multi-tasking, Multi-programming and Real-time Systems). | **25** | **35** |
| 3 | **Data Communication and Networks**<br><br>Concepts of Data Communication, Types of Data-Communication, Communications Media, Concepts of Computer Networks, Primary Network Topologies, Operation of the Internet and services provided by Internet, World Wide Web, Intranets and Extranets | **10** | **25** |
| 4 | **Functional and Enterprise Systems**<br><br>Data, Information and Knowledge Concepts, Decision Making Process, Physical Components of Information Systems, Computer N/W: Need for computer networking (LAN and WAN) their characteristics, features and uses, Networking goals and applications; International, national, public and private networks, Networking aspects of video conferencing, imaging and multimedia. | **15** | **25** |
| | **Total** | **60** | **100** |

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| **Suggested Distribution Of Theory Marks Using Bloom's Taxonomy** | | | | |
|---|---|---|---|---|
| **Level** | Understanding | Analyze | Evaluate | Create |
| **Weightage** | 25 | 25 | 25 | 25 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

| **List of Practical** | |
|---|---|
| 1. | Write a program to demonstrate the use of basic logic gates (AND, OR, NOT). |
| 2. | Write a program to display different types of computer memory (RAM, ROM) and their characteristics. |
| 3. | Write a program to simulate a simple CPU operation (e.g., addition of two numbers). |
| 4. | Write a program to show the hierarchy of computer storage (e.g., registers, cache, main memory, secondary storage). |
| 5. | Write a program to demonstrate how data is read from and written to a hard disk. |
| 6. | Write a program to perform basic data analysis using a spreadsheet (e.g., calculating the sum and average of a column of numbers). |
| 7. | Write a program to demonstrate different types of operating systems (e.g., batch processing, multi-tasking). |
| 8. | Write closing account in bank for customer to manager and below all steps are used to write application. |
| 9. | Clear Print Guidelines Example A: Example A is Times New Roman, size ten, with single spacing. Example B is Arial, size twelve with 1.5 spacing. As you can see, smaller font sizes, single spacing and serif fonts are harder to read. Additionally, it is easier to keep one's place on a page with left aligned text, as in example B, as left alignment gives the body of the text a specific shape and gives uniformity between words. Example A, which is justified, has no natural shape. |
| 10. | Create power point presentation to introduction about India |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 1** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | Basic Knowledge of Computer Network and Web Surfing | |
| **Course Objective** | 1. Able to understand Computer Network and Internet Environment<br>2. Able to understand design and develop static and/or interactive website using HTML5, CSS and Javascript.<br>3. Able to explore different web elements.<br>4. Able to understand knowledge of CSS3, Javascript and Bootstrap Framework | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 4 | 0 | 0 | 4 | 50 | 50 | | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction to Computer Network and its Applications**<br>Introduction to Computer Network and its Applications<br><br>Different Terminologies used in Computer Network Internet, ISP (Internet Service Provider), Intranet, VSAT (very small aperture terminal), URL, Portal, Domain Name Server, World Wide Web (WWW), Search Engine, Remote Login, Telnet, Email, E-Commerce, E-Business, E-Governance, Mobile Commerce Website Basics (WebPages; Hyper Text Transfer Protocol, File Transfer Protocol, Domain Names; URL; Protocol Address; Website[Static, Dynamic, Responsive etc, Web browser, Web Servers; Web Hosting | **10** | **20** |
| 2 | **Basic of HTML & Advance HTML 5**<br>Fundamental of HTML, Basic Tag and Attribute, The Formatting Tags, The List Tags, Link Tag, inserting special characters, adding images and Sound, lists types of lists, Table in HTML, Frame in HTML, Forms HTML 5 & Syntax, HTML5 Document Structure (section, article, aside, header, footer, nav, dialog, figure) Attributes of HTML 5 Web Form ( datetime, date, month, week, time, number, range, email, url) Audio / Video – Canvas | **10** | **15** |
| 3 | **Cascading Style Sheet & CSS 3**<br><br>Introduction to CSS,Types of Style Sheets, Class & ID Selector, CSS Pseudo, CSS Font Properties, CSS Text Properties, CSS Background Properties, CSS List Properties, CSS Margin Properties, CSS Comments<br><br>CSS 3 - Border Property, Background & Gradient Property, Drop Shadow Property - 2D & 3D Transform Property, Transition Property, Box Sizing Property, Position Property<br><br>Media Query, CSS Flexbox Properties (display, flex-direction, flex-wrap, flex-flow, justify-(display, flex-direction, flex-wrap, flex-flow, justify-gap)<br><br>CSS Advance Properties (Overflow, text-overflow, Cursor, Visibility, filter,backdrop-filter, object-fit), How to use Google Fonts & Custom Fonts (@font-face), BEM Naming Convention | **20** | **35** |
| 4 | **Java Script** | **10** | **15** |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| | Introduction to JavaScript, Variables, JavaScript Operators, Conditional Statements, JavaScript Loops, Break and Continue Statements, Dialog B, JavaScript User Define Function, Built in Function: string, Maths, Array, Date, Events ( onclick, ondblclick, onmouseover, onmouseout, onkeypress, onkeyup, onfocus, onblur, onload, onchange, onsubmit, onreset), DOM & History Object, Form Validation & E-mail Validation | | |
| 5 | **Bootstrap Framework**<br><br>Introduction to Bootstrap, Bootstrap Layout (Container, Row, Columns, Responsive classes, Offset Column, Reordering Columns), Bootstrap Content (Typography, Tables, Images, Forms), Bootstrap Components (Navbar, Navs and tabs, Dropdowns, Buttons, Button Groups, Breadcrumb, Pagination, Labels, Alerts, Progress Bars, Accordion, Card, Modal) Bootstrap Utilities (Colors, Background, Borders, Display, Overflow, Position, Spacing, Text, Vertical align) | **15** | **10** |
| | **Total** | **65** | **95** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| Level | Remembrance | Understanding | Application | Analyze | Evaluate | Create |
|---|---|---|---|---|---|---|
| **Weightage** | 10 | 20 | 30 | 20 | 10 | 10 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

**Course Outcomes**

| At the end of this course, students will be able to: | |
|---|---|
| CO1 | Able to understand Computer Network and Internet Environment. |
| CO2 | Able to understand design and develop static and/or interactive website using HTML5, CSS and Javascript. |
| CO3 | Able to explore different web elements. |
| CO4 | Able to understand knowledge of CSS3, Javascript and Bootstrap Framework. |
| CO5 | Students will acquire skills in using the bootstrap framework to create responsive & user-friendly web |

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| List of Practical | |
|---|---|
| 1. | Create a simple HTML page with headings, paragraphs, and lists to understand the structure of an HTML document. |
| 2. | Embed images and create hyperlinks to other web pages within an HTML document. |
| 3. | Design and create an HTML table to display tabular data. |
| 4. | Apply CSS styles to HTML elements, including changing text color, font, and background. |
| 5. | Practice using CSS properties like margin, padding, and border to control the layout of elements. |
| 6. | Make a webpage responsive by using CSS media queries to adapt to different screen sizes. |
| 7. | Build a layout using CSS Flexbox to understand its flexible and responsive design capabilities. |
| 8. | Create simple JavaScript functions to perform calculations or display messages on web pages. |
| 9. | Experiment with variables, data types, and operators to understand how JavaScript handles data. |
| 10. | Implement JavaScript conditional statements to create interactive elements on a webpage. |
| 11. | Use JavaScript loops to iterate through arrays or perform repetitive tasks. |
| 12. | Develop a form that uses JavaScript for client-side validation, ensuring the data entered is correct. |
| 13. | Create interactive elements like image sliders or dropdown menus using JavaScript and HTML/CSS. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 1** |
| **Type of Course** | - | |
| **Prerequisite** | | |
| **Course Objective** | - | |

| Teaching Scheme (Contact Hours) | | | | Assessment Scheme | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 0 | 0 | 8 | 4 | - | - | 100 | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| 1 | **Praticals of Programming in C**<br>1. Write a program to display “Hello Computer” on the screen.<br>2. Write a C program to display Your Name, Address and City in different lines.<br>3. Write a C program to find the area of a circle using the formula: Area = PI * r.<br>4. Write a C program to swap a variable value of no1 and no2.<br>5. Write a C program to print the multiply, addition, division & subtraction value of two accepted numbers.<br>6. Write a program to find a maximum from given two numbers.<br>7. Write a program to find a minimum from given two numbers.<br>8. Write a program to find a maximum from given three numbers.<br>9. Write a program to find a minimum from given three numbers.<br>10. Write a C program to print a multiplication table from 1 to 12.<br>11. Write a C program to find addition of 45 to 65 using loop.<br>12. Write a C program to check whether a number is prime or not.<br>13. Write a C program to show month using Switch statement.<br>14. Write a C program to print the 3x3 array.<br>15. Write C program to print range of 101 to 130 using array.<br>16. Write a C program to find the length of the given string.<br>17. Write a C program to copy one string into another string.<br>18. Write a C program to concate (merge) the two strings. Write a C program to print the following shape.<br>*<br>* *<br>* * *<br>* * * *<br>19. Write a C program to find the addition of two values using a function. | | |
| 2 | **Practicals of Network and Internet Environment** | | |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| | 1. Create a simple HTML page with headings, paragraphs, and lists to understand the structure of an HTML document.<br>2. Embed images and create hyperlinks to other web pages within an HTML document.<br>3. Design and create an HTML table to display tabular data.<br>4. Apply CSS styles to HTML elements, including changing text color, font, and background.<br>5. Practice using CSS properties like margin, padding, and border to control the layout of elements.<br>6. Make a webpage responsive by using CSS media queries to adapt to different screen sizes.<br>7. Build a layout using CSS Flexbox to understand its flexible and responsive design capabilities.<br>8. Create simple JavaScript functions to perform calculations or display messages on web pages.<br>9. Experiment with variables, data types, and operators to understand how JavaScript handles data.<br>10. Implement JavaScript conditional statements to create interactive elements on a webpage.<br>11. Use JavaScript loops to iterate through arrays or perform repetitive tasks.<br>12. Develop a form that uses JavaScript for client-side validation, ensuring the data entered is correct.<br>13. Create interactive elements like image sliders or dropdown menus using JavaScript and HTML/CSS. | | |
| | **Total** | | |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 2** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | An open mindset and willingness to cultivate personal growth through soft skills development. | |
| **Course Objective** | 1. Effective Communication: Enhance verbal and non-verbal communication skills for interpersonal and professional success.<br>2. Self-Confidence: Build self-assurance and assertiveness in various personal and professional scenarios.<br>3. Team Collaboration: Develop teamwork, leadership, and conflict resolution skills for better collaboration.<br>4. Emotional Intelligence: Improve self-awareness and empathy to manage emotions and relationships effectively.<br>5. Adaptability and Resilience: Foster adaptability and resilience to navigate challenges and change with confidence. | |

