

तार : विश्वविद्यालय  
Gram : UNIVERSITY



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# बुन्देलखण्ड विश्वविद्यालय, झाँसी BUNDELKHAND UNIVERSITY, JHANSI

झाँसी (उ.प्र.) 284128


संदर्भ B.U./Maths./1897

दिनांक 03/09/2022

## The Minutes of Meeting of BOS

In reference to the BOS of department of *Mathematical Sciences & Computer Applications* Institute of *Mathematical Sciences & Computer Applications* held on 28-06-2022 regarding the revision of syllabus in tune with CBES/NEP-2020 and subsequent approval from Academic Council. This is to certify that the syllabus is 100% revised.

*Ans*  
Registrar  
Bundelkhand University  
JHANSI

  
HOD/Coordinator  
*Dr. R. K. Saini*  
Head  
Deptt. of Mathematical Sciences  
& Computer Applications

Department of Mathematical Sciences and Computer Applications

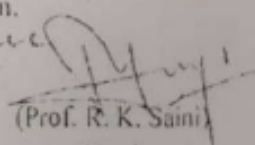
**Minutes of BOS Meeting**

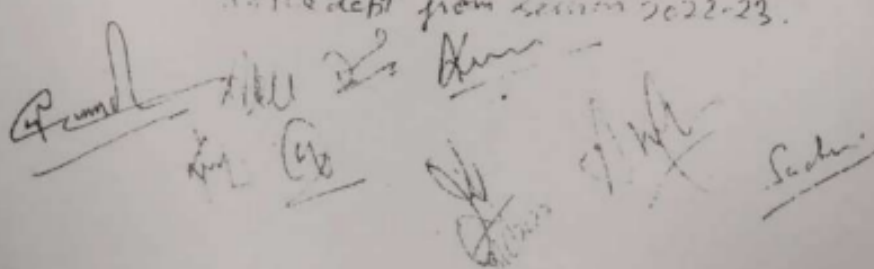
Today on 28<sup>th</sup> May 2022 from 12:15 PM onwards, a meeting of BOS (Board of Studies) for the session 2022-2023 as per New Education Policy (NEP-2020) for the courses BCA, B.Sc.(Mathematics/Statistics/Computer Science), M.Sc.(Statistics), MCA (As per AKTU), B.Sc. (CS & IT), M.Sc. (CS & IT) held in the department of Mathematical Science & Computer Applications, Bundelkhand University, Jhansi, UP. The following members present in the meeting:

- |   |                      |
|---|----------------------|
| 1. Prof. R.K. Saini, BU Jhansi-         | HOD, Convener of BOS |
| 2. Prof. Ravindra Patel RGPV, Bhopal-   | External Expert      |
| 3. Prof. Vijay Gupta, RGPV, Bhopal-     | External Expert      |
| 4. Prof. Avnish Kumar, BU Jhansi-       | Member               |
| 5. Dr. Alok Verma, BU Jhansi-           | Member               |
| 6. Dr. Saurabh Srivastava BU Jhansi-    | Member               |
| 7. Dr. Dharmendra Badal, BU Jhansi-     | Member               |
| 8. Dr. Dharmendra Kanchan, BU Jhansi-   | Member               |
| 9. Dr. D. Das Prajapati, BU Jhansi-     | Member               |
| 10. Dr. Anil Kevat, BU Jhansi-          | Member               |
| 11. Dr. Sachin Upadhyay, BU Jhansi-     | Member               |
| 12. Mr. Kamal Gupta, BU Jhansi-         | Member               |
| 13. Dr. Punit Matapurkar, BU Jhansi-    | Member               |
| 14. All Teaching Assistants, BU Jhansi- | Member               |

After a through discussion, the following decisions are adopted:-

1. New Education Policy-2020 is adopted for the courses BCA, B.Sc.(Mathematics/Statistics/Computer Science), M.Sc.(Statistics), MCA(As per AKTU), B.Sc. (CS & IT), and M.Sc. (CS & IT), which will be effective session 2022-2023.
2. Panel of examiners for all courses running through the department are signed by members.
3. The syllabus of all the courses as BCA, B.Sc.(Mathematics/Statistics/Computer Science), M.Sc.(Statistics), MCA(As per AKTU), B.Sc. (CS & IT), and M.Sc. (CS & IT), takes a modification upto 20% form previous one, suggested by students and industry persons.
4. According NEP-2020, some value added courses, entrepreneurship programme and employability skill programme and courses are adopted.
5. Discussion for starting the course M.Sc.(Statistics with soft computing) in place of M.Sc.(Statistics) in the department from next academic session.
6. M.Sc in Data Science, will be the new course in the dept from session 2022-23.

