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 2.Translate algorithm/flowchart into C program using correct syntax and execute it. 3.Write a program using branching ,looping, iteration and recursion.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		**LAB**	**Total Marks**
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**		
4	0	2	6	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 Fundamental of Computer** Basic block diagram of Computer component, hardware, software, memory, generation of computer, Flowcharts and algorith **Overview of C** Introduction, Importance of C, Sample C programs, Basic structure of C programs, Programming style, Executive a C program. **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. **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** Introduction, reading a character, writing a character, formatted input, formatted output, structure of c program input output function **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, Jumps in loops Break and continue. **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 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.		
	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**	15	20
	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.		
	Pointers Introduction, understanding pointers, Accessing the address of 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		
	File Management in C Introduction, Defining files and its Operations, Error handling during I/O operations, Random access files, Command line arguments.		
	Total	60	100

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 and Union.

Reference Books	
1.	**Let Us C** By Yashwant Kanetker | BPB Publication
2.	**Programming in ANSIC (TextBook)** 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 print the multiply, addition, division & subtraction value of two accepted numbers.
5.	Write a C program to swap a variable value of no1 and no2.
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 function.

Rai University
EVOLVING THINKING MINDS

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. 2. Learn about Networks and data communication. 3. Learn about Enterprise systems and functions.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks			
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**	**LAB**	**Total Marks**
4	0	2	6	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	**Computer Hardware System**	10	15
	Concepts and generation of computer, CPU, Basic Logic Gates, Computer Memory and Mass Storage Devices, Computer Hierarchy, Input and Output Technologies		
2	**Operating Systems and Application, System Software Application and System Software**	25	35
	Application and System Software, Compilers and Interpreters, Process of Software Development, Data Analysis using Spreadsheets **Operating Systems** Functions of Operating Systems, Types of Operating Systems (Batch Processing, Multi-tasking, Multi-programming and Real-time Systems)		
3	**Data Communication and Networks**	10	25
	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		
4	**Functional and Enterprise Systems**	15	25
	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.		
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy				
Level	Remembrance	Understanding	Analyze	Create
Weightage	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	Understand computer hardware concepts, generations, and input/output technologies.
CO2	Gain proficiency in operating systems, software development, and data analysis.
CO3	Explore functions and types of operating systems.
CO4	Acquire knowledge of data communication, networks, and the Internet.
CO5	Understand functional systems, decision-making processes, and computer networking needs.

Reference Books

1.	**Introduction to computers (TextBook)** By Peter Norton | Mc Grew Hill

List of Practical

1.	MS-WORD Microsoft Word is a word processor developed by Microsoft. It was first released in 1983 under the name Multi-Tool Word for Xenix systems. MSWord is a popular word-processing program used primarily for creating documents such as letters, brochures, learning activities, tests, quizzes and students' homework assignments. There are many simple but useful features available in Microsoft Word to make it easier for study and work. That's why so many people would prefer to convert the read-only
2.	Create a employee table (EMP_ID , EMP_NAME , SALARY , SALE_AMOUNT , COMMISSION , TOTAL SALARY)
3.	Create item table (ITEM_NO , NO OF ITEM , ITEM PRICE , TAX)
4.	Create a presentation about your self-introduction.
5.	Create power point presentation to introduction about Rai University.
6.	Write a medical leave application for student to their mentor and below all steps are used to write application.
7.	Create power point presentation to introduction about festival celebration in India.
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	General Elective Courses	
Prerequisite	Basic maths skills	
Course Objective	1. Student will be able to solve problems based on set theory. 2. Student will able to explain relations and functions. 3. Student will able to solve problems based on matrix and determinant. 4. Able to compute limits, derivatives, and integrals. 5. Able to remember formulas based on differentiation.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
4	0	0	4	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	**Set Theory**	17	28
	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.		
2	**Relation and function**	15	26
	Cartesian product of the sets, relations, Functions, Types of functions, algebra of functions, Examples		
3	**Matrix and determinants**	15	18
	Introduction of matrices, Definition of different matrices, Determinants of matrix, minors, cofactors, determinant of matrix. Adjoint of matrix, Inverse of the matrixIntroduction of matrices, Definition of different matrices, Determinants of matrix, minors, cofactors, determinant of matrix. Adjoint of matrix, Inverse of the matrix		
4	**Limit Differentiation and integration**	13	28
	Limit, Concept of limit, some standard limit, continuity of function, Definition of derivative, rules of derivative, Standard formulae and examples based on standard forms		
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate
Weightage	15	20	25	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	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.

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CO4	Student will able to compute limits, derivatives, and integrals.
CO5	Student will Able to apply differential and Integral equations to significant applied problems.

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Reference Books

1.	**Class XI Mathematics NCERT book (TextBook)** By NCERT | NCERT
2.	**Basic mathematics (TextBook)** Atul Prakashan
3.	**Business Mathematics** By V.K.Kapoor | S. Chand and sons, New Delhi

Course	Bachelor in Computer Application (BCA)	Semester - 1
Type of Course	Ability Enhancement Courses	
Prerequisite	Basic knowledge of science & 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. 2. Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving. 3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems 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		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
3	1	0	4	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	**The multidisciplinary nature of environmental studies** Environmental Science 'definition, scope & importance, Evolution of the universe, origin of the earth; solar system; evolution of life; 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** 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; ecological niche; guild, Significance of ecological adaptation; ecological adaptation in plants and animals- Zeric adaptations in plants and animals; adaptations of plants and animals to aquatic habitat; arboreal adaptations in plants and animals	15	25
3	**Ecosystem** 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, Chemistry of decaying compounds, Case Studies. Earth - Its interior and surface, Layers of the earth, Earths Crust: Formation of Rocks Major land forms and their transformation, Denudation and its agents: Weathering ' Mechanical and chemical - Agents of weathering, Composition of soil, Formation and types of soils.	15	25
4	**Biogeochemical cycles and Environmental Pollution**	15	25