| Teaching Scheme (Contact Hours) | | | | Assessment Scheme | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 2 | 0 | 0 | 2 | 25 | 25 | | 50 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| 1 | **Introduction to soft skill**<br>Meaning and introduction to soft skill, Types of soft skill (communication, empathy, leadership, time management, observation, conflict resolution, listening skill,) Difference between soft skill and hard skill, IQ,SQ,EQ and emotion competence | 6 | 10 |
| 2 | **Mastering the Art of Habits**<br>Guiding Principles, Identifying Good And Bad Habits, Habit Cycle; Breaking Bad Habits, Using The Zeigarnik Effect For Productivity And Personal Growth, Forming Habits of Success | 9 | 15 |
| 3 | **Personality development**<br>Meaning of personality, elements of personality, Determents of personality, Personal development plan | 6 | 10 |
| 4 | **Self-management skill**<br>Time management (planning, scheduling and meeting), Emotion and stress management, SWOT analysis, Etiquettes and manners, Personal grooming (Appearance, Dressing ). | 9 | 15 |
| | **Total** | **30** | **50** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| Level | Understanding | Analyze | Evaluate | Create |
|---|---|---|---|---|
| **Weightage** | 25 | 25 | 25 | 25 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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**Course Outcomes**

| | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Effective Communication: Enhance verbal and non-verbal communication skills for interpersonal and professional success. |
| CO2 | Self-Confidence: Build self-assurance and assertiveness in various personal and professional scenarios. |
| CO3 | Team Collaboration: Develop teamwork, leadership, and conflict resolution skills for better collaboration. |
| CO4 | Emotional Intelligence: Improve self-awareness and empathy to manage emotions and relationships effectively. |
| CO5 | Adaptability and Resilience: Foster adaptability and resilience to navigate challenges and change with confidence. |

**Reference Books**

| | |
|---|---|
| 1. | **Soft skill know the self and know the world (TextBook)**<br>By Dr. K. Alex –S.chand \| PHL learning Pvt. Ltd. New Delhi |
| 2. | **Personal growth and wealth**<br>By Dale Carnegie , Napoleon Hill, Dr. Joseph Murphy |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 2** |
| **Type of Course** | Ability Enhancement Courses | |
| **Prerequisite** | | |
| **Course Objective** | - | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **Theory Marks** | | **LAB** | **Total Marks** |
| | | | | **SEE** | **CIA** | | |
| 1 | - | 1 | 2 | 25 | | 25 | 50 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 2** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | Basic knowledge of Maths | |
| **Course Objective** | 1. Student will be Able to understand the basics concepts of Discrete Mathematical Structures<br>2. student will have developed ability to Understand the concept of Group Theory<br>3. Students will achieve command of the fundamental definitions and concepts of graph theory<br>4. Solve simple application problems<br>5. Student will have developed ability to Distinguish various types of graphs | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 2 | 0 | 0 | 2 | 25 | 25 | | 50 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** – Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| **1** | **UNIT-I**<br>Binary operations with properties, Definition of group and examples, commutative group, Elementary properties of group, Order of a group and order of an element, Sub-group | **12** | **28** |
| **2** | **UNIT-II**<br>Cyclic group, Right Coset and left coset, equivalence class, Lagrange's theorem, Euler's theorem, Fermat's theorem, permutation and example, transposition and example | **9** | **26** |
| **3** | **UNIT-III**<br>Graph and multi graphs, degree of a vertex, paths, connectedness, connected components, cut points, bridges, complete graphs, regular graphs, matrices and graphs | **7** | **18** |
| **4** | **UNIT-IV**<br>Planner graphs, maps and regions, Euler's formula (only statement), non-planner graphs, colored graphs, coloring of maps, trees, spanning trees. | **12** | **28** |
| | **Total** | **40** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate |
|---|---|---|---|---|---|
| **Weightage** | 10 | 25 | 25 | 25 | 15 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

**Course Outcomes**

| **At the end of this course, students will be able to:** | |
|---|---|
| CO1 | Student wil be Able to understand the basics concepts of Discrete Mathematical Structures |
| CO2 | Student will have developed ability to Understand the concept of Group Theory |
| CO3 | Students will achieve command of the fundamental definitions and concepts of graph theory |

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| | |
|---|---|
| CO4 | Solve simple application problems |
| CO5 | Student will have developed ability to Distinguish various types of graphs |

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| Reference Books | |
|---|---|
| 1. | **Discrete Mathematics (TextBook)**<br>By S. Lipschutz and M. l. Lipson \| Schaum's Outline Series McGRAW-HILL \| Third Edition |
| 2. | **Graph Theory with Applications to Engineering and Computer Science**<br>By Narsingh Deo \| Dover Publications Inc. |
| 3. | **GRAPH THEORY WITH APPLICATIONS (TextBook)**<br>By J. A. Bondy and U. S. R. Murty \| Elsevier Science Ltd, Pub. Year 1976 |

| List of Tutorial | |
|---|---|
| 1. | Examples on groups |
| 2. | Examples on sub groups |
| 3. | Examples on equivalence relations |
| 4. | Examples on paths |
| 5. | Examples on Euler's formula. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 2** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | | |
| **Course Objective** | - | |

| Teaching Scheme (Contact Hours) | | | | Assessment Scheme | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 0 | 0 | 8 | 4 | - | - | 100 | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| 1 | **Practical of Advanced C & Data structure**<br>1. Write a C program to display linear array elements.<br>2. Write a C program to calculate length of a given string.<br>3. Write a C program to perform index operation on a given String.<br>4. Write a C program to Concate two String.<br>5. Write a C program to find Sub string of given string.<br>6. Write a C program to implement PUSH and POP operation of STACK.<br>7. Write program to implement simple queue using C language.<br>8. Write a C program to search an element using linear search.<br>9. Write a C program to search an element using Binary search.<br>10. Write a C program to sort given list using Insertion sort.<br>11. Write a C program of matrix addition.<br>12. Write a C program of matrix multiplication.<br>13. Write a C program to traverse single linked list.<br>14. Write a C program to implement Bubble sort.<br>15. Write a C program to implement Radix sort.<br>16. Write a C program to implement Merge sort.<br>**17.** Write a C program to implement Selection sort**.** | | |
| 2 | **Practical of Database Management System**<br>1. Perform the following : (a) View all databases, create a database of university, select that database and view all table in it. (b) Perform DDL commands (create, Alter, Truncate, Drop)<br>2. Perform DML (insert, update, delete) and DQL commands on student_info table.<br>3. Retrieve details from student_info table using distinct, order by clause and LIMIT clause.<br>4. Create customers table using Constraints with given Attributes: Customer_id – Primary key, Auto increment, Customer_name – Not Null, Contact_no – Unique key, City – Not Null.<br>5. Retrieve details from customers table using group by clause.<br>6. Create Product table with given attributes and Perform Aggregate functions (count, sum, avg, min, max) on product table. Product_id – Primary key, Product_name - Not Null, Quantity – Not Null.<br>7. Perform Numeric functions (sqrt, abs, floor, ceiling, round, square, power) on product table.<br>8. Perform String functions (ASCII, Char, Concat, Concat_ws, Left, Right, Lower, Upper, Ltrim, Rtrim, Trim, Reverse, substring, replace) on student_info table.<br>9. Perform Date functions (NOW, CURDATE, CURTIME, DATE, EXTRACT) on student_info table.<br>10. Apply check and default constraints on customers table.<br>11. Retrieve details from customers table using IN operator.<br>12. Perform join (inner, left, right, full outer) on tables.<br>13. Write a Subquery to transfer all the records from one table to another. | | |