  
 (Prof. R. K. Saini)  
 Head



# **BCA(Hons.)**

## **Programme Overview**

### PROGRAMME OVERVIEW –

The Programme of BCA (Hons) has been well updated as per NEP 2020 in the Department of Mathematical Sciences & Computer Applications. The full form of BCA is bachelors in Computer Application. BCA is a 3-year undergraduate degree Programme that focuses on knowledge on the basics of computer application and software development. A BCA degree is considered to be at par with a BTech/BE degree in Computer Science or Information Technology. The Programme is unique as it offers a rich blend of theoretical and practical applications of Computer as part of the classroom learning experience and field -based experiential learning. The Programme experience is designed for Software Developer who is looking for a full-fledged career in the area of Computer and enjoy working in an intellectually stimulating environment. A number of career opportunities are open for postgraduate students of Computer. Programme is spread over three academic years and divided into six semesters. The basic objective of BCA Course is to provide young men and women with the required knowledge and necessary skills to get rewarding careers into the changing world of Information Technology. A candidate seeking admission to the BCA Course must have passed 10+2 (any stream) securing not less than 50% marks in aggregate (5% relaxation to ST/SC candidates) from the Central Board of Secondary Education or any other equivalent examination recognized by the Mizoram University preferably with Mathematics as one of compulsory or optional course, or any other vocational course related to the computer stream having either Computer Science or Computer Engineering as compulsory/optional course. The course of BCA includes database management systems, operating systems, software engineering, web technology and languages such as C, C++, HTML, Java etc. Recruiting companies include both big established companies like Accenture, Capgemini, Cognizant and new-age technology startups like Flipkart. The average salary package post BCA varies between INR 1.8 LPA to 7 LPA depending on company and the specific role/designation. A BCA graduate has scope in jobs such as Software Engineer, Web Designer and System Analyst. With the IT industry spreading its wings over every sector from business to medicine, there is a never-ending need for proficient tech enthusiasts in the market. For those inclined towards making a career in this field or those who don't want to go for a traditional BTech, universities have brought a feasible alternative in the form of BCA. A Bachelor of Computer Application (BCA) is ideal for those who love computers and want to delve deeper into how they operate, software, hardware and related tools and technologies. So, let's explore more about this course, the career scope of BCA and see what it has to offer. The department regularly organizes theme-based seminars, workshops and symposiums to impart add-on skills and knowledge to the postgraduate students. Reputed scholars and experts from both national and international communities are often invited speakers at the seminars.

## Program Outcomes (POs)

Program Outcomes (POs): It represents the knowledge, skills and attitudes the students should have at the end of BCA (Hons) program.

PO1	Domain Knowledge	Understand, analyze and develop computer programs in the areas related to algorithm, system software, web design and networking. Also Develop the theoretical, Conceptual and applied Knowledge of Computer
PO2	Problem Analysis	Develop the ability to analyze, design and code the software systems.
PO3	Design / Development of Solutions	Able to function effectively on teams to accomplish shared computing design, evaluation and implementation of goals.
PO4	Modern Tool Usage	Recognize the need and adopt appropriate tools and techniques for modern computing practices.
PO5	The Citizen and the Society	Enable students to become informed and responsible citizens by inculcating the practice of rational, ethical thinking and optimal decision-making to minimize resource wastage.
PO6	Environment and Sustainability	Understand the societal, environmental and moral values and its impact with respect to computing, communication, literary and professional practice
PO7	Ethics	Make use of ethical

		practices and cyber regulations in the computing field for managing software projects.
PO8	Individual and Team Work	Manage and build high performance teams by understanding the role of incentives, scientific virtue, decent work and pillars of organization efficiency
PO9	Communication	Practice effective oral and written communication to be able to convey advanced Computer theories and Program in a pragmatic manner to the society
PO10	Project Management	Ability to apply knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.
PO11	Life-Long Learning	Raise awareness on the importance of constant up skilling in the wake of Industry 4.0 and Education
PO12	Computational Knowledge	Demonstrate competencies in fundamentals of computing, computing specialization, mathematics and domain knowledge suitable for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.
PO13	Innovation and Entrepreneurship	Ability to apply innovation to track a suitable opportunity to create value and wealth for the betterment of the individual and society at large.