Course Content

T - Teaching Hours | W - Weightage

Sr.	Topics	T	W
	Biogeochemical cycles, Carbon cycle, Nitrogen cycle, Phosphorus cycle, Oxygen cycle, Water cycle Environmental Pollution Types of Environmental Pollution, Water Pollution, Air Pollution, Land and Noise Pollution, Current Issues in environment sciences		
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	40	30	5	5	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	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** By Erach Bharucha	Universities Press (India) Private Ltd, Hyderabad.	Second edition, Pub. Year 2013
2.	**Environmental Sciences** 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	Ability Enhancement Courses	
Prerequisite	Basic knowledge of English	
Course Objective	1. Enhance reading, writing, listening, and speaking skills in English. 2. Develop an understanding of the cultural and historical context of English-speaking regions. 3. Foster analytical thinking and the ability to interpret and evaluate English texts. 4. Gain confidence in expressing ideas and opinions effectively in both written and oral forms. 5. Explore and appreciate various literary genres and styles in English literature.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
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	**Fundamentals of grammar**	12	25
	Parts of Speech (Noun, Pronoun, Adjective, Verb, Adverb, Conjunction, Preposition, Interjection) Article Tense: Application of tenses with respect to time, All tenses & their Sub-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		
2	**Listening**	11	25
	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.		
3	**Reading**	11	25
	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		
4	**Letter writing**	11	25
	Formal and informal; CV; Report Writing; Presentation as a skilllllElements of Presentation Strategies – Audience – Objectives – Medium - Key Ideas, Structuring The Material, Organizing Content, Audio -Visual Aids – Handouts - Use of Power Point		
	Total	45	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	1.To understand the process of e-mail communication minutes of meeting.
CO2	To make aware about barriers to communication with ethical context.
CO3	To make effective and impressive communication.
CO4	Better presentation and communication using proper body language.

Reference Books	
1.	**High School English Grammar & Composition (TextBook)** By Wren & Martin | Blackie
2.	**Learn English vocabulary at a Glance** By Dr. Rakesh Bharadwaj | Dr. Rakesh Bharadwaj

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Course	Bachelor in Computer Application (BCA)	Semester - 2
Type of Course	Core Courses	
Prerequisite	02080201-T - COMPUTER FUNDAMENTALS AND PROGRAMMING WITH C	
Course Objective	1. To Understand different types of data. 2. To develop the capability of selecting a particular data structure and implement algorithm.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks			
Lecture	Tutorial	Lab	Credit	SEE	CIA	LAB	Total Marks
4	0	2	6	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 Data Structure**	15	25
	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		
2	**Linear data Structure, Stack, Queue ,Linked List**	15	25
	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		
3	**Non Linear Data Structure Tree, Graph**	15	25
	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)		
4	**Hashing ,Sorting and Searching, Hashing ,Sorting and Searching**	15	25
	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		
	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 Algorithm
CO5	Apply various hashing techniques.

Reference Books

1.	**Data Structures using C & C++ (TextBook)** By Ten Baum | Prenctice-Hall International
2.	**Fundamentals of Computer Algorithms by (TextBook)** 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. 2. To learn the fundamental of data models and SQL query. 3. To develop application using PL/SQL blocks.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks			**Total Marks**
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**	**LAB**	
4	0	2	6	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** 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** 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** 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** 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.

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)** By Abraham Silberschatz, Henry F. Korth and S. Sudharshan | Sixth Edition, Tata Mc Graw Hill, 2011
2.	**An Introduction to Database Systems** By C.J.Date, A.Kannan and S.Swamynathan | Eighth Edition, Pearson Education, 2006.
3.	**Introduction to Database Management Systems (TextBook)** 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	Basic knowledge of Maths	
Course Objective	1. Student will be Able to understand the basics concepts of Discrete Mathematical Structures 2. student will have developed ability to Understand the concept of Group Theory 3. Students will achieve command of the fundamental definitions and concepts of graph theory 4. Solve simple application problems 5. Student will have developed ability to Distinguish various types of graphs	

Teaching Scheme (Contact Hours)				Assessment Scheme			
Lecture	Tutorial	Lab	Credit	Theory Marks		LAB	Total Marks
				SEE	CIA		
3	1	0	4	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	**UNIT-I**	12	28
	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		
2	**UNIT-II**	9	26
	Cyclic group, Right Coset and left coset, equivalence class, Lagrange's theorem, Euler's theorem, Fermat's theorem, permutation and example, transposition and example		
3	**UNIT-III**	7	18
	Graph and multi graphs, degree of a vertex, paths, connectedness, connected components, cut points, bridges, complete graphs, regular graphs, matrices and graphs		
4	**UNIT-IV**	12	28
	Planner graphs, maps and regions, Euler's formula (only statement), non-planner graphs, colored graphs, coloring of maps, trees, spanning trees.		
	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 |

Reference Books		
1.	**Discrete Mathematics**	
	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**	
	By Narsingh Deo	Dover Publications Inc.	
3.	**GRAPH THEORY WITH APPLICATIONS**	
	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	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. 2. Self-Confidence: Build self-assurance and assertiveness in various personal and professional scenarios. 3. Team Collaboration: Develop teamwork, leadership, and conflict resolution skills for better collaboration. 4. Emotional Intelligence: Improve self-awareness and empathy to manage emotions and relationships effectively. 5. Adaptability and Resilience: Foster adaptability and resilience to navigate challenges and change with confidence.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks			**Total Marks**
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**	**LAB**	
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 soft skill** 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	15	25
2	**Habits** 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	15	25
3	**Personality development** Meaning of personality, elements of personality Determents of personality Personal development plan	15	25
4	**Self-management skill** Time management (planning, scheduling and meeting) Emotion and stress management SWOT analysis Etiquettes and manners Personal grooming (Appearance, Dressing)	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

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vary slightly from above table.

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)** By Dr. K. Alex –S.chand | PHL learning Pvt. Ltd. New Delhi
2.	**Personal growth and wealth** By Dale Carnegie , Napoleon Hill, Dr. Joseph Murphy