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| | | |
|---|---|---|
| **Total** | | |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 2** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 139901101 - PROGRAMMING IN C | |
| **Course Objective** | 1. To Understand different types of data.<br>2. To develop the capability of selecting a particular data structure and implementing the algorithm. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 4 | 0 | 0 | 4 | 50 | 50 | | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction to Data Structure**<br><br>Introduction to Data Structure and different types of data Data types, primitive and non-primitive Linear & Non-Linear Data Structures String, Introduction, Operation performed on string Array, Introduction to Arrays, Linear array and its representation. | **15** | **25** |
| 2 | **Linear data Structure, Stack, Queue ,Linked List**<br><br>Representation of arrays, Applications of arrays, sparse matrix and its representation Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression, Recursion Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue Singly Linked List, Doubly Linked list, Circular linked list, Linked implementation of Stack, Linked implementation of Queue, Applications of linked list. | **15** | **25** |
| 3 | **Non Linear Data Structure Tree, Graph**<br><br>Definitions and Concepts, Representation of binary tree, Binary tree traversal (In order, post order, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications of Trees- Some balanced tree mechanism, Height Balanced, Weight Balance, Representation Of Graphs, Elementary Graph operations,(Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree ). | **15** | **25** |
| 4 | **Hashing ,Sorting and Searching, Hashing ,Sorting and Searching**<br><br>The symbol table, Hashing Functions, Collision-Resolution Techniques Sorting types, Insertion, sort, Selection Sort, Quick Sort, Merge Sort, Radix sort, Searching types, Sequential Search and Binary Search | **15** | **25** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate |
|---|---|---|---|---|---|
| **Weightage** | 15 | 30 | 20 | 15 | 20 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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## Course Outcomes

| At the end of this course, students will be able to: | |
|---|---|
| CO1 | Discuss The Basic Concept and Principle of Data Structure |
| CO2 | Implement Data Strcuture And Algorithm to Solve Problem. |
| CO3 | Learn the Basic Techniques of Algorithm Analysis |
| CO4 | Descibe various Tree and Graph travsersal Algorithms |
| CO5 | Apply various hashing techniques. |

## Reference Books

| | |
|---|---|
| 1. | **Data Structures using C & C++ (TextBook)**<br>By Ten Baum \| Prenctice-Hall International |
| 2. | **Fundamentals of Computer Algorithms by**<br>By Horowitz, Sahni \| Galgotia Pub. 2001 ed. |

## List of Practical

| | |
|---|---|
| 1. | Write a C program to display linear array elements. |
| 2. | Write a C program to calculate length of a given string. |
| 3. | Write a C program to perform index operation on a given String. |
| 4. | Write a C program to Concate two String. |
| 5. | Write a C program to find Sub string of given string. |
| 6. | Write a C program to implement PUSH and POP operation of STACK. |
| 7. | Write program to implement simple queue using C language. |
| 8. | Write a C program to search an element using linear search. |
| 9. | Write a C program to search an element using Binary search. |
| 10. | Write a C program to sort given list using Insertion sort |
| 11. | Write a C program of matrix addition. |
| 12. | Write a C program of matrix multiplication. |
| 13. | Write a C program to traverse single linked list |
| 14. | Write a C program to implement Bubble sort. |
| 15. | Write a C program to implement Radix sort |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 2** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 03080301-T - OBJECT ORIENTED PROGRAMMING WITH C++ | |
| **Course Objective** | 1. To understand the Fundamental of Database Management System, RDBMS and locking mechanism.<br>2. To learn the fundamental of data models and SQL query.<br>3. To develop application using PL/SQL blocks. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 4 | 0 | 0 | 4 | 50 | 50 | | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction**<br>What is database system, purpose of database system, view of data, Types of Databases, database architecture, transaction management **Data Models** Hierarchical data model, Network data model, Relational Data model | **10** | **15** |
| 2 | **Relational Database Design and E-R Model, E-R Model, Normalization**<br>Structure of Relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax, relational algebra queries, tuple relational calculus Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema, Data redundancy Normal forms 1NF, 2NF, 3NF, BCNF and 4NF | **10** | **15** |
| 3 | **Structured Query Language, Constraints, Functions, Advanced Query**<br>Introduction to SQL, DDL, DML, DCL, TCL. Basic commands and Functions of SQL, Data Definition Language (DDL), Data Manipulation language (DML),Data Control Language (DCL), Transaction control Language (TCL) and all related commands, Use of Group by, Having, order by Primary key, foreign key, unique, not null, check, IN operator Aggregate functions, Built-in functions –numeric, date, string functions Set operations, Sub-queries and correlated sub-queries, Join and types of Join | **20** | **30** |
| 4 | **Introduction to PL/SQL, Basics of PL/SQL, Transaction Management and Concurrency Control**<br>The PL/SQL Syntax, The PL/SQL Block Structure, Fundamentals of PL/SQL, Advantages of PL/SQL data Types. Advanced SQL features such as updatable views, stored procedures, Triggers Transaction concepts, ACID properties, Serializability and Concurrency Control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, optimistic methods, database recovery management. | **20** | **40** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate | Create |
|---|---|---|---|---|---|---|
| **Weightage** | 15 | 25 | 20 | 20 | 10 | 10 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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| **Course Outcomes** | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Understand the basic networking and internet concepts |
| CO2 | Understand principle of basic world wide web |
| CO3 | Use various HTML tags and advance html to develop the user friendly web pages |
| CO4 | Use various CSS to develop the user friendly web pages and more attractive. |
| CO5 | Use the JavaScript to develop the dynamic web pages. |

| **Reference Books** | |
|---|---|
| 1. | **Database System Concepts (TextBook)**<br>By Abraham Silberschatz, Henry F. Korth and S. Sudharshan \| Sixth Edition, Tata Mc Graw Hill, 2011 |
| 2. | **An introduction to Database Systems**<br>By Desai Bipin C. \| Pearson Education Asia \| 7, Pub. Year 2001 |
| 3. | **Introduction to Database Management Systems (TextBook)**<br>By Atul Kahate \| Pearson Education, New Delhi, 2006 |

| **List of Practical** | |
|---|---|
| 1. | Perform the following : (a) View all databases, create a database of university, select that database and view all table in it. (b) Perform DDL commands (create, Alter, Truncate, Drop) |
| 2. | Perform DML (insert, update, delete) and DQL commands on student_info table. |
| 3. | Retrieve details from student_info table using distinct, order by clause and LIMIT clause. |
| 4. | Create customers table using Constraints with given Attributes: Customer_id – Primary key, Auto increment, Customer_name – Not Null, Contact_no – Unique key, City – Not Null. |
| 5. | Retrieve details from customers table using group by clause. |
| 6. | Create Product table with given attributes and Perform Aggregate functions (count, sum, avg, min, max) on product table. Product_id – Primary key, Product_name - Not Null, Quantity – Not Null, |
| 7. | Perform Numeric functions (sqrt, abs, floor, ceiling, round, square, power) on product table. |
| 8. | Perform String functions (ASCII, Char, Concat, Concat_ws, Left, Right, Lower, Upper, Ltrim, Rtrim, Trim, Reverse, substring, replace) on student_info table. |
| 9. | Perform Date functions (NOW, CURDATE, CURTIME, DATE, EXTRACT) on student_info table. |
| 10. | Apply check and default constraints on customers table. |
| 11. | Retrieve details from customers table using IN operator. |
| 12. | Perform join (inner, left, right, full outer) on tables. |
| 13. | Write a Subquery to transfer all the records from one table to another. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 2** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 13990102- T - COMPUTER FUNDAMENTAL AND EMERGING TECHNOLOGY | |
| **Course Objective** | 1. To develop skills needed for building interactive, data-driven sites<br>2. To learn object oriented concepts with PHP<br>3. To learn effective usage of cookies and sessions | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 3 | 0 | 2 | 4 | 50 | 50 | | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction to Internet**<br>Introduction to Internet, Evolution & history of internet, Growth of Internet, Owners of Internet, Services of Internet, How does Internet works?, Internet addressing & DNS, Internet Vs Intranet, Impact of Internet, Governance on Internet, Getting connected, Different types of connections, Dial-UP connections: ISDN, ADSL, Leased Line Connections, Satellite Connections. Level off internet connectivity, One level, Two level, Three level,Internet service provider, Internet account options, Telephone option, Protocol option, Service option, Switching: Circuit switching, Packet switching, Message switching, Routers, Gateways. | **15** | **25** |
| 2 | **Internet Applications and Services**<br>Email, Remote Login, Telnet, FTP, Search Engines, VPN, Firewall | **15** | **25** |
| 3 | **Introduction to HTML**<br>HTML, Working with List, Working with Table | **15** | **25** |
| 4 | **Advance HTML**<br>Working with Frames, Working with Forms, Working with Link & Images, Working with Layer, Working with Multimedia | **15** | **25** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Create |
|---|---|---|---|---|---|
| **Weightage** | 15 | 25 | 20 | 15 | 25 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

**Course Outcomes**

| **At the end of this course, students will be able to:** | |
|---|---|
| CO1 | Understand the basic networking and internet concepts in world wide web. |
| CO2 | Use various HTML tags and advance html to develop the user friendly web pages |
| CO3 | Use various CSS to develop the user friendly web pages and more attractive. |
| CO4 | Use the Cookies,Session and security in PHP web development. |

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| | |
|---|---|
| CO5 | Use the object oriented programming with PHP to develop the dynamic web pages. |