## **Program Specific Outcomes (PSOs)**

Program Specific Outcomes (PSOs): PSOs are statements that describe what the students of BCA (Hons) should be able to do.

**PSO1:** To produce skill oriented human resource.

**PSO2:** To impart practical skills among students.

**PSO3:** To make industry ready resource.

**PSO4:** Students get the knowledge of relational databases.

**PSO5:** To know the training and development methods of employees of employee's skills in organization.

**PSO6:** Assimilate technological expertise with practical skills in various fields of computer applications.

## First semester

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>	
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>	
<b>Branch: Computer Application</b>		<b>Semester: I</b>	
<b>1</b>	<b>Course Code</b>	11332	<b>Paper Code :10111</b>
<b>2</b>	<b>Course Title</b>	Programming in C	
<b>3</b>	<b>Credits</b>	4	
<b>4</b>	<b>Contact Hours (L-T-P)</b>	2-2-2	
	<b>Course Type</b>	Compulsory	
<b>5</b>	<b>Course Objective</b>	<ol style="list-style-type: none"> <li>1. C language is a simple computer language designed to enable sophisticated Procedural-oriented programming.</li> <li>2. C is defined as a small but powerful set of extensions to the standard ANSI C language.</li> <li>3. Its additions to C are mostly based on Smalltalk, one of the first Procedural - oriented programming languages.</li> </ol>	
<b>6</b>	<b>Course Outcomes</b>	<p><b>CO1:</b>Describe the functional components and fundamental concepts of a Digital computer system including number systems.</p> <p><b>CO2:</b> Construct flow chart and write algorithms for solving basic problems. Write ‘C’ programs that incorporate use of variables, operators and Expressions along with data types.</p> <p><b>CO3:</b>Write simple programs using the basic elements like control statements, Functions, arrays and strings.</p> <p><b>CO4:</b>Write advanced programs using the concepts of pointers, structures, Unions and enumerated data types.</p> <p><b>CO5:</b>Apply pre-processor directives and basic file handling and graphics Operations in advanced programming.</p>	
<b>7</b>	<b>Course Description</b>	C is a structured, procedural programming language that has been widely used both for operating systems and applications and that has had a wide following in the academic community. Many versions of UNIX-based operating systems are written in C. C has been standardized as part of the Portable Operating System Interface (POSIX).With the increasing popularity of object-oriented programming, C is being rapidly replaced as "the" programming language by C++, a superset of the C language that uses an entirely different set of programming concepts	
<b>8</b>	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Introduction</b>	
	<b>A</b>	Introduction to ‘C’ Language, Structures of ‘C’ programming, Function as building blocks.	CO1
	<b>B</b>	Language Fundamentals Character set, C Tokens, Keywords  Identifiers, Variables, Constant, Data Types, and Comments..	CO1, CO2
	<b>C</b>	Operators, Precedence and Associativity, Expression, Statement and types of statements Build in Operators.	C02

<b>D</b>	Function Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); Concept of header.	CO2
<b>E</b>	Files, Preprocessor directives: #include, #define, Control structures Decision making structures: If, If-else, Nested If-else.	CO2, CO3
<b>F</b>	Switch, Loop Control structures While, Do while, for, Nested for loop; break, continue, go to, and exit.	CO2, CO3
<b>Unit 2</b>	<b>Function</b>	
<b>A</b>	Functions Basic types of function, Declaration and definition, Types of function	CO2, CO3
<b>B</b>	Parameter passing, Call by value, Call by reference, Scope of variable, Storage classes.	CO2, CO3
<b>C</b>	Recursion, Arrays Definition, declaration and initialization of one dimensional array Accessing array elements; Displaying array elements.	CO2, CO3
<b>D</b>	Sorting arrays; Arrays and function.	CO2, CO3
<b>E</b>	Two Dimensional arrays: Declaration and Initialization, Accessing and Displaying	CO2, CO3
<b>F</b>	Memory representation of array [Row Major, Column Major]; Multidimensional array.	CO2, CO3
<b>Unit 3</b>	<b>Pointer</b>	
<b>A</b>	Pointers Definition and declaration, Initialization; Indirection operator, address of operator; pointer arithmetic.	CO3, CO4
<b>B</b>	Dynamic memory allocation; arrays and pointers, function and pointers.	CO3, CO4
<b>C</b>	Strings Definition declaration and initialization of strings.	CO3, CO4
<b>D</b>	Standard library function: strlen(), strcpy(), strcat(), strcmp().	CO3, CO4
<b>E</b>	Structure operations; Nested structures; Union: Definition and declaration; Differentiate between Union.	CO4, CO5
<b>F</b>	Definition of Files, Opening modes of files; Standard function: fopen(), fclose(), feof(), fseek(), rewind(); Using text files: fgetc(), fputc(), fscanf().	CO4, CO5
<b>Mode of examination</b>	Theory and Practical	
<b>Text Books</b>	1. Let us C-Yashwant Kanetkar 2. Programming in C-Balguruswamy 3. The C programming Lang., Person Ecl – Dennis Ritchie 4. Structured programming approach using C-Forouzah & Ceilberg Thomson learning publication	