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Course	Bachelor in Computer Application (BCA)	**Semester - 2**
Type of Course	Core Courses	
Prerequisite	Basic knowledge of emergency response procedures and an understanding of disaster risk concepts.	
Course Objective	1. Explain disaster management theory (cycle, phases, risk, crisis, emergency, disasters, resilience) 2. Compare hazards, disasters and associated natural phenomena and their interrelationships, causes and their effects - developing humanitarian Assistance before and after disaster 3. Compare anthropogenic hazards, disasters and associated activities and their interrelationships of the subsystems - Green House Effect, Global warming, Causes and their effects and development of humanitarian assistance before and after disaster 4. Apply knowledge about existing global frameworks and existing agreements and role of community in successful Disaster Risk Reduction. 5. Remember the different laws and policies regarding disaster management.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks			
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**	**LAB**	**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	**Disasters in India - An Overview** Introduction, Definition, Disasters not new to Mankind, Disasters – Global Scenario, Vulnerability Profile of India, Climate Profile, Cause and Effect of Disasters, Types of Disasters	15	25
2	**Institutional Framework** Evolution of Disaster Management in India, Disaster Management during British Administration and Post-Independence, Emergence of Institutional Arrangement in India, Organization and Structure of Disaster Management, Disaster Management Framework, Present Structure for Disaster Management in India, Disaster Management Act, 2005, Different committees and authority associated with disaster management.	20	35
3	**Prevention and Mitigation; Preparedness and Response** Introduction, Prevention and Mitigation; Preparedness and Response regarding different disasters	10	15
4	**Policy and Guidelines** Introduction, National Policy on Disaster Management (NPDM), National Plan on Disaster Management, Focus and Objectives of Guidelines, Management of Droughts, National Action Plan on Climate Change, Rules notified under the Disaster Management Act, 2005	15	25
	Total	60	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	Explain disaster management theory (cycle, phases, risk, crisis, emergency, disasters, resilience)
CO2	Compare hazards, disasters and associated natural phenomena and their interrelationships, causes and their effects - developing humanitarian Assistance before and after disaster.
CO3	Compare anthropogenic hazards, disasters and associated activities and their interrelationships of the subsystems - Green House Effect, Global warming, Causes and their effects and development of humanitarian assistance before and after disaster.
CO4	Apply knowledge about existing global frameworks and existing agreements and role of community in successful Disaster Risk Reduction.
CO5	Remember the different laws and policies regarding disaster management.

Reference Books

1.	**Disaster Management (TextBook)** By Harsh K. Gupta | Universities Press, Pub. Year 2003
2.	**Disaster Management** By K. Palanivel J. Saravanavel S. Gunasekaran | Allied Publishers Pvt. Ltd

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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. 2. Decompose the problem into a set of objects 3. Objects interact with each other to solve the problem	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
4	0	2	6	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 of OOPS, Principles of OOP, C++ Basics**	15	25
	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		
2	**Classes, Object and Function, Constructor & Destructor**	15	20
	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		
3	**Inheritance**	10	10
	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.		
4	**Operator Overloading, Files & Pointers**	20	35
	Introduction to Operator overloaded, Rules for Overloading Operator**,** Declaration of Operator Overloading**,** Unary Operator Overloading**,** Binary Operator Overloading**,** Data Conversion, and Type Conversions. 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		
	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)** By Y kanitkar | BPB Publication
2.	**Object Oriented Programming with C++ (TextBook)** 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	Basic computer knowledge and HTML	
Course Objective	1.Understand the basic networking and internet concepts 2.Understand principle of basic world wide web 3.Use various HTML tags and advance html to develop the user friendly web pages 4.Use various CSS to develop the user friendly web pages and more attractive. 5.Use the JavaScript to develop the dynamic web pages.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks			**Total Marks**
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**	**LAB**	
4	0	2	6	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 Internet**	15	25
	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.		
2	**Internet Applications and Services**	15	25
	Email **,** Remote Login **,** Telnet **,** FTP **,** Search Engines **,** VPN **,** Firewall		
3	**Introduction to HTML**	15	25
	HTML **,** Working with List **,**Working with Table		
4	**Advance HTML**	15	25
	Working with Frames **,** Working with Forms **,** Working with Link & Images **,** Working with Layer **,** Working with Multimedia		
	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.

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

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.	
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.	Write a HTML document to illustrate the uses of tags.
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	The goal of this course is to provide students with an understanding of basic concepts in the Operating System. At the end of this course students will: understand key mechanisms in design of operating systems modules understand process management, concurrent processes and threads, memory management, virtual memory concepts, deadlocks compare performance of processor scheduling algorithms produce algorithmic solutions to process synchronization problems use modern operating system calls such as Linux process and synchronization libraries practice with operating system concepts such as process management, synchronization, networked processes and file systems.		

Teaching Scheme (Contact Hours)				Assessment Scheme			
Lecture	**Tutorial**	**Lab**	**Credit**	**Theory Marks**		**LAB**	**Total Marks**
				SEE	**CIA**		
4	0	2	6	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 OS**	10	20
	Introduction: What is an OS?, Evolution Of OS, OS Services, Types Of OS, Concepts of OS, Different Views Of OS Process Management: Process, Process Control Block, Process States, Threads, Types of Threads, Multithreading.		
2	**Deadlock**	20	30
	Inter-process Communication: Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation , Peterson's Solution, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc., Scheduling, Scheduling Algorithms. Deadlock: Deadlock Problem, Deadlock Characterization, Deadlock Detection, Deadlock recovery, Deadlock avoidance: Banker's algorithm, Deadlock Prevention.		
3	**Memory Management**	20	25
	Paging: Principle Of Operation, Page Allocation, H/W Support For Paging, Multiprogramming With Fixed partitions, Segmentation, Swapping Virtual Memory: Concept, Performance Of Demand Paging, Page Replacement Algorithms, Thrashing, Locality.		
4	**Input Output Management**	10	25
	Principles Of Input/Output H/W : I/O Devices, Device Controllers, Direct Memory Access Principles Of I/O S/W :Goals Of The I/O S/W, Interrupt Handler, Device Driver Device Independent I/O Software Disks : RAID levels, Disks Arm Scheduling Algorithm, Error Handling		
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy					
Level	Remembrance	Understanding	Application	Analyze	Evaluate
Weightage	20	30	15	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	Understand key mechanisms in design of operating systems modules
CO2	Understand process management, concurrent processes and threads, memory management, virtual memory concepts, deadlocks
CO3	Comapare performance of processor scheduling algorithms.
CO4	Analyze different IPC problems and its solutions.
CO5	Implement shell scripting programming.

Reference Books

1.	**Operating System by Tanenbaum (TextBook)** By Tanenbaum | Pearson publication
2.	**Operating Systems** By Stallings | Pearson Education

List of Practical

1.	Perform all basic Linux commands.
2.	Write a shell script to display "Hello Computer" on the screen.
3.	Write a shell script to print the multiply value of two accepted numbers.
4.	Write a shell script to print the addition value of two accepted numbers.
5.	Write a shell script to print the division value of two accepted numbers.
6.	Write a shell script to print the subtraction value of two accepted numbers.
7.	Write a shell script to swap a variable value of no1 and no2.
8.	Write a shell script to find greatest of two numbers
9.	Write a shell script to find greatest of three numbers.
10.	Write a shell script to find smallest of two numbers.
11.	Write a shell script to find smallest of three numbers.
12.	Write a shell script to print inverted half pyramid using numbers.
13.	Write a shell script to check whether a number is positive or negative.
14.	Write a shell script to check whether given number is prime or not.
15.	Write a shell script to display first 25 Fibonacci nos.
16.	write a shell script to find the factorial of given integer
17.	Write a shell script that list the all files in a directory.
18.	Write a shell script to print half pyramid using *
19.	Write a shell script to print half pyramid using numbers.
20.	Write a shell script to print inverted half pyramid using *
21.	Write a Shell Script to create basic calculator using switch statement.