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| Reference Books | |
|---|---|
| 1. | **HTML 5 in Simple Steps (TextBook) (TextBook)**<br>By Kogent Learning Solutions Inc. \| Dreamtech Press |
| 2. | **Internet Technology and Web Design (TextBook) (TextBook)**<br>By ISRD Group \| Tata McGraw Hill |

| List of Practical | |
|---|---|
| 1. | Write a HTML code for display various list. |
| 2. | Write an HTML code to display Student detail form. |
| 3. | Create your 12th mark sheet in HTML Code. |
| 4. | Write an HTML code to display your CV on a web page |
| 5. | Write HTML document to illustrate the uses of the following tags with all attributes. |
| 6. | Design a web page which will have output like this. |
| 7. | Make a table with your friend's details in it. i. Column One, your friends names ii. Column Two, Address of your friends iii. Column Three, Mobile No of your friends iv. Column Four, Birth-Date of your friends. |
| 8. | Write an HTML code to display your education details in a table format with background color and heading etc. |
| 9. | Write an HTML code to create a frameset having header, navigation and content sections. |
| 10. | Write a HTML document to illustrate the uses of tags. |
| 11. | Make Registration form like this. |
| 12. | Display images with its content and background color |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 3** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 13990101- T - PROGRAMMING IN C | |
| **Course Objective** | 1. Allow programmers to think in terms of the structure of the problem rather than in terms of the structure of the computer.<br>2. Decompose the problem into a set of objects<br>3. Objects interact with each other to solve the problem | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 4 | 0 | 0 | 4 | 70 | 30 | | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** – Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction of OOPS, Principles of OOP, C++ Basics**<br>Introduction to Object Oriented Programming, Difference between Procedure Oriented and Object Oriented Programming, Difference between C and C++ Class, Object, Inheritance, Polymorphism, Dynamic Binding, Message Passing Programming Structure, Variables in C++, C++ Output/ Input, Keywords in C++, New style of the header file specification, Comments in C++, Token, Enum, Typecasting, Operators, Control Structures, Default Arguments, Scope Resolution Operator, New and Delete Operator, Manipulators | **15** | **25** |
| 2 | **Classes, Object and Function, Constructor & Destructor**<br>Introduction to Class and Objects, Access Specifier, Memory Allocation for an object, Simple Function, Call and Return by Reference, Static data, Function and Members, Inline Function, Function Overloading, Friend Functions, Friend Class, Array of Class Object. Constructor, Characteristics of Constructor, Types of Constructor, Destructor, Characteristics of Destructor | **15** | **20** |
| 3 | **Inheritance**<br>Introduction, Advantages of Inheritance, Inheritance using different access Specifiers, Initialization of Base class members through a derived class object, Different forms of Inheritance, Virtual Base Classes, Abstract Class, Function Overriding. | **10** | **10** |
| 4 | **Operator Overloading, Files & Pointers**<br>Introduction to Operator overloaded, Rules for Overloading Operator, Declaration of Operator Overloading, Unary Operator Overloading, Binary Operator Overloading, Data Conversion, and Type Conversions.<br>C++ Streams, C++ Streams Classes, I/O Operations, Open, and Close File, Read/write modes in C++, Managing Output with Manipulators, File Modes and File Pointers, Pointer to constant and constant to Pointer | **20** | **35** |
| | **Total** | **60** | **90** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate | Create |
|---|---|---|---|---|---|---|
| **Weightage** | 25 | 25 | 10 | 10 | 10 | 20 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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| **Course Outcomes** | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Understand concept of C++ programming & understand the fundamental principles of OOP concept. |
| CO2 | How to write a C++ program using the concept of Classes, Object, Function, Constructor & Destructor. |
| CO3 | Understanding the concept of inheritance & polymorphism along with method over-loading concept. |
| CO4 | Implement the concept of operator Overloading. |
| CO5 | Implement the concept of Files & Pointers using functions. |

| **Reference Books** | |
|---|---|
| 1. | **Let us C++ (TextBook)**<br>By Y kanitkar \| BPB Publication |
| 2. | **Object Oriented Programming with C++ (TextBook)**<br>By E Balaguruswami \| The Mc Graw-Hill Education India Pvt. Ltd |

| **List of Practical** | |
|---|---|
| 1. | Write a program to print “Hello World”. |
| 2. | Write a program to perform operation of calculator. |
| 3. | Write a program to add two numbers by using function |
| 4. | Write a program to swap two numbers. |
| 5. | Write a program to check whether number is even or odd. |
| 6. | Write a program to find largest number among three numbers |
| 7. | Write a program to generate multiplication table of a given number. |
| 8. | Write a program to reverse a number |
| 9. | Write a program to calculate power of a number. |
| 10. | Write a program to multiply two numbers. |
| 11. | Write a program to subtract complex number using operator overloading. |
| 12. | Write a program to check whether a number is palindrome or not. |
| 13. | Write a program to check whether a number is prime or not. |
| 14. | Write a program to find the length of a string. |
| 15. | Write a program to concatenate two strings. |
| 16. | Write a program to write content of a file “studentmarks.txt”. |
| 17. | Write a program to read from file “studentmarks.txt”. |
| 18. | Write a program to using copy constructor to copy data of an object to another object. |
| 19. | Write a program of multiple inheritance. |
| 20. | Write a program which illustrates the use of parameterized constructor. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 3** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 139902103 HTML and CSS | |
| **Course Objective** | 1.Understand the Fundamentals of PHP<br>2.Develop Web Applications<br>3.Database Integration<br>4.Work with Advanced PHP Features | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 4 | 0 | 0 | 4 | 70 | 30 | | 100 |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| **1** | **Introduction to Internet**<br>Introduction to Internet, Evolution & history of internet, Growth of Internet, Owners of Internet, Services of Internet, How does Internet works?, Internet addressing & DNS, Internet Vs Intranet, Impact of Internet, Governance on Internet, Getting connected, Different types of connections, Dial-UP connections: ISDN, ADSL, Leased Line Connections, Satellite Connections. Level off internet connectivity, One level, Two level, Three level,Internet service provider, Internet account options, Telephone option, Protocol option, Service option, Switching: Circuit switching, Packet switching, Message switching, Routers, Gateways. | **15** | **25** |
| **2** | **Internet Applications and Services**<br>Email, Remote Login, Telnet, FTP, Search Engines, VPN, Firewall | **15** | **25** |
| **3** | **Introduction to HTML**<br>HTML, Working with List, Working with Table | **15** | **25** |
| **4** | **Advance HTML**<br>Working with Frames, Working with Forms, Working with Link & Images, Working with Layer, Working with Multimedia | **15** | **25** |
| | **Total** | **60** | **100** |

**Reference Books**


| | |
|---|---|
| 1. | **HTML 5 in Simple Steps (TextBook) (TextBook)**<br>By Kogent Learning Solutions Inc. \| Dreamtech Press |
| 2. | **Internet Technology and Web Design (TextBook) (TextBook)**<br>By ISRD Group \| Tata McGraw Hill |


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| List of Practical | |
|---|---|
| 1. | Write a HTML code for display various list. |
| 2. | Write an HTML code to display Student detail form. |
| 3. | Create your 12th mark sheet in HTML Code. |
| 4. | Write an HTML code to display your CV on a web page. |
| 5. | Write HTML document to illustrate the uses of the following tags with all attributes. |
| 6. | Create a diagram illustrating the process of data transmission from a client to a server and back. |
| 7. | Creating an Ordered List |
| 8. | Write an HTML code to display your education details in a table format with background color and heading |
| 9. | Write an HTML code to create a frameset having header, navigation and content sections. |
| 10. | Write a HTML document to illustrate the uses of tags. |
| 11. | Learn how to create a simple table in HTML. |
| 12. | Display images with its content and background color |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 3** |
| **Type of Course** | - | |
| **Prerequisite** | | |
| **Course Objective** | - | |

| Teaching Scheme (Contact Hours) | | | | Assessment Scheme | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 0 | 0 | 8 | 4 | - | - | 100 | 100 |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| 1 | **Practical of Advanced C & Data structure**<br>1. Write a C program to display linear array elements.<br>2. Write a C program to calculate length of a given string.<br>3. Write a C program to perform index operation on a given String.<br>4. Write a C program to Concate two String.<br>5. Write a C program to find Sub string of given string.<br>6. Write a C program to implement PUSH and POP operation of STACK.<br>7. Write program to implement simple queue using C language.<br>8. Write a C program to search an element using linear search.<br>9. Write a C program to search an element using Binary search.<br>10. Write a C program to sort given list using Insertion sort.<br>11. Write a C program of matrix addition.<br>12. Write a C program of matrix multiplication.<br>13. Write a C program to traverse single linked list.<br>14. Write a C program to implement Bubble sort.<br>15. Write a C program to implement Radix sort.<br>16. Write a C program to implement Merge sort. | | |
| 2 | **Practical of Database Management System**<br>1. Perform the following : (a) View all databases, create a database of university, select that database and view all table in it. (b) Perform DDL commands (create, Alter, Truncate, Drop)<br>2. Perform DML (insert, update, delete) and DQL commands on student_info table.<br>3. Retrieve details from student_info table using distinct, order by clause and LIMIT clause.<br>4. Create customers table using Constraints with given Attributes: Customer_id – Primary key, Auto increment, Customer_name – Not Null, Contact_no – Unique key, City – Not Null.<br>5. Retrieve details from customers table using group by clause.<br>6. Create Product table with given attributes and Perform Aggregate functions (count, sum, avg, min, max) on product table. Product_id – Primary key, Product_name - Not Null, Quantity – Not Null.<br>7. Perform Numeric functions (sqrt, abs, floor, ceiling, round, square, power) on product table.<br>8. Perform String functions (ASCII, Char, Concat, Concat_ws, Left, Right, Lower, Upper, Ltrim, Rtrim, Trim, Reverse, substring, replace) on student_info table.<br>9. Perform Date functions (NOW, CURDATE, CURTIME, DATE, EXTRACT) on student_info table.<br>10. Apply check and default constraints on customers table. | | |
| | **Total** | | |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 3** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 130002103 Discrete mathematics | |
| **Course Objective** | 1. Understand the Foundations of Logical Thinking<br>2. Analyze Arguments<br>3. Recognize Logical Fallacies<br>4. Apply Logical and Critical Thinking in Problem Solving | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 2 | 0 | 0 | 2 | 25 | 25 | | 50 |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| **1** | **UNIT-1 -> Logical Reasoning**<br>Analogy based and kinds of relationships, Simple Analogy; Pattern and Series of Numbers, Letters, Figures. Coding- Decoding of Numbers, Letters, Symbols (Figures), Blood relations. | **8** | **25** |
| **2** | **UNIT-2 -> Visual Reasoning**<br>Venn Diagrams, Mirror Images, Problems on cubes & dices, Image & Figure Counting, Direction & Speed. | **7** | **25** |
| **3** | **UNIT-3-> Statistics Based Aptitude**<br>Basic concepts, Percentage, Profit & Loss, Simple Interest, Ratio & Proportion, Mixture. | **8** | **25** |
| **4** | **UNIT-4-> Quantitative Aptitude**<br>Average, Time & Work, Pipes & Cisteren, Probability, Data Interpretation Test25 %74.00 . | **7** | **25** |
| | **Total** | **30** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate |
|---|---|---|---|---|---|
| **Weightage** | 10 | 30 | 20 | 20 | 10 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