<b>School:</b> <b>DEPARTMENT OF MATHEMATICAL SCIENCES AND COMPUTER APPLICATIONS</b>		<b>Batch : 2022-23</b>	
<b>Program: BCA</b>		<b>Current Academic Year:2022-23</b>	
<b>Branch:</b> <b>COMPUTER FUNDAMENTALS</b>		<b>Semester: I</b>	
<b>1</b>	<b>Paper Code</b>	10112	
<b>2</b>	<b>Course Title</b>	Computer fundamental and office automation	
<b>3</b>	<b>Credits</b>	4	
<b>4</b>	<b>Contact Hours (L-T-P)</b>	02-02-02	
	<b>Course Type</b>	Compulsory	
<b>5</b>	<b>Course Objective</b>	1. To understand Computer fundamentals, its history and generation, types of programming language and input output devices. 2. To teach number system, algorithm and flow chart. 3. To help student in operating systems. 4. MS OFFICE with its applications.	
<b>6</b>	<b>Course Outcomes</b>	<b>CO1: Introduction to Computers</b> Block diagram of computers and its organisations. <b>CO2: Number Systems</b> Different types of number system, flow chart and algorithm. <b>CO3: Types of O.S.</b> MS OFFICE and its application.	
<b>7</b>	<b>Course Description</b>	Characteristics of Computers, Block diagram of computer Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Conversion, Simple Addition, Subtraction, Multiplication. Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples. Editors and Word Processors Basic Concepts, Examples: MS-Word. Introduction to desktop publishing. Spreadsheets and Database package. Purpose, usage, command, MS-Excel.	
<b>8</b>	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit no.</b>	<b>Unit Name</b>	

<b>I</b>	<b>Introduction to Computers:</b>	
I.1	Characteristics of Computers, Block diagram of computer.	co1
I.2	Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers.	co1
I.3	Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages).	co1
I.4	Data Organization, Drives, Files, Directories. Types of Memory (Primary And Secondary).	co1
I.5	RAM ROM, PROM, and EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive).	co1
I.6	I/O Devices (Scanners, Plotters, LCD, Plasma Display).	co1
<b>II</b>	<b>Number Systems:</b>	
II.1	Introduction to Binary, Octal, Hexadecimal system.	co2
II.2	Conversion, Simple Addition, Subtraction, Multiplication.	co2
II.3	Algorithm: Definition, Characteristics, Advantages disadvantages, Examples.	co2
II.4	Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples.	co2
II.5	Operating System and Services in O.S. DOS – History, Files and Directories, Internal and External Commands.	co2
<b>III</b>	<b>Types of O.S.</b>	
III.1	Windows Operating Environment Features of MS – Windows, Control Panel.	co3
III.2	Taskbar, Desktop, Windows Application, Icons.	co3
III.3	Windows Accessories, Notepad, Paintbrush.	co3
III.4	Editors and Word Processors Basic Concepts, Examples: MS-Word.	co3
III.5	Introduction to desktop publishing. Spreadsheets and Database package. Purpose, usage, command, MS-Excel.	co3
III.6	Creation of files in MS-Access, Switching between applications, MS-PowerPoint.	co3
Text Book	1.fundamental of computers E Balagurusamy Mc Graw hill education 2.computer fundamentals preeti singha and PK singha BPb publication	