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Course	Bachelor in Computer Application (BCA)	Semester - 3
Type of Course	Core Courses	
Prerequisite	02060402-T - BASICS OF MICROPROCESSORS & ITS ARCHITECHTURE	
Course Objective	1. To understand the principles and tools of systems analysis and design. 2. To understand the application of computing in different context.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks			
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**	**LAB**	**Total Marks**
4	0	2	6	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	**System Concepts and Information Systems Environment**	15	25
	Definition of system**,** Characteristics of a system**,** Elements of a system**,** Types of system**,** SDLC, Prototyping**,** Role of system Analyst		
2	**System Analysis**	15	25
	System planning and initial investment, Dimensions of planning, Determining the user's information requirements, Information Gathering, Tools for structured Analysis, Cost/benefit Analysis		
3	**System Design**	15	25
	Process of design, Design methodologies, Audit considerations, Input/output Design, Database design, OOAD concepts, Architectural, behavior diagrams		
4	**System Implementation**	15	25
	System Testing**,** Nature of test**,** Test Plan**,** Quality assurance, Goals in SDLC.**,** Levels of quality Assurance**,** Software Maintenance**,** Process scheduling – what is Project Management**,** Security, Disaster/ Recovery and Ethics in development.**,** Control Measures		
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy					
Level	Remembrance	Understanding	Application	Analyze	Evaluate
Weightage	30	20	20	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.

Course Outcomes	
At the end of this course, students will be able to:	
CO1	Understand the principles, methods and techniques of systems development.
CO2	Understand the problems relating to systems development.
CO3	Summarize The Key Concept Principle Of Object Oriented Analysis And Design
CO4	Understand the various stages of a phased systems analysis method.
CO5	Student Will Able To Create Object Oriented Modules And Diagrams To Represent Complex System

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Reference Books	
1.	**Systems Analysis and Design (TextBook)** By Elias M. Awad | Galgotia Publisher

List of Practical	
1.	Draw architectural diagram of SDLC
2.	Show class diagram using any example
3.	Show Object diagram using any example
4.	Show Package diagram using any example
5.	Show class diagram using any example
6.	Show Composite structure diagram using any example.
7.	Show Sequence diagram using any example
8.	Show Activity diagram using any example
9.	Show USE CASE diagram using any example.
10.	Show Interaction diagram using any example
11.	Show Component diagram using any example.

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Course	Bachelor in Computer Application (BCA)	Semester - 3
Type of Course	Ability Enhancement Courses	
Prerequisite	Proficiency in the language of instruction (usually English) and a basic understanding of academic writing conventions.	
Course Objective	1. Clarity and Precision: Develop the ability to express complex ideas clearly and concisely. 2. Research Proficiency: Acquire skills in conducting and citing academic research effectively. 3. Critical Thinking: Enhance critical analysis and argumentation skills in writing. 4. Citation and Referencing: Master proper citation and referencing formats, such as APA or MLA. 5. Academic Integrity: Promote ethical writing practices and avoid plagiarism in academic work.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
Lecture	Tutorial	Lab	Credit	Theory Marks		LAB	Total Marks
				SEE	CIA		
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	**Academic & research writing**	10	25
	Introduction; Importance of academic writing; Basic rules of academic writing, English in academic writing I & II; Styles of research writing.		
2	**Plagiarism**	12	25
	Introduction: Tools for the detection of plagiarism; Avoiding plagiarism. Literature review: Introduction, Source of literature; Process of literature review, Online literature databases; Literature management tools, referencing and citations		
3	**Report**	11	25
	Report writing for an event, CV writing, Job Application, Types of letters- Business letters, Cover letter.		
4	**E-Mails**	11	25
	Memo, Notice, Agenda, Minutes of Meeting, Business correspondence, How to write emails- do's and don'ts		
	Total	44	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	Clarity and Precision: Develop the ability to express complex ideas clearly and concisely.
CO2	Research Proficiency: Acquire skills in conducting and citing academic research effectively.
CO3	Critical Thinking: Enhance critical analysis and argumentation skills in writing.
CO4	Citation and Referencing: Master proper citation and referencing formats, such as APA or MLA.
CO5	Academic Integrity: Promote ethical writing practices and avoid plagiarism in academic work.

Reference Books

1.	**Academic Writing, Anti- Plagiarism And Citations (TextBook)** By Vinod Kumar Kanvaria | Shipra Publications

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Course	Bachelor in Computer Application (BCA)	Semester - 3
Type of Course	Core Courses	
Prerequisite	03060302-T - DIGITAL LOGIC DESIGN	
Course Objective	1. Identify various part Of System memory Hirerchy 2. Understand pipeline and Parallel Processing Technique 3. Analysis How Central Processing Work 4. Understand Numbering systems and conversion of numbering systems 5. Comprehend the features and performance parameters of different types of computer architectures.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		**LAB**	**Total Marks**
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**		
3	1	0	4	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	**Digital Logic Circuits** Digital Computers, Logic Gates, Boolean algebra. **Digital Component and Data Representation** Combinational circuits, Flip-flops, Sequential Circuits. Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit, Number System.	10	15
2	**Overview of Register Transfer** Register Transfer and Register Transfer Language, Bus and Memory transfer. **Micro Operations** Arithmetic Micro Operation, Logic Micro Operation, Shift Micro Operation, Arithmetic and Logic Shift Unit. **Basic Computer Organization and Design** Instruction Codes – Register, Instruction, Time and Control. Instruction Cycle, Memory Reference Instruction, I/O and Interrupt, Design of Computer, Design of Accumulator Logic.	15	35
3	**Basic Computer Programming** Introduction, Machine Language, Assembly Language, the Assembler, Program Loops. **Micro Programmed Control** Programming Arithmetic and Logic Operation, Subroutines, I/O–Programming. Control Memory; Address sequencing, Micro Program Example, Design of Control Unit**.**	10	25
4	**Central Processing Unit** Introduction to Central Processing Unit, General Register Organization, Stack. Organization Instruction Formats, Addressing Modes, Data Transfer and Manipulation. Program Control, RICS and CISC. **Pipeline** Parallel Processing; Pipelining	10	25
	Total	45	100

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Suggested Distribution Of Theory Marks Using Bloom's Taxonomy					
Level	Remembrance	Understanding	Application	Analyze	Evaluate
Weightage	30	20	10	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	Discuss Basic Attributes of computer
CO2	Understand Numbering systems and conversion of numbering systems
CO3	Analyze How Central Processing Work
CO4	Identify various part Of System memory Hirerchy
CO5	Comprehend the features and performance parameters of different types of computer architectures.