**Course Outcomes**

| **At the end of this course, students will be able to:** | |
|---|---|
| CO1 | Student will be able to identify and apply various type of analogies and relationships in problem-solving. |
| CO2 | Students will be demonstrate proficiency in interpreting and solving problems related to Ven daigram , mirror image, cubes and dice and image & figure Counting. |
| CO3 | Students will be exhibit strong understanding of basic statistical concepts. |

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| | |
|---|---|
| CO4 | Student will demonstrate the ability to interpret data presented in diffrent formats and make infromed decision. |
| CO5 | Student will domenstrate competative midset,Confidence,and rediness to tackle a board range of questions in aptitude tests. |

| **Reference Books** | |
|---|---|
| 1. | **Critical Thinking: A Student's Introduction (TextBook)**<br>By Gregory Bassham, William Irwin, Henry Nardone, and James M. Wallace \| McGraw-Hill Education \| 5th Edition (2012) |
| 2. | **Critical Thinking**<br>By Richard Paul and Linda Elder \| Foundation for Critical Thinking \| 9th Edition (2019) |
| 3. | **"The Demon-Haunted World: Science as a Candle in the Dark"**<br>By Carl Sagan \| Ballantine Books \| Reprint Edition (1997) |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 3** |
| **Type of Course** | Core subject | |
| **Prerequisite** | 139902102 Database Management Systems | |
| **Course Objective** | 1. Understand the Fundamentals of ERP:<br>2. ExploreERPSystem Components:<br>3. AnalyzeBusiness Processes:<br>4. CaseStudiesandReal-World Applications: | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 2 | 0 | 0 | 2 | 25 | 25 | | 50 |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction to ERP:**<br>Evolution of ERP, Reasons for the Growth of ERP, ERP in India; Various Modules of ERP; Advantage of ERP. **An Overview of Enterprise:** Integrated Management Information; Business Modeling; ERP for Small Business; ERP for Make to Order Companies; Business Process Mapping for ERP Module Design; Hardware Environment and its Selection for ERP Implementation. | **10** | **15** |
| 2 | **ERP and Related Technologies:**<br>ERP and Related Technologies; Business Process Reengineering (BPR); Management Information System (MIS); Executive Information System (EIS); Decision support System (DSS); . Supply Chain Management (SCM). | **15** | **35** |
| 3 | **Project Planning:**<br>Gap Analysis; Various Project Planning Phases; Project Training & Testing; Project Post Implementation & Maintenance Mode; Project Reengineering'<br>ERP Implementation Lifecycle: Pre-evaluation Screening; Package Evaluation & Implementation . | **10** | **25** |
| 4 | **ERP Vendors & Users:**<br>Vendors, Consultants and Users; In-House Implementation - Pros and Cons; Future Directions in ERP; Supply Chain Management; E-Procurement & E – Logistics | **10** | **25** |
| | **Total** | **45** | **100** |

**Course Outcomes**

| **At the end of this course, students will be able to:** | |
|---|---|
| CO1 | Make basic use of Enterprise software, and its role in integrating business functions |
| CO2 | Analyze the strategic options for ERP identification and adoption |
| CO3 | Design the ERP implementation strategies. |
| CO4 | Create reengineered business processes for successful ERP implementation. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 3** |
| **Type of Course** | Core subject | |
| **Prerequisite** | 139902103 Database Management System | |
| **Course Objective** | 1. Understand the Fundamentals of Project Management<br>2. Plan and Initiate Software Projects<br>3. Handle Project Closure and Evaluation<br>4. Utilize Project Management Tools | |

| Teaching Scheme (Contact Hours) | | | | Assessment Scheme | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 2 | 0 | 0 | 2 | 25 | 25 | | 50 |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| 1 | **INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT**<br>Project Definition ,Contract Management, Activities Covered By Software Project Management, Overview Of Project Planning, Stepwise Project Planning | 10 | 15 |
| 2 | **PROJECT EVALUATION**<br>Strategic Assessment, Technical Assessment, Cost Benefit Analysis, Cash Flow Forecasting , Cost Benefit Evaluation Techniques, Risk Evaluation | 15 | 25 |
| 3 | **ACTIVITY PLANNING**<br>Project Schedule ,Sequencing and Scheduling Activities, Network Planning Models Forward Pass ,Backward Pass ,Activity Float , Shortening Project Duration, Activity on Arrow Networks, Risk Management ,Nature Of Risk ,Types Of Risk , Managing Risk Hazard Identification , Hazard Analysis, Risk Planning And Control. | 15 | 25 |
| 4 | **MONITORING AND CONTROL**<br>Creating Framework, Collecting The Data ,Visualizing Progress, Cost Monitoring, Earned Value, Prioritizing Monitoring, Getting Project Back To Target – Change Control, Managing Contracts, Introduction, Types Of Contract, Stages In Contract, Placement, Typical Terms Of A Contract ,Contract Management , Acceptance. | 10 | 20 |
| 5 | **MANAGING PEOPLE AND ORGANIZING TEAMS**<br>Introduction : Understanding Behavior Organizational Behavior: A Background :Selecting The Right Person For The Job Instruction In The Best Methods Motivation: The Oldman, Hackman Job Characteristics Model, Working In Groups, Becoming A Team ,Decision Making ,Leadership , Organizational Structures ,Stress ,Health And Safety | 10 | 15 |
| | **Total** | 60 | 100 |

**Reference Books**


| | |
|---|---|
| 1. | **Managing Global Projects (TextBook)**<br>By Ramesh Gopalaswamy \| Tata McGraw Hill |
| 2. | **Software Project Management in Practice (TextBook)**<br>By Pankaj Jalote \| Pearson, Education Asia |


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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 3** |
| **Type of Course** | Elective Subject | |
| **Prerequisite** | 139902101 Advanced c and data structure | |
| **Course Objective** | 1. Introduction to Machine Learning<br>2. Mathematical Foundations<br>3. Introduction to Neural Networks<br>4. Model Evaluation and Selection: | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | **LAB** | **Total Marks** |
| 3 | 0 | 0 | 3 | 70 | 30 | | 100 |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction to Machine Learning**<br>Machine Learning, Machine Learning Examples, Types of Machine Learning, Supervised Learning, Examples of Supervised Learning, Unsupervised Learning, Semi Supervised Learning, Reinforcement, ML Applications, Machine Learning Life Cycle, AI vs ML, Data in Machine Learning, Data Processing, Data Cleaning, Inconsistent column, Missing data, Outliers, Duplicate rows, Data cleansing tools, Tidy data set. | **10** | **20** |
| 2 | **Introduction to Supervised Learning**<br>Classification problems, Linear Regression – Predicting numerical value, finding best fit line with linear regression, Perceptron, learning neural networks structures, Decision tree representation, appropriate problems for decision tree learning, basic decision tree algorithm, support vector machines | **10** | **25** |
| 3 | **Unsupervised Learning**<br>**Fuzzy C-Means** – Clustering, Types of Clustering, Fuzzy, Fuzzy terms, Fuzzy set, Fuzzy C Means, Membership function, Algorithmic steps for Fuzzy c-means clustering, Result of Fuzzy c-means clustering. **Unsupervised Learning** - Machine Learning, Unsupervised Learning, Advantages of Unsupervised Learning, Disadvantages of Unsupervised Learning, Difference between Supervised and Unsupervised Learning, Types of Unsupervised Learning, Clustering, Example of Clustering, Types of Clustering, Types of Clustering Techniques, Partitioning (Centroid) Clustering, K-Means Clustering, Example of centroid-based clustering. | **20** | **30** |
| 4 | **Machine Learning and Speech Recognition**<br>**Speech Recognition** - Introduction to Speech Recognition, Types of Speech Recognition, Speaker Dependent Model, Speech Recognition Applications, features of speech recognition systems, Advantages of Speech Recognition, Disadvantages of Speech Recognition. **Pattern Recognition** – Define pattern, Pattern Recognition, Applications Of Pattern Recognition, Pattern Recognition System, People detection with recognition based on video deep learning, Design Principles, Features, Training and Learning in Pattern Recognition, Advantages, Disadvantages. | **20** | **25** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate | Create |
|---|---|---|---|---|---|---|
| **Weightage** | 20 | 20 | 20 | 20 | 10 | 10 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may*

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*vary slightly from above table.*