BUNDELKHAND UNIVERSITY, JHANSI

School: DEPARTMENT OF MATHEMATICAL SCIENCES AND COMPUTER APPLICATIONS		Batch : 2022-23
Program: BCA		Current Academic Year:2022-23
Branch:DISCRETE MATHEMATICS		Semester: I
1	Course Code	
2	Course Title	Discrete Mathematics
3	Credits	6
4	Contact Hours (L-T-P)	04-04-00
	Course Type	Compulsory
5	Course Objective	1. To understand mathematical sets and logic for computer, interpret, and evaluate changes correctly 2. To teach a matmatcal practical approach to number theory. 3. To help student identify and propose logical tricsa on set relation and function of data, estimate them with data, diagnose whether they fit, and interpret their meanings. 4. Though Computer utilization on number systems and understanding of concepts and methods.
6	Course Outcomes	<b>CO1: Mathematical Logic</b> Logics, its application with sets and relations with partial ordering. <b>CO2:Functions, Counting and Discrete Probability</b> Describe functions counting and discrete probability theory. <b>CO3:Number Theory, Graphs and Tree</b> : Number theory and different types of graphs
7	Course Description	Logic Introduction, statements, truth tables, conditional and bi Conditional statements, Sets and Relations, POSET, Functions, Counting, Permutaion and combination, Discrete probability, Number theory nd different types of alogorithmsgraphs models and tree

8	Outline syllabus		CO Mapping
Unit no.	Unit Name		
<b>I</b>	<b>Mathematical logic</b>		
	1.1	<b>Mathematical logic:</b> Introduction, statements, Connectives, negation, conjunction, disjunction, statement formulas and truth tables, conditional and bi Conditional statements.	CO1
	1.2	Tautology, contradiction, equivalence of formulas, duality law.	CO1
	1.3	Predicates and Quantifiers, arguments, joint Daniel.	CO1
	1.4	Sets:Definition, notation, inclusion and equality of sets, the power set, Operations on sets, Venn diagram, ordered pairs, and n-tuples, Cartesian product.	CO1
	1.5	Relations: Introduction, properties of a binary relation in a set, Relation matrix and graph of a relation.	CO1
	1.6	Equivalence relations, compatibility relations, composition of Binary relation.	CO1
	1.7	Partial Ordering:Definition, lexicographic ordering, Partially ordered set, Hasse diagram, well-ordered set.	CO1
<b>II</b>	<b>Functions, Counting and Discrete Probability:</b>		
	II.1	Functions: Definition and introduction, types of functions, composition of functions, inverse functions.	CO2
	II.2	Basics of counting, Pigeonhole principle, Permutation and combination, generating permutation and combination, inclusion and exclusion.	CO2
	II.3	Discrete ProbabilityIntroduction, finite probability, probabilities of complements and unions of events.	CO2
	II.4	probability theory, conditional probability, independence, random variables, Bayes' theorem, expected value and variance, independent random variable.	CO2
<b>III</b>	<b>Number Theory, Graphsand Trees:</b>		
	III.1	Number Theory: Division algorithm, Modular arithmetic, primes and greatest common divisors,least common multiple, the Euclidean algorithm.	
	III.2	Graphs and Graph models, Graph Terminology and Special Types of Graphs, Representing Graphs.	CO3
	III.3	Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.	CO3
	III.4	Directed tree, leaf node, branch node, ordered tree, degree of a node, forest, descendent, m-wary tree, conversion of directed tree into a binary tree.	CO3