Reference Books

1.	**Computer System Architecture (TextBook)** By M. Morris Mano | Pearson
2.	**Structured Computer Organization** By Andrew S. Tanenbaum and Todd Austin | PHI

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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. Get knowledge about Linux system in CUI and GUI surfaces. 2. Learn programming techniques in Linux scripting.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
4	0	2	6	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	**Overview of Unix**	20	30
	UNIX as an operating system, Kernel, Shell, UNIX File System hierarchy Basic UNIX Commands Listing Files & Directories Copying, Deleting, Renaming, Comparing, Splitting, Linking Files, Creating, Navigating, Removing Directories.		
2	**Unix Commands**	15	20
	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 string, Process Status, Process Killing		
3	**System Administration**	10	20
	Adding & Modifying Users accounts, Controlling Password, Creating & Mounting File System, init process & inittab startup files, Run levels, Managing Disk Space(df , du ,cpio), Searching Files with find command Using ftp protocol to move files between computers, 'Shutdown' commands.		
4	**Shell Programming**	15	30
	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.		
	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.

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.

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CO5	Evaluate shell scripts, positional parameters and string handling to solve certain problems.

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Reference Books	
1.	**Advanced C Programming by Example (TextBook)** By John W Perry | PWS Publishing Company
2.	**Advanced Programming in Unix Environment (TextBook)** By Richard Stevens | Addison Wesley
3.	**Begining Linux Programming (TextBook)** By Neil Mathew & Richard Stones | Wrox Press
4.	**Beginning RedHat Linux (TextBook)** By Bhattacharya, Mauro, Mamone, Kapil Sharma, Thomas, Whiting, Gundavaram | Wrox Press
5.	**Expert C Programming** By Peter Van Der Linden | Publisher - Prentice Hall, also available through o'Reilly Media Press
6.	**Instant Linux/Unix (TextBook)** By Andrew E vans, Neil M athew & Richard Stones | Wrox Press
7.	**Linux Cookbook** 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.
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	03080101-T - PROGRAMMING IN C	
Course Objective	1. Learn how to design and develop a Web page using HTML and CSS. 2. Learn how to link pages so that they create a Web site. 3. Learn to apply CSS in a web page	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		**LAB**	**Total Marks**
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**		
4	0	2	6	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**	10	15
	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.		
2	**Methods, Object , Classes, Conditions & Loops in Java**	15	25
	Methods, Object , Classes, Conditions & Loops in Java 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.		
3	**Inheritance and Polymorphism**	20	40
	Inheritance and Polymorphism 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.		
4	**Multi-Threading & Applet**	15	20
	Exception Handling & Multi-Threading Exception Handling 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). Multi-Threading 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.		
	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

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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)** By Dr. G.T.Thampi | Dreamtech
2.	**Programming with Java** 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	Core Courses	
Prerequisite	02070403-T - INTRO. TO COMPUTER ORG. & ARCHITECHTURE	
Course Objective	1. Build an understanding of the fundamental concepts of computer networking 2. Familiarize the student with the basic taxonomy and terminology of the computer networking. 3. Allow the student to gain expertise in some specific areas of networking.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
4	0	2	6	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	15	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)** By Andrew S. Tanenbaum | Pearson
2.	**Introduction to Data Communication and Networking (TextBook)** 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	13990203- T - BASICS OF WEB TECHNOLOGY	
Course Objective	Web technology refers to the different tools and techniques used to communicate between different devices over the Internet. A web browser is used to access the website. A web browser can be defined as a program that displays text, data, images, animations, and videos on the Internet.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
4	0	2	6	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	**Unit-1**	15	25
	Introduction To PHP Building blocks of PHP: Basic syntax, Variables, Data Types, Operators and expressions, Constants. Flow Control: Switch flow, Loops, Code Block, Sending data to the browser. **Working With Arrays:** Arrays, Creating array, Array related Functions. Working with Function: Function, Calling Function, Defining Function, Returning the Values from user defined function, Variable Scope, Argument. **Working with Strings And Date and Time Functions:** formatting String with PHP, Date and Time Function, String Manipulation and Investigating Strings with PHP. **Working with Forms:** Creating form, Handling form, Validating form data, Accessing form data, use of Hidden fields to save State, Redirecting user, file Upload and Sending Mail on Form Submission.		
2	**Unit-2**	15	25
	Introduction to MySQL & Interacting with MySQL Understanding the Database Design Process: The importance of good database design, Types of Table Relationship, Understanding Normalization. Learning Basic SQL Command: Table Creation, Insert row, Select Command Using Where Clause, Update and Delete Command, Replace Command, String Function, Date and Time Functions, Stored Procedures, Join, Indexing and Sorting query. **Using MySQL with PHP:** connecting to MySQL and selecting the database, executing simple queries, retrieving query results, counting return Records, updating, Record Addition, Viewing Record, and Deletion Record with PHP.		
3	**Unit-3**	15	25
	Introduction to Cookies & working With Files and Directories Working with files: Include Files with INCLUDE, creating and deleting files, opening a file for reading, writing or Appending, Reading from files, Validating Files. Working with Directories: Open Pipes to and from Process using Popen(), Running command with Exec(), Running Command with System() or Passthrough(). **Working with Cookies and User Session : -** Introduction of Cookie, Setting a Cookie with PHP, Introduction of Session, Improving Session Security, Starting a Session, Working with Session Variables, Passing Session Id in the query String, Destroying Session and Unsetting Variables.		
4	**Unit-4**	15	25
	Introduction to Object Oriented Programming With PHP and Error Handling Introduction, the basic, auto loading objects, Class, Extends, Constructs, Scope Resolution Operator, Parent, serializing object, The magic objects – sleep and awake, reference inside the constructor, comparing objects. Visibility, overloading, object interface, pattern, magic method, reflection, extending exception. Error Handling and Debugging: General error types and debugging, displaying PHP errors, Adjusting Error Reporting, Creating Custom error handler, PHP debugging techniques, SQL and MySQL debugging techniques.		
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Create
Weightage	10	20	25	30	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	Develop Web application with files and forms
CO2	Explain the working approach of PHP.
CO3	Implement simple programming logic using conditional statements, loops, Operators.
CO4	Implement Object oriented programming concepts in backend development.
CO5	Developing and Testing web application using PHP and MySQL.