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| Course Outcomes | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Explain the concept of supervised, unsupervised and semi-supervised learning. |
| CO2 | Develop algorithms to learn linear and non-- linear models using software. |
| CO3 | Perform creative work in the field ML to solve given problem. |
| CO4 | Explain the principles and applications of agglomerative hierarchical clustering. |
| CO5 | Explain the challenges and solutions associated with noise in maximum margin classification. |

| Reference Books | |
|---|---|
| 1. | **An Algorithmic Perspective (TextBook)**<br>By Tom M Mitchell \| McGraw Hill Education, 2013. |
| 2. | **The Art and Science of Algorithms that Make Sense of Data**<br>By Peter Flach \| First Edition, Cambridge University Press, 2012. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 4** |
| **Type of Course** | Discipline Specific Elective Courses | |
| **Prerequisite** | 02070303-T - BASICS OF OPERATING SYSTEM | |
| **Course Objective** | 1. Get knowledge about Linux system in CUI and GUI surfaces.<br>2. Learn programming techniques in Linux scripting. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | **LAB** | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | | **Total Marks** |
| 3 | 0 | 1 | 4 | 70 | 30 | 50 | 150 |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Overview of Unix**<br><br>UNIX as an operating system – Kernel – Shell – User – UNIX File System – Files & Directory – File System, Hierarchy, Basic UNIX Commands, Listing Files & Directories. Copying, Deleting, Renaming, Comparing, Splitting, Linking Files., Creating, Navigating, and Removing Directories. | **15** | **25** |
| 2 | **Unix Commands**<br><br>Setting Access permission of files & directories, Using VI editor of UNIX. Paging & Printing Files., Status of users terminals & setting terminal, Characteristics, Cutting, Pasting, Sorting of Files., Searching for a pattern in a string. Process Status, Process Killing | **15** | **25** |
| 3 | **System Administration**<br><br>Adding & Modifying Users' accounts, Controlling Passwords. Creating & Mounting File System, init process & inittab startup files, Run levels., Managing Disk Space(df , du ,cpio), Searching Files with the find command, Using FTP protocol to move files between computers. 'Shutdown' commands. | **15** | **25** |
| 4 | **Shell Programming**<br><br>Shell Script, System variables & shell variables. Shell termination, Looping statements; conditional statements; case statements. Logical operators, Mathematical expression, Command line parameters – Positional parameters. String handling. | **15** | **25** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Create |
|---|---|---|---|---|---|
| **Weightage** | 20 | 25 | 25 | 15 | 15 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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## Course Outcomes

| At the end of this course, students will be able to: | |
|---|---|
| CO1 | Understanding of the Linux operating system architecture and its various components, including kernel, shell and utilities. |
| CO2 | Learn editor and implement different commands on linux terminal. |
| CO3 | Test how to work with users accounts and manage system administration. |
| CO4 | Create file system and directories, operate those using programs. |
| CO5 | Evaluate shell scripts, positional parameters and string handling to solve certain problems. |
| CO6 | Prepare C programming and shell scripts using Linux. |

## Reference Books

| | |
|---|---|
| 1. | **Advanced C Programming by Example**<br>By John W Perry \| PWS Publishing Company |
| 2. | **Advanced Programming in Unix Environment**<br>By Richard Stevens \| Addison Wesley |
| 3. | **Begining Linux Programming (TextBook)**<br>By Neil Mathew & Richard Stones \| Wrox Press |
| 4. | **Beginning RedHat Linux**<br>By Bhattacharya, Mauro, Mamone, Kapil Sharma, Thomas, Whiting, Gundavaram \| Wrox Press |
| 5. | **Expert C Programming**<br>By Peter Van Der Linden \| Publisher - Prentice Hall, also available through o'Reilly Media Press |
| 6. | **Instant Linux/Unix (TextBook)**<br>By Andrew E vans, Neil M athew & Richard Stones \| Wrox Press |
| 7. | **Linux Cookbook (TextBook)**<br>By Carl a Schroder \| o'Reilly Media |

## List of Practical

| | |
|---|---|
| 1. | Create a Shell Script to print 'Rai University' |
| 2. | Create a Shell Script to read and display content of file. |
| 3. | Create a Shell Script to read from command line. |
| 4. | Create a Shell script to append content of one file to another |
| 5. | Create a Shell script to accept a string in lower case letters from a user, & convert to upper case letters. |
| 6. | Create a Shell script to find numbers of characters, words & lines of a given input file. |
| 7. | Create a Script to reverse a string and display it. |
| 8. | Create a Script to check a string is palindrome. |
| 9. | Create a shell script to reverse the digits of a given 5-digit number. |
| 10. | Create a shell script to print 20 to 1. In reverse order. |
| 11. | Write a shell Script to print 'Rai University' 10 times with use of While loop. |
| 12. | Write a program to print 1 to 5 with use of for loop. |
| 13. | Write a program to demonstrate case statement demo. |
| 14. | Write a program to read two numbers from user and find that both are equal or not. Use if statement. |

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| | |
|---|---|
| 15. | Write a program demonstrate if ..elif demo. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 4** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 02070303-T - BASICS OF OPERATING SYSTEM | |
| **Course Objective** | 1. To understand the basic concepts of Path testing, Logic based testing<br>2. To implement Data flow testing, domain testing | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | **LAB** | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | | **Total Marks** |
| 3 | 0 | 0 | 3 | 70 | 30 | 0 | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **INTRODUCTION TO DATA WAREHOUSING**<br>Introduction – What is Data Warehousing - Data Warehousing concepts, Data Warehousing building blocks : Defining features – Data Warehouse and Data Marts, Issues in Data Warehousing -Benefits of Data Warehousing, Overview of Components, Metadata : Use of metadata in Data Warehouse, Categories of Metadata – Roles of Metadata, Architecture of Data Warehouse, Data Warehouse models, Methodology for Data Warehousing | **15** | **25** |
| 2 | **DATA DESIGN AND DATA PREPARATION**<br>ETL Process overview, Data Extraction, Data Transformation, Data Loading, Data Quality, Challenges, ETL Tools, OLAP in Data Warehouse, Features and operations of OLAP – (Drill-down, Rollup, Slice, Dice), OLAP schema design OLAP Models | **15** | **25** |
| 3 | **INTRODUCTION TO DATA MINING**<br>Motivation for Data Mining, Data Mining: On What kind of Data?, Definition and Functionalities: What kind of patterns can be mined?, Issues in DM, KDD Process, Classification of Data Mining Systems | **10** | **15** |
| 4 | **DATA PREPROCESSING, CONCEPT DISCRIPTION AND ASSOCIATION RULE MINING**<br>Why Preprocess the Data?, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Data Mining Primitives: What Defines a Data Mining Task?<br>What is concept description?, Association Rule Mining: Market basket analysis, Basic concepts, Finding frequent item sets: Apriori algorithm, generating rules, Improved Apriori algorithm, Frequent pattern growth algorithm. | **20** | **35** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate | Create |
|---|---|---|---|---|---|---|
| **Weightage** | 30 | 30 | 10 | 10 | 10 | 10 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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| Course Outcomes | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Understand the functionality of the various data mining and data warehousing component |
| CO2 | Appreciate the strengths and limitations of various data mining and data warehousing models |
| CO3 | Explain the analyzing techniques of various data using OLAP Cube |
| CO4 | Describe different methodologies used in data mining and data ware housing. |
| CO5 | Compare different approaches of data ware housing and data mining with various technologies |

| Reference Books | |
|---|---|
| 1. | **Data Mining: Concepts and Techniques**<br>By Jiawei Han and Micheline Kamber \| Morgan Kaufmann Publishers |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 4** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 02070403-T - INTRO. TO COMPUTER ORG. & ARCHITECHTURE | |
| **Course Objective** | 1. Build an understanding of the fundamental concepts of computer networking<br>2. Familiarize the student with the basic taxonomy and terminology of the computer networking.<br>3. Allow the student to gain expertise in some specific areas of networking. | |

| Teaching Scheme (Contact Hours) | | | | Assessment Scheme | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | LAB | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | | **Total Marks** |
| 3 | 0 | 2 | 4 | 70 | 30 | 50 | 150 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| 1 | **Introduction to Networking** | **15** | **25** |
| | Definition of network and Data Communication, Network Applications, Standard organization (ISO, CCITT, ANSI, IEEE, ITU, ISOC, IETF) Data Flow: Simple Duplex, Half duplex, Full Duplex, data communications key points Categories of network :LAN, WAN, MAN Internetworks, Definition of Protocol, line configurations, multi point, point-point, unicast, multicast, broad cast | | |
| 2 | **The Reference Model and Topology** | **15** | **25** |
| | OSI model & function of each Layer, TCP/ IP model Comparison of OSI & TCP/IP Topology and its Types: Mesh, Star, Ring, Bus, Tree Configuration of topologies in Cisco packet tracer Different types of servers, File Application, Print, Mail, Proxy, Web servers | | |
| 3 | **Transmission Media & Network Components** | **15** | **25** |
| | Transmission Media: Guided Media and Unguided media Network Components: Hub ,Switches, Routers ,Bridge, NIC, Repeater, Gateway, Network software, Wired Network, Wireless Networks Network commands | | |
| 4 | **IP Protocol and Network Applications** | **15** | **25** |
| | IP protocol, IP V4 Header & protocol functions, IP addressing schemes, Subnet & subnet masking HTTP,WWW,URL,DHCP,DNS (Domain Name System),Name Server, File transfer protocol & Trivial FTP, Electronic Mail, Functions of E-mail systems (mail box & address),User agents, Message format, Mail Protocols (SMTP, POP, IMAP, MIME). | | |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| Level | Remembrance | Understanding | Application | Analyze | Evaluate | Create |
|---|---|---|---|---|---|---|
| **Weightage** | 10 | 30 | 20 | 20 | 15 | 5 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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| **Course Outcomes** | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Describe the components and infrastructure that form the basis for most computer networks |
| CO2 | Describe the technical aspects of data communications on the Internet. |
| CO3 | Design different topologies using Packet tracer. |
| CO4 | Understand the use of various Network components and Transmission Media. |
| CO5 | Explain Network Applications such as IPv4, IPv6, Subnet masking, http, DNS etc. |