Department of Mathematical Science and Computer Application		Batch 2022-25	
Program: BCA(H)		Current Academic Year:2022-23	
Branch: Computer Application		Semester: I	
1	Course Code	11332	Paper Code :
2	Course Title	Entrepreneurship	
3	Credits	4	
4	Contact Hours (L-T-P)	2-2-2	
	Course Type	Compulsory	
5	Course Objective	<ol style="list-style-type: none"> <li>1. The goals of this program are to inspire students and help them imbibe an entrepreneurial mind-set.</li> <li>2. The students will learn what entrepreneurship is and how it has impacted the world and their country.</li> <li>3. They will be introduced to key traits and the DNA of an entrepreneur, and be given an opportunity to assess their own strengths and identify gaps that need to be addressed to become a successful entrepreneur.</li> <li>4. The programmed comprises several short courses, each focusing on a specific entrepreneurial knowledge or skill requirement such as creative thinking, communication, risk taking</li> </ol>	
6	Course Outcomes	<p><b>CO1:</b> Meaning and concept of entrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development,</p> <p><b>CO2:</b> to understand <b>the</b> Myths about entrepreneurs, agencies in entrepreneurship</p> <p><b>CO3:</b> management and future of entrepreneurship types of entrepreneurs.</p> <p><b>CO4:</b> Meaning and concept of E-cells, advantages to join E-cell, significance of E-cell, various activities conducted by E-cell</p> <p><b>CO5:</b> Importance of communication, barriers and gateways to communication, listening to people, the power of talk, personal selling, risk taking &amp; resilience, negotiation.</p>	
7	Course Description	<p>The entrepreneur is defined as someone who has the ability and desire to establish, administer and succeed in a startup venture along with risk entitled to it, to make profits. The best example of entrepreneurship is the starting of a new business venture. The entrepreneurs are often known as a source of new ideas or innovators, and bring new ideas in the market by replacing old with a new invention. <b>1. Small Business Entrepreneurship 2. Scalable Startup Entrepreneurship 3. Large Company Entrepreneurship 4. Social Entrepreneurship.</b></p> <p>Understand the DNA of an entrepreneur and assess their strengths and weaknesses from an entrepreneurial perspective.</p>	
8	Outline syllabus		CO Mapping
	Unit 1	<b>Introduction to Entrepreneurship</b>	
	A	Meaning and concept of entrepreneurship, the history of entrepreneurship development.	CO1

	<b>B</b> Entrepreneurship in economic development, Myths about entrepreneurs. Agencies in entrepreneurship management and future of entrepreneurship types of entrepreneurs.	CO1
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<b>DEPT OF MATHEMATICAL SCIENCES AND COMPUTER APPLICATIONS</b>		<b>Batch : 2022-23</b>
<b>Program: BCA</b>		<b>Current Academic Year:2022-23</b>
<b>Subject: Mathematics</b>		<b>Semester: I</b>
<b>1</b>	<b>Course Code</b>	
<b>2</b>	<b>Course Title</b>	Vedic Mathematics
<b>3</b>	<b>Credits</b>	3
<b>4</b>	<b>Contact Hours (L-T-P)</b>	2-1-0
	<b>Course Type</b>	
<b>5</b>	<b>Course Objective</b>	<p>To promote Indian Mathematics.</p> <p>To enhance computation skills in students.</p> <p>Improve clarity on mathematical concepts.</p> <p>Develop analytical thinking through Vedic Mathematics.</p>
<b>6</b>	<b>Course Outcomes</b>	<p>Completion of this course the students will be able to:</p> <p><b>CO-1</b> Through Vedic Math students can do calculations in Arithmetic, Algebra and even Trigonometry for that matter and simplify and speed up calculations.</p> <p><b>CO-2</b> It is a Fun-Filled way to do Math and arises interest.</p> <p><b>CO-3</b> Sharpens your mind, increases mental agility and intelligence.</p>

7	<b>Course Description</b>	Vedic Mathematics is a collection of Techniques/Sutras to solve mathematical arithmetic in easy and faster way.  It consists of 16 Sutras (Formulae) and 13 sub-sutras (Sub Formulae) which can be used for problems involved in arithmetic, algebra, geometry, calculus, conics.	
8	<b>Outline syllabus</b>	CO Mapping	
	<b>Unit 1</b>		
	<b>A</b>	Introduction to Vedic Mathematics, Applications of Vedic Mathematics, theory of numbers.	CO1, CO2
	<b>B</b>	Algebraic Operations, mathematical computation.	
	<b>C</b>	Basic of calculus, coordinate system theory.	
	<b>Unit 2</b>		
	<b>A</b>	Principles of vedic mathematics, 16 sutras, high speed multiplications, faster division.	CO1,CO2
	<b>B</b>	Math meditation- doing math calculation without pen & paper	CO1,CO2,CO3
	<b>C</b>	Divisibility, calendars	CO1,CO2,CO3
	<b>Unit 3</b>		
	<b>A</b>	Algebra: linear, simultaneous, quadratic & miscellaneous equations.	CO3,CO4
	<b>B</b>	Accelerated addition, instant subtractions,	CO3,CO4
	<b>C</b>	Squares, cubes, square roots, cube roots, digital roots	CO3,CO4
	<b>Unit 4</b>		
	<b>A</b>	Pythagoras theorem	CO3,CO4
	<b>B</b>	Recurring decimal	CO3,CO4
	<b>C</b>	Determinants, triples	CO3,CO4
	<b>Unit 5</b>		
	<b>A</b>	Coordinate geometry	CO3,CO4
	<b>B</b>	Calculus	CO3,CO4