Reference Books

1.	**PHP MySQL and Apache, SAMS Teach Yourself (TextBook)** By Julie C. Meloni	SAMS

List of Practical

1.	Write a Program to print "Hello World".
2.	Write a program to concatenate two strings.
3.	Write a program to add two integer numbers.
4.	Write a program to swap two numbers.
5.	Write a program to find the area and perimeter of a circle.
6.	Write a program to print bio when name is echoed.
7.	Write a program to print birth date and time.
8.	Write a program to print the date in different formats.
9.	Write a program to print current time zone.
10.	Write a program to accept the details from a form and show it into different page.
11.	Write a program to accept the details from a form and show it into same page.
12.	Create a form and use different validators.
13.	Write a program to check the eligibility of voting in India.
14.	Write a program to connect php to MySql and show the message "Connection Established".

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Course	Bachelor in Computer Application (BCA)	Semester - 4
Type of Course	Skill Enhancement Courses	
Prerequisite	Basic English Knowledge	
Course Objective	Objectivity is the ability to remove your personal experience, bias or preference from your speech. Objectivity gives you credibility as an impartial, unbiased speaker and subject matter expert.	

Teaching Scheme (Contact Hours)				Examination Scheme			
				Theory Marks		**LAB**	**Total Marks**
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**		
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	**Unit-1**		10	25
	Introduction to Management and Organizations Functions of management - Planning, Organizing, Controlling and Leading Managerial Roles Management Hierarchy Scientific management and administrative management Social responsibility and ethics			
2	**Unit-2**		11	25
	Functions of Management Planning- process Organizing: types of structure, formal and informal groups Decision making: process Leading : Leadership styles Controlling: process			
3	**Unit-3**		13	25
	Organizational Behavior Overview of OB Concept of culture and its importance Conflict –sources , levels Communication – Process, types Stress management- sources, resolution strategies			
4	**Unit-4**		11	25
	Functional areas of Management Marketing Management Financial management Production Management Plant layout: Product and process layout Inventory control Quality control Human Resource Management			
		Total	45	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	Demonstrate a thorough understanding of core management functions—planning, organizing, leading, and controlling—and their application in various organizational contexts.
CO2	Evaluate different types of organizational structures, managerial roles, and the impact of management hierarchy on organizational effectiveness and employee performance.
CO3	Integrate knowledge from scientific management, administrative management, and contemporary management theories to address real-world organizational challenges.
CO4	Assess the importance of ethics and social responsibility in management and apply ethical decision-making frameworks in professional practice.
CO5	Utilize various leadership styles and decision-making processes to enhance team performance, resolve conflicts, and drive organizational success.

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

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Course	Bachelor in Computer Application (BCA)	Semester - 5
Type of Course	Core Courses	
Prerequisite	13990202-T - DATABASE MANAGEMENT SYSTEM	
Course Objective	1.Understand the development of applications using Programming Language of SQL. 2.Understand the uses the database file and need for create & manage files. 3.Use different types of physical implementation of database to manage transactions.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
4	0	2	6	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	**Basic Data base Management System Architecture** History of Data base Systems DBMS structure, DBMS Applications, File System , View of Data ,Data Abstraction , Data base Users and Administrator, Transaction Management , Storage Manager the Query Processor **Need of ER diagrams** Database design and ER diagrams, Beyond ER Design Entities, Attributes and Entity sets, Additional features of ER Model, Concept Design with the ER Model ,Conceptual Design for Large enterprises	15	25
2	**Relational Database Management System** Introduction to the Relational Model, Relationships and Relationship sets, Integrity Constraint Over relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views, altering of Table, Relational Algebra, Selection and projection set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus	10	25
3	**Introduction to PL/SQL** Form of Basic SQL Query, Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries Set, Comparison Operators, Aggregative Operators, NULL values, Comparison using NULL values, Logical connectivity's Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active databases, Schema refinement , Problems Caused by redundancy, Decompositions, Problem related to decomposition, Reasoning about FDS, Dependency preserving Decomposition, Schema refinement in Data base Design, Multi valued Dependencies	25	30
4	**Transaction Processing** Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols Multiple Granularity, Recovery and Atomicity, Log Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with loss of nonvolatile storage, Advance Recovery systems, Remote Backup systems	10	20
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	20	20	20	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 the development of applications using Programming Language of SQL.
CO2	Understand the uses the database file and need for create & manage files.
CO3	Use different types of physical implementation of database to manage transactions
CO4	Use different types of physical implementation of database and understand ER diagram.
CO5	Exceute SQL queries

Reference Books	
1.	**Database Systems using ORACLE (TextBook)** By Nilesh shah | PHI Publication
2.	**SQL and Relational Theory** By C.J.Date | O'Reilly, 2009
3.	**SQL/PLSQL,The Programming Language of ORACLE (TextBook)** By Ivan Bayross | BPB Publication

List of Practical	
1.	Create PL/SQL block to perform arithmetic operations.
2.	Implement PL/SQL programs using Control Structure.
3.	Implement PL/SQL program using CURSOR.
4.	Implement PL/SQL program using Exception Handling.
5.	Implement user defined procedures and Function using PL/SQL blocks.
6.	Implement various Triggers.
7.	Practice on Functional Dependencies.
8.	Create stored procedure.
9.	Practice on Normalization using various Normal Forms.
10.	Practice on Transaction Processing.