| **Reference Books** | |
|---|---|
| 1. | **Computer Network (TextBook)**<br>By Andrew S. Tanenbaum \| Pearson |
| 2. | **Introduction to Data Communication and Networking (TextBook)**<br>By Behrouz Forouzan \| TMH |

| **List of Practical** | |
|---|---|
| 1. | Bus Topology using CISCO Packet Tracer |
| 2. | Star Topology using CISCO Packet Tracer |
| 3. | Mash Topology using CISCO Packet Tracer |
| 4. | Ring Topology Using CISCO Packet Tracer |
| 5. | Network basics Commands |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 4** |
| **Type of Course** | Core Courses | |
| **Prerequisite** | 03080101-T - PROGRAMMING IN C | |
| **Course Objective** | 1. Establishing Fundamental Java Programming Skills<br>2. Mastery of Object-Oriented Concepts in Java<br>3. Advanced Java Concepts: Inheritance, Polymorphism, Exception Handling, and GUI Programming | |

| Teaching Scheme (Contact Hours) | | | | Assessment Scheme | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | LAB | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | | **Total Marks** |
| 3 | 0 | 2 | 4 | 70 | 30 | 50 | 150 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| 1 | **Introduction to Java**<br>Basics of Java programming, Creating first java classes. Features of Java, Adding comments to a java, Saving, compilingand running a java application. Creating a java application using GUI output Data types, Variables, Operators. Control structures including selection, Looping, Java methods, Overloading, Math class. Arrays in Java, Advantages of Java, Applications of Java, Constants, Literals, variables, Keywords, Identifiers, numeric type conversion, Operators in Java. String handling functions and string buffer class. | **10** | **25** |
| 2 | **Methods, Object , Classes, Conditions & Loops in Java**<br>Basics of objects and classes in Java. Constructors, Finalizer, Visibility modifiers, Methods and objects. Inbuilt classes like String, Character, String Buffer, File this reference. Method overloading, Constructors, Sending arguments to constructors, Constructors overloading. 'this' keyword, Static variable. Working with constants, if and if…..else, Nesting if… else, Using logical AND and OR operators, switch statement, Using the conditional AND not operators, Using the NOT operator, Understanding precedence. While loop, for loop, do…. while loop. | **15** | **25** |
| 3 | **Inheritance and Polymorphism**<br>Inheritance in Java, Super and sub class. Overriding, Object class, Polymorphism, Dynamic binding. Generic Programming, Casting objects, Instance of operator, Abstract class, Interface in Java, Package in Java, Accessing super class methods. Constructor calling during inheritance, Extending classes. Method overriding, Final method, Final super class, Static method. | **20** | **25** |
| 4 | **Exception Handling & Multi-Threading**<br>Learning about exceptions, Understanding the limitations of traditional error, and handling. Trying code and catching exceptions. Throwing and catching multiple exceptions. 'finally' block, Understanding the advantages of exception handling. Checked and unchecked exception, Creating own exceptions (custom exception). Introduction, Thread Life Cycle. Creating and running thread (using Thread class and, Runnable interface).Thread Priorities. Thread join (), sleep () method, Thread synchronization. Exception handling with try-catch-finally, Collections in Java. Introduction to JavaBeans and Network Programming. | **15** | **25** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| Level | Remembrance | Understanding | Application | Analyze | Evaluate | Create |
|---|---|---|---|---|---|---|
| **Weightage** | 25 | 25 | 10 | 10 | 10 | 20 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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**Course Outcomes**

| | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Understand fundamentals of Java programming |
| CO2 | Learn object-oriented programming, including inheritance and polymorphism |
| CO3 | Gain proficiency in exception handling and multithreading |
| CO4 | Explore inbuilt classes and libraries in Java |
| CO5 | Basic knowlwdge of advanced topics such as JavaBeans, network programming, and collections |

**Reference Books**

| | |
|---|---|
| 1. | **Object Oriented Programming in java (TextBook)**<br>By Dr. G.T.Thampi \| Dreamtech |
| 2. | **Programming with Java (TextBook)**<br>By E. Balagurusamy \| Sixth Edition, Tata Mc Graw Hill |

**List of Practical**

| | |
|---|---|
| 1. | Write a program to convert rupees to dollar. 60 rupees=1 dollar. |
| 2. | Write a program that calculate percentage marks of the student if marks of 6 subjects are given. |
| 3. | Write a program to enter two numbers and perform mathematical operations on them. |
| 4. | Write a program to find length of string and print second half of the string. |
| 5. | Write a program to accept a line and check how many consonants and vowels are there in line. |
| 6. | Write a program to count the number of words that start with capital letters. |
| 7. | Write a program to find that given number or string is palindrome or not. |
| 8. | Create a class called Student. Write a student manager program to manipulate the student information from files by using FileInputStream and FileOutputStream. |
| 9. | Refine the student manager program to manipulate the student information from files by using the BufferedReader and BufferedWriter. |
| 10. | Refine the student manager program to manipulate the student information from files by using the DataInputStream and DataOutputStream. Assume suitable data. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 4** |
| **Type of Course** | Discipline Specific Elective Courses | |
| **Prerequisite** | 05070409-T - MACHINE LEARNING ALGORITHMS(T) | |
| **Course Objective** | 1. To explain the fundamentals of deep learning, Convolution neural network.<br>2. Explore Convolutional Neural Networks (CNNs) in depth, including their architecture and applications.<br>3. Examine various problem domains in machine learning, such as classification, detection, segmentation, and generation.<br>4. Apply transfer learning methods to enhance model performance and efficiency.<br>5. Utilize hyperparameter optimization techniques to fine-tune models for improved results | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | **LAB** | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | | **Total Marks** |
| 3 | 0 | 0 | 3 | 70 | 30 | 0 | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction to Deep Learning**<br>Overview of machine learning and deep learning ,History and evolution of neural networks, Biological inspiration: the neuron and neural networks, Types of neural networks (Feedforward, Recurrent, Convolutional) | **10** | **20** |
| 2 | **Neural Network Fundamentals**<br>Perceptrons and activation functions, Backpropagation and gradient descent, Weight initialization and regularization, Loss functions for various tasks (classification, regression) | **15** | **25** |
| 3 | **Deep Learning Frameworks**<br>Introduction to deep learning libraries (TensorFlow, PyTorch), Setting up development environments, Building and training simple neural networks | **10** | **15** |
| 4 | **Natural Language Processing (NLP) with Deep Learning, Advanced Topics in Deep Learning**<br>Text data preprocessing, Word embeddings (Word2Vec, GloVe), Recurrent Neural Networks for NLP, Sequence-to-sequence models for machine translation<br>Generative Adversarial Networks (GANs),Reinforcement Learning basics,Transfer learning and fine-tuning pre-trained models,Ethical considerations in deep learning | **25** | **40** |
| | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate |
|---|---|---|---|---|---|
| **Weightage** | 20 | 20 | 20 | 20 | 20 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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**Course Outcomes**

| | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | To explain the fundamentals of deep learning, Convolution neural network. |
| CO2 | Explore Convolutional Neural Networks (CNNs) in depth, including their architecture and applications. |
| CO3 | Examine various problem domains in machine learning, such as classification, detection, segmentation, and generation. |
| CO4 | Apply transfer learning methods to enhance model performance and efficiency. |
| CO5 | Utilize hyperparameter optimization techniques to fine-tune models for improved results. |

**Reference Books**

| | |
|---|---|
| 1. | **"Deep Learning" (TextBook)**<br>By Ian Goodfellow \| Third Edit on, O'reily Media, 2012 |
| 2. | **Dive into Deep Learning**<br>By Yoshua Bengio \| (1 ed.), Corwin, 2019 |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 4** |
| **Type of Course** | Discipline Specific Elective Courses | |
| **Prerequisite** | 13990402-T - JAVA PROGRAMMING | |
| **Course Objective** | 1.Understand the core blockchain concepts and their importance in enterprise settings.<br>2.Understand demonstrate proficiency in using various Hyperledger frameworks, including Fabric, Sawtooth, and Indy.<br>3. Understand capable of developing and deploying secure enterprise blockchain applications with appropriate security measures.<br>4. Understand the integrate blockchain solutions into existing enterprise architecture, ensuring compatibility and efficiency.<br>5. Understand their knowledge to analyze and propose blockchain solutions for advanced use cases such as supply chain management, identity verification, and more. | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | **LAB** | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | | **Total Marks** |
| 3 | 0 | 0 | 3 | 70 | 30 | 0 | 100 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| 1 | **Introduction to Blockchain and Hyperledger**<br><br>**Understanding Blockchain Technology -** Overview of blockchain fundamentals, Types of blockchain networks (public vs. private), Real-world use cases and examples<br><br>**Introduction to Hyperledger -** An overview of the Hyperledger project, Key Hyperledger frameworks and tools, Selecting the right Hyperledger framework for your project | **10** | **20** |
| 2 | **Hyperledger Fabric - Building a Private Blockchain**<br><br>**Hyperledger Fabric Basics -** Architecture and components of Hyperledger Fabric, Setting up a development environment, Creating a simple Hyperledger Fabric network<br><br>**Chaincode Development in Fabric -**Writing smart contracts (chaincode) in Go, Deploying and invoking chaincode, Testing and debugging chaincode | **15** | **25** |
| 3 | **Advanced Fabric Development and Deployment**<br><br>**Fabric Network Configuration -** Configuring channels, peers, and orderers, Identity management in Fabric, Exploring Fabric's consensus mechanisms<br><br>**Security, Scalability, and Integration -** Security considerations in Fabric, Strategies for scaling Fabric networks, Integrating Hyperledger Fabric with existing systems | **20** | **30** |
| 4 | **Beyond Fabric - Other Hyperledger Frameworks** | **15** | **25** |