<b>School:Department of mathematical science and computer applications</b>		<b>2022-2023</b>	
<b>Program: BCA(H)</b>		<b>CurrentAcademicYear:2022-23</b>	
		<b>Semester: I</b>	
1	<b>CourseCode</b>		
2	<b>CourseTitle</b>	<b>Food, Nutrition and Hygiene</b>	
3	<b>Credits</b>	Qualifying Nature	
4	<b>ContactHours (L-T-P)</b>	30-15-15	
	<b>CourseType</b>	Compulsory	
5	<b>CourseObjective</b>	The course provides students with the learning of the importance of nutrition in our food. It teaches them the skills and knowledge to preserve the nutritious elements in our diet with an aim to having a healthy diet.	
6	<b>CourseOutcomes</b>	<b>CO1:</b> To learn the basic concept of the Food and Nutrition <b>CO2:</b> To study the nutritive requirement during special conditions like pregnancy and lactation □ To learn meal planning <b>CO3:</b> To learn 100 days Nutrition Concept □ To study common health issues in the society <b>CO4:</b> To learn the special requirement of food during common illness	
7	<b>CourseDescription</b>	A food and nutrition course is a learning process that will enable you with the skills required to research, process, and preserve the nutritional components in our food. The nutritional components are protein, carbohydrates, vitamins, fiber, minerals, and fat. The scope in food and nutrition courses is broad	
8	<b>Outlinesyllabus</b>		<b>CO Mapping</b>
	<b>UnitNo</b>	<b>UnitName</b>	
	<b>I</b>	<b>Concept of Food and Nutrition</b>	
	I.1	Definition of Food, Nutrients, Nutrition, Health, balanced Diet	CO1,CO2
	I.2	Types of Nutrition- Optimum Nutrition, under Nutrition, Over Nutrition	CO1,CO2
	I.3	Meal planning- Concept and factors affecting Meal Planning	CO1,CO2
	I.4	Food groups and functions of food	CO1,CO2
	<b>II</b>	<b>Nutrients: Macro and Micro RDA, Sources, Functions, Deficiency and excess of</b>	
	II.1	Carbohydrate	CO1,CO2
	II.2	Fats	CO1,CO2
	II.3	Protein	CO1,CO2
	II.4	Minerals Major: Calcium, Phosphorus, Sodium, Potassium Trace: Iron, Iodine, Fluorine, Zinc	CO1,CO2
	II.5	Vitamins Water soluble vitamins: Vitamin B, C Fat soluble vitamins: Vitamin A, D, E, K	CO1,CO2
	<b>III</b>	<b>1000 days Nutrition</b>	
	III.1	Concept, Requirement, Factors affecting growth of child Prenatal Nutrition (0 - 280 days): Additional Nutrients'	CO1,CO2

		Requirement and risk factors during pregnancy Breast / Formula Feeding (Birth – 6 months of age) Complementary and Early Diet (6 months – 2 years of age)	
	<b>IV</b>	<b>Community Health Concept</b>	
	IV.1	Causes of common diseases prevalent in the society and Nutrition requirement in the following: Diabetes Hypertension (High Blood Pressure) Obesity Constipation Diarrhea Typhoid	CO3,CO4
	IV.2	National and International Program and Policies for improving Dietary Nutrition	CO3
	IV.3	Immunity Boosting Food	CO3,CO4
	<b>Mode of examination</b>	Theory and Practical 75+25=100 Marks & 100 Marks	
		CA	MTE
	<b>Weightage Distribution</b>	5%	20%
	<b>Textbook/s*</b>	Singh, Anita, “Food and Nutrition”, Star Publication, Agra, India, 2018	
	<b>Other References</b>	1000Days-Nutrition_Brief_Brain-Think_Babies_FINAL.pdf 3. <a href="https://pediatrics.aappublications.org/content/141/2/e20173716">https://pediatrics.aappublications.org/content/141/2/e20173716</a> 4. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5750909/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5750909/</a>	