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Course	Bachelor in Computer Application (BCA)		Semester - 5
Type of Course	Core Courses		
Prerequisite	13990402-T - JAVA PROGRAMMING		
Course Objective	1. Understand the overall concepts of .NET Framework 2. Apply ADO.NET and ASP.NET in web programming with database connectivity 3. Able to use different state management techniques for a page		

Teaching Scheme (Contact Hours)				Assessment Scheme			
Lecture	Tutorial	Lab	Credit	Theory Marks		LAB	Total Marks
				SEE	CIA		
4	0	2	6	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 .NET Framework and ASP.NET**	10	17
	State the Components of Framework and describe CLR : Microsoft .NET Framework overview, NET Framework Architecture,.NET Framework Components (CLR, CLS,CTS,MSIL,Namespace,JIT,Metadata), Explain benefits of ASP over classic ASP, The client- Server architecture, Develop applications using ASP.NET IDE ASP.NET(WEB FORMS) - Develop Simple web page using built in objects : Types of ASP.NET Files, Page Life Cycle		
2	**ASP.NET Controls and Validations Use controls available with IDE platform of ASP.NET**	15	25
	Button, Checkbox, Check box List**,** Radio button, Radio Button list**,** Drop down List, Hyperlink ,Image, Image Button,Label,Link Button, List Box, List Item,Panel,Text Box**.** **Validation Controls :** Required field validation, Range Validation**,** Regular Expression, Custom Validation, Validation Summary		
3	**Styles, Themes and Master Pages**	10	16
	Creating Style sheet, applying style sheet rules, Themes, Basics of Master Page, How master page and content pages are connected, Nesting Master page **ASP.NET State Management** State Management : Client Side state management Technique and Server Side Management technique, View State, The Query String, Cookies, Session State, Application State, The Global.asax application files , ASP.NET Configuration files		
4	**Connecting Database Using ADO.NET ADO.NET Architecture**	10	17
	Data provider, Connection Object , Command Object , DataReader Object , DataAdapter Object, Grid View, Dataset, Data View, Data Binding **SQL Data Source :** Select, Update , Deleting Records		
	Total	45	75

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Course Outcomes	
At the end of this course, students will be able to:	
CO1	Explain ASP.net framework, state management , master page concept, database connectivity.
CO2	Analyze how to work with asp.net web forms,controls and validations.
CO3	Design web based application with different controls and security features.
CO4	Conduct experiments of database programming using ADO.NET
CO5	Prepare small applications through master page concept of .Net framework

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

List of Tutorial	
1.	Write a program that displays a textbox, a button and a label. Display the entered text of textbox to label after clicking on button.
2.	Develop a simple calculator with two boxes, and four buttons for addition, subtraction, multiplication and division and the output of the program displays in a label.
3.	Set the font-Arial, font style-bold , font size-18px of different controls(ie. Label, textbox, button) using css.
4.	Create the application that accepts name, password, age, email id, and user id. All the information entry is compulsory. Password should be reconfirmed. Age should be within 21 to 30. Email id should be valid. User id should have at least a capital letter and digit as well as length should be between 7 and 20 characters.
5.	Create home page of your website using master page concept.
6.	Why web applications are stateless? Explain with example.
7.	Create a web page with "Hit Count" button. The count must be increased whenever mouse clicks by using Hidden Field.
8.	Create a web page with "Hit Count" button. The count must be increased whenever mouse clicks by using View State.
9.	Develop a web page to implement the concept of Query String.
10.	Create a Web App to display all the Empname and Deptid of the employee from the database using SQL source control and bind it to GridView. Database fields are(DeptId, DeptName, EmpName, Salary).
11.	Write an application which implements the use of Theme and Skin.
12.	Create a form which contains UID, Name, Branch and Semester. Insert the values into a database table.

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Course	Bachelor in Computer Application (BCA)	Semester - 5
Type of Course	Core Courses	
Prerequisite	13990101- T - PROGRAMMING IN C	
Course Objective	This course covers the basics and advanced Python programming to harness its potential for modern computing requirements.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
Lecture	Tutorial	Lab	Credit	Theory Marks		LAB	Total Marks
				SEE	CIA		
4	0	2	6	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 Python, Functions, Scoping and Abstraction**	15	25
	The basic elements of python, Branching Programs, Control Structures, Strings and Input, Iteration Functions and scoping, Specifications, Recursion, Global variables, Modules, Files, System Functions and Parameters		
2	**Structured Types, Mutability and Higher-Order Functions, Testing, Debugging, Exceptions and Assertions**	15	25
	Strings, Tuples, Lists and Dictionaries, Lists and Mutability, Functions as Objects Types of testing – Black-box and Glass-box, Debugging, Handling Exceptions, Assertions		
3	**Classes and Object-Oriented Programmingm, Simple Algorithms and Data structures**	10	25
	Abstract Data Types and Classes, Inheritance, Encapsulation and Information Hiding Search Algorithms, Sorting Algorithms, Hash Tables		
4	**Advanced Topics I , Advance Topics II**	20	25
	Regular Expressions – REs and Python, Plotting using PyLab, Networking and Multithreaded Programming – Sockets, Threads and Processes, Chat Application Security – Encryption and Decryption , GraClassical Cyphers,phics and GUI Programming – Drawing using Turtle, Tkinter and Python, Other GUIs		
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	25	25	20	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.

Course Outcomes	

At the end of this course, students will be able to:	
CO1	Learn basic programming concepts such as function, control structures and Branching Statements in python.
CO2	Understand Object Oriented programming approaches.
CO3	Learn about various structured types.
CO4	Understand the use of Testing, Debugging, Exceptions and Assertions.
CO5	Compare different sorting and searching Algorithms.

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Reference Books		
1.	**Core Python Programming (TextBook)** By R. Nageswara Rao, | dreamtech	
2.	**Fundamentals of Python – First Programs (TextBook)** By Kenneth A. Lambert | CENGAGE Publication	

List of Practical	
1.	Develop programs to understand the control structures of python
2.	Develop programs to learn different types of structures (list, dictionary, tuples) in python
3.	Develop programs to learn the concept of functions scoping, recursion and list mutability
4.	Develop programs to understand the working of exception handling and assertions.
5.	Develop programs for data structure algorithms using python – searching, sorting and hash tables.
6.	Develop programs to learn regular expressions using python
7.	Develop a chat room application using multithreading.
8.	Learn to plot different types of graphs using PyPlot.
9.	Implement classical ciphers using python.
10.	Draw graphics using Turtle.
11.	Develop programs to learn GUI programming using Tkinter.