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**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| | **Hyperledger Sawtooth -** Overview of Hyperledger Sawtooth, Setting up a Sawtooth development environment, Building a Sawtooth network and transaction processors<br><br>**Hyperledger Indy and Final Projects -** Introduction to Hyperledger Indy for decentralized identity, Final projects: Students develop and present blockchain applications, Reflection on the future of enterprise blockchain | | |
| | | **Total** | **60** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| Level | Remembrance | Understanding | Analyze | Evaluate | Create |
|---|---|---|---|---|---|
| **Weightage** | 25 | 15 | 20 | 20 | 20 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

**Course Outcomes**

| At the end of this course, students will be able to: | |
|---|---|
| CO1 | Understand the core blockchain concepts and their importance in enterprise settings. |
| CO2 | Understand demonstrate proficiency in using various Hyperledger frameworks, including Fabric, Sawtooth, and Indy. |
| CO3 | Understand capable of developing and deploying secure enterprise blockchain applications with appropriate security measures. |
| CO4 | Understand the integrate blockchain solutions into existing enterprise architecture, ensuring compatibility and efficiency. |
| CO5 | Understand their knowledge to analyze and propose blockchain solutions for advanced use cases such as supply chain management, identity verification, and more. |

**Reference Books**

1. **Mastering Blockchain: Unlocking the Power of Cryptocurrencies, Smart Contracts, and Decentralized Applications (TextBook)**
By Imran Bashir | Packt Publishing

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 4** |
| **Type of Course** | Discipline Specific Elective Courses | |
| **Prerequisite** | 13990503-T - PYTHON | |
| **Course Objective** | 1.Understand the fundamental concepts of machine learning and its various types.<br>2.Understand the importance of model selection and validation techniques.<br>3.Understand linkage-based clustering algorithms and the k-means algorithm.<br>4.Understand Bayesian learning principles and their application in machine learning.<br>5.Evaluate and apply feature selection, transformation, and learning techniques for enhancing model performance | |

| **Teaching Scheme (Contact Hours)** | | | | **Assessment Scheme** | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Theory Marks** | | **LAB** | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | | **Total Marks** |
| 3 | 0 | 2 | 4 | 70 | 30 | 50 | 150 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| **Sr.** | **Topics** | **T** | **W** |
|---|---|---|---|
| **1** | **Introduction**<br>Machine Learning, Different types of machine learning, Linear regression, Logistic regression, K-Nearest Neighbour, Support Vector Machines: Hard SVM, Soft SVM, Optimality conditions, Duality, Kernel trick, Implementing Soft SVM with Kernels, | **15** | **20** |
| **2** | **Decision Trees**<br>Decision Tree algorithms, Random forests, Neural Networks: Feedforward neural networks, Expressive power of neural networks, SGD and Backpropagation, Model selection and validation: Validation for model selection, k-fold cross-validation, Training validation-Testing split, Regularized loss minimization | **15** | **25** |
| **3** | **Unsupervised Learning and Generative Models**<br>Clustering: Linkage-based clustering algorithms, k-means algorithm, Spectral clustering Dimensionality reduction: Principal Component Analysis, Random projections, Compressed sensing. | **15** | **20** |
| **4** | **Generative Models**<br>Maximum likelihood estimator, Naive Bayes, Linear Discriminant Analysis, Latent variables and Expectation-maximization algorithm, Bayesian learning Feature Selection and Generation: Feature selection, Feature transformations, Feature learning | **10** | **25** |
| | **Total** | **55** | **90** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| **Level** | Remembrance | Understanding | Application | Analyze | Evaluate | Create |
|---|---|---|---|---|---|---|
| **Weightage** | 10 | 20 | 25 | 10 | 25 | 10 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.*

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| **Course Outcomes** | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Understand the fundamental concepts of machine learning and its various types. |
| CO2 | Understand the importance of model selection and validation techniques. |
| CO3 | Understand linkage-based clustering algorithms and the k-means algorithm. |
| CO4 | Understand Bayesian learning principles and their application in machine learning. |
| CO5 | Evaluate and apply feature selection, transformation, and learning techniques for enhancing model performance |

| **Reference Books** | |
|---|---|
| 1. | **"Machine Learning" (TextBook)**<br>By Mitchell Tom \| Tata Mcgraw- Hill |

| **List of Practical** | |
|---|---|
| 1. | Write a Python program to implement Simple Linear Regression. |
| 2. | Using Python develop Logistic Regression Model for a given dataset. |
| 3. | Identifying handwritten digits (0-9) using SVM on the MNIST dataset. |
| 4. | Predicting loan approval decisions using a decision tree. |
| 5. | Classifying diseases using a random forest on medical data. |
| 6. | Clustering news articles into topics based on their content. |
| 7. | Reducing image dimensions for face recognition using PCA. |
| 8. | Categorizing sentiment of movie reviews using a Naive Bayes classifier. |
| 9. | Segmenting an image into foreground and background using Gaussian Mixture Model (GMM). |
| 10. | Handwriting recognition using a feedforward neural network. |

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| | | |
|---|---|---|
| **Course** | Bachelor in Computer Application (BCA) | **Semester - 4** |
| **Type of Course** | Discipline Specific Elective Courses | |
| **Prerequisite** | 13990313-T - CRYPTOCURRENCY AND DIGITAL LEDGERS(T) | |
| **Course Objective** | 1. Understand the overall concepts of golang and their developing infrastructure.<br>2. Get knowledge about array,loop and their type casting.<br>3.Understand basic structure, error handling and interface.<br>4. Apply different library and build application.<br>5. Building new applications and perform testing and debugging. | |

| Teaching Scheme (Contact Hours) | | | | Assessment Scheme | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | LAB | |
| **Lecture** | **Tutorial** | **Lab** | **Credit** | **SEE** | **CIA** | | **Total Marks** |
| 3 | 0 | 2 | 4 | 70 | 30 | 50 | 150 |

***SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

**Course Content**

**T** - Teaching Hours | **W** - Weightage

| Sr. | Topics | T | W |
|---|---|---|---|
| 1 | **Introduction to GOLANG**<br><br>Overview of Go language, its history and design principles, Setting up the development environment, Compiling and Executing Go, Programs, Installation, Verifying the Installation,Go syntax basics: Data Types, Variables, Constants, Operators, and Expressions | **10** | **25** |
| 2 | **Flow Control**<br><br>Conditional statements (if, if…else, Nested If, Select, Switch), Loops (for, Nested for, while, Continue, goto, Infinite), Functions and scopes, String, Ponters, Arrays, Slices and Maps, Arrays and Slices in Go, Working with Maps in Go, Range, Recursion, Type Casting | **15** | **25** |
| 3 | **Structs and Interfaces, Concurrency in Go**<br><br>Defining and using structs in Go, Interfaces in Go and their use cases, Error handling<br><br>Goroutines and Channels, Synchronization and deadlocks, Best practices for writing concurrent code in Go | **10** | **25** |
| 4 | **Package Management, Web Development with Go**<br><br>Go's Standard Library,Third-party packages,Creating and publishing Go packages<br><br>Introduction to HTTP and REST APIs, Building web applications with Go, Debugging and profiling Go web applications | **10** | **25** |
| | **Total** | **45** | **100** |

**Suggested Distribution Of Theory Marks Using Bloom's Taxonomy**

| Level | Remembrance | Understanding | Analyze | Evaluate | Create |
|---|---|---|---|---|---|
| **Weightage** | 15 | 20 | 30 | 15 | 20 |

*NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may*

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*vary slightly from above table.*

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| **Course Outcomes** | |
|---|---|
| **At the end of this course, students will be able to:** | |
| CO1 | Understand the overall concepts of golang and their developing infrastructure. |
| CO2 | Get knowledge about array,loop and their type casting. |
| CO3 | Understand basic structure, error handling and interface. |
| CO4 | Apply different library and build application. |
| CO5 | Building new applications and perform testing and debugging. |

| **Reference Books** | |
|---|---|
| 1. | **Professional C#.Net (TextBook)**<br>By Christian Nagel \| Wrox Publication |
| 2. | **ASP.NET Complete Reference**<br>By Matthew Macdonald and Robert Standefer \| TMH |

| **List of Practical** | |
|---|---|
| 1. | write a simple "Hello, World!" program. |
| 2. | Write a program that uses an if statement to check a condition. |
| 3. | Write a program that uses a for loop to iterate over a range of numbers. |
| 4. | Write a program with multiple functions, including functions with parameters and return values. |
| 5. | Write a program to create and initialize an array .Manipulate elements in a slice, including appending and slicing operations. |
| 6. | Define a struct with multiple fields and create instances of the struct. Write methods for the struct. |
| 7. | Write a program that performs an operation that could produce an error (e.g., file I/O). |
| 8. | Write a program that launches multiple goroutines to perform concurrent tasks. |
| 9. | Create a custom Go package with functions. |
| 10. | Create a simple REST API with endpoints for CRUD operations. Implement handlers for the endpoints and test them using a tool like Postman |

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