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Course	Bachelor in Computer Application (BCA)	**Semester - 5**
Type of Course	Core Courses	
Prerequisite	13990301 - Object Oriented Programming with C++	
Course Objective	The main purpose of the JAVA programming language is to provide programmers with one-time write and run, anywhere functionality. The compiled Java code can be run on any platform that supports Java without recompiling.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
Lecture	**Tutorial**	**Lab**	**Credit**	**Theory Marks**		**LAB**	**Total Marks**
				SEE	**CIA**		
4	0	2	6	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 J2EE, Basic swing components**	15	25
	Introduction to advances Java technologies, MVC Architecture, Java GUI components, Swing, AWT, Look and Feel. Text Fields, Buttons, Toggle Buttons, Checkboxes, and Radio Buttons.		
2	**Java Database Programming &RMI**	15	25
	Java database Programming.java.sql Package, JDBC driver types, java beans, RMI Architecture, Designing RMI application, Executing RMI application.		
3	**Java Servlet**	15	25
	Server-side programming with Java Servlet, HTTP and Servlet, Servlet API, Life cycle, configuration and context, Request and Response objects, Session handling, and event handling, Introduction to filters with writing simple filter application.		
4	**Java Server Pages**	15	25
	JSP architecture, JSP page life cycle, JSP elements, Expression Language, Tag Extensions, Tag Extension API, Tag handlers, and JSP Fragments. Tag Files, JSTL, Core Tag library, Overview of XML Tag library, SQL Tag library, and Functions Tag library.		
	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.

Course Outcomes	
At the end of this course, students will be able to:	
CO1	Explain MVC architecture, GUI components, Java database programming, RMI, Servlet, and Java Server pages.
CO2	Analyze how to work with swing components, Database connectivity, and server-side programming with Java and JSP.
CO3	Design web-based applications using Java server pages and database programming.
CO4	Conduct experiments of database programming using Java Database Connectivity (JDBC) API

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CO5	Prepare small applications through Java swing components.

Reference Books	
1.	**Complete Reference J2EE** By James Keogh | mcgraw publication
2.	**Black Book " Java server programming" J2EE** By Kathy walrath | 1st ed., Dream Tech Publishers
3.	**Java EE 5 for beginners (TextBook)** By Bayross and Shah | SPD

List of Practical	
1.	Create Servlet file which contains following functions: 1.Connect 2. Create Database 3. Create Table 4. Insert Records into respective table 5. Update records of particular table of database 6. Delete Records from table. 7. Delete table and also database.
2.	User can create a new database and also create new table under that database. Once database has been created then user can perform database operation by calling above functions. Use following Java Statement interface to implement program: 1.Statement 2. Prepared statement 3. Callable statement
3.	Create Servlet file and study web descriptor file.
4.	Create login form and perform state management using Cookies, HttpSession and URL Rewriting.
5.	Implement Authentication filter using filter API.
6.	Write RMI application where client supplies two numbers and server response by summing it. Provide your custom security policy for this application.
7.	Implement Student information system using JDBC and RMI.

Course	Bachelor in Computer Application (BCA)	Semester - 5
Type of Course	Core Courses	
Prerequisite	03070501-T - COMPUTER NETWORK	
Course Objective	1. To provide an introduction to the fundamental principles of cryptography and network security. 2. To study various Encryption techniques. 3. To illustrate how to prevent, detect, and mitigate security threats against the network.	

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		LAB	Total Marks
Lecture	Tutorial	Lab	Credit	SEE	CIA		
3	1	0	4	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 cryptography and Network Security**	15	25
	Roadmap, Introduction to security, Security Trends, OSI security Architecture ,Security Attacks, Security services Security Mechanisms, A model for network Security, Security Attack and Security Threat, Malicious Software Hacking, Cryptography, Digital Signature, Firewall and its types, User identification and authentication, Other security measures		
2	**Encryption Techniques**	15	25
	Symmetric Cipher model, Substitution Techniques, Transposition Techniques Steganography Block Cipher Principles, DES (Data Encryption Standard), Strength of DES, Block Cipher design principles. AES (Advance Encryption Standard), Origin, Evaluation, AES Cipher More on Symmetric ciphers- Block cipher mode of operation.		
3	**Public Key Cryptography and RSA**	15	25
	Principles of public key cryptosystems, Applications for public key Cryptosystems, RSA Algorithm, Security of RSA, Key Management- Distribution of Public keys, Distribution of secret keys using public key cryptography, Diffie-Hellman Key Exchange		
4	**Message Authentication and E- Mail Security**	15	25
	Authentication Requirements, Authentication Functions, MAC (Message Authentication Codes), Hash Functions, Birthday attacks, Secure Hash Algorithm (SHA),PGP and its operation, S/MIME, MIME and its Functionality, IP Security, Applications, Architecture, Services, Security Association, AH, ESP, Web security threats		
	Total	60	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	10	10	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	Understand different types of cryptographic algorithm.
CO2	Explain Basic concept of Message Authentication Codes
CO3	Enable the students to learn fundamental concepts of computer security and cryptography and utilize these techniques in computing systems.
CO4	Understand management issues and algorithm
CO5	Describe importance of RSA Algorithm and Asymmetric cryptography.

Reference Books

1.	**Cryptography and Network Security (TextBook)** By William Stalling | Pearson
2.	**"A Course in Number Theory and Cryptography"** By Neal Koblitz

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Course	Bachelor in Computer Application (BCA)		Semester - 6
Type of Course	Core Courses		
Prerequisite			
Course Objective	-		

Teaching Scheme (Contact Hours)				Assessment Scheme			
				Theory Marks		**LAB**	**Total Marks**
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE**	**CIA**		
0	0	10	12	0	0	400	400

*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	**Project Guideline**		**100**

AIM

This course provides an opportunity for students to apply the knowledge and skills acquired in the core courses to larger and more complex problems and to gain experience in working in teams.

LEARNING OUTCOMES

This course is designed to provide the student experience in working with a client organization from the initial request through a final design and development of prototype software.

The student would be able to..

• Students will be exposed to software development process by choosing a typical business/scientific/administrative/system application.

• Define project scope, assess feasibility, and establish a project schedule.

• Get some experience in working with a client organization.

• Gain experience in working in a group for successfully developing the deliverables.

Mode of study: Half / One day off to work on the project in a week. (Atleast three hours must be allotted in weekly timetable for discussion/preparation of deliverables)

Course Contents:

1. Developing System Design
2. Writing code for the project
3. Doing testing of the code

Deliverables by the students:

· At the end of the semester, the student should be able to successfully develop the project and prepare the documentation (hard copy) as well as presentation of the project details.

· Live Demo of the Project must be shown at the time of presentation.

	Total		**100**

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