## Second Semester

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>	
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>	
<b>Branch: Computer Application</b>		<b>Semester: II</b>	
<b>1</b>	<b>Course Code</b>	11332	<b>Paper Code : 10116</b>
<b>2</b>	<b>Course Title</b>	<b>Object Oriented Programming using C++</b>	
<b>3</b>	<b>Credits</b>	4	
<b>4</b>	<b>Contact Hours (L-T-P)</b>	2-2-2	
	<b>Course Type</b>	Compulsory	
<b>5</b>	<b>Course Objective</b>	<p>1. The course helps acquire a fundamental understanding of the OOPs concepts, input/output data management, arrays in C++, functions, classes, objects, pointers, and much more. The course has been designed with a uniform structured series of modules enumerating various pertinent concepts.</p> <p>2. Inheritance in C++</p> <p>3. Constructors and destructors in C++</p> <p>4. Files management and templates in C++</p> <p>5. Handling exceptions to control errors</p>	
<b>6</b>	<b>Course Outcomes</b>	<p><b>CO1:</b> List the significance and key features of object oriented programming and modeling using UML.</p> <p><b>CO2:</b> Construct basic structural, behavioral and architectural models using object oriented software engineering approach.</p> <p><b>CO3:</b> Integrate object oriented modeling techniques for analysis and design of a system.</p> <p><b>CO4:</b> Use the basic features of data abstraction and encapsulation in C++ programs.</p> <p><b>CO5:</b> Use the advanced features such as Inheritance, polymorphism and virtual function in C++ programs.</p>	
<b>7</b>	<b>Course Description</b>	<p>This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development, and coding and testing using a modern software development environment. Students learn how to write programs in an object-oriented high level programming language. Topics covered include fundamentals of algorithms, flowcharts, problem solving, programming concepts, classes and methods, control structures, arrays, and strings. Throughout the semester, problem solving skills will be stressed and applied to solving computing problems. Weekly laboratory experiments will provide hands-on experience</p>	

		in topics covered in this course.	
<b>8</b>	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Introduction</b>	
	<b>A</b>	Introducing Object – Oriented Approach, Relating to other Paradigms (Functional, Data decomposition).	CO1
	<b>B</b>	Basic concepts: Abstraction, Encapsulation.	CO1, CO2
	<b>C</b>	Inheritance, Polymorphism, Review of C.	CO2,CO1
	<b>D</b>	Difference between C and C++ cin, cout, new, delete, operators. Classes.	CO1
	<b>E</b>	Objects: Encapsulation, information hiding, abstract data types, Object.	CO1,CO2
	<b>F</b>	classes, attributes, methods, C++ class declaration, State identity and behavior of an object,	CO1
	<b>G</b>	Constructors and destructors, instantiation of objects, Default.	CO3
	<b>H</b>	Parameter value, object types++ garbage collection, dynamic memory allocation.	CO1
	<b>I</b>	Meta class / abstract classes.	CO1

	<b>Unit 2</b>	<b>Inheritance and Polymorphism:</b>	
	<b>A</b>	Inheritance, Class hierarchy, derivation – public	CO2
	<b>B</b>	Private & protected, Aggregation, composition vs classification hierarchies.	CO1, CO2
	<b>C</b>	Polymorphism, Categorization of polymorphism techniques, Method.	CO1,CO2

<b>D</b>	Polymorphism, Polymorphism by parameter, Operator overloading, Parametric.	CO2
<b>E</b>	Polymorphism.	CO1,CO2
<b>Unit 3</b>	<b>Generic function:</b>	
<b>A</b>	Template function, function name overloading, Overriding	CO2,CO4
<b>B</b>	Inheritance methods, Run time polymorphism, Multiple Inheritance. Files and.	CO2,CO4
<b>C</b>	Exception Handling: Streams and files, Namespaces, Exception handling.	CO5
<b>D</b>	Generic Classes.	CO4

<b>Text book/s*</b>	<b>Reference Books:</b> 1.Herbert Schildt, "Java The complete referencell", McGraw Hill Education, 8th Edition, 2011.  2.Cay S. Horstmann, Gary Cornell, "Core Java Volume –I Fundamentals", Prentice Hall, 9 <sup>th</sup> Edition,2013.  3. Steven Holzner, "Java Black Book", Dreamtech. 4.Programming in C++-Balguruswamy	
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Department of Mathematical Science and Computer Applications		BATCH 2022-25	
Program: BCA(H)		Current Academic Year:2022-23	
BRANCH: COMPUTER APPLICATIONS		Semester: II	
1	Course Code		Paper Code:10117
2	Course Title	Operating System	
3	Credits	4	
4	Contact Hours (L-T-P)	2-2-2	
	Course type	Compulsory	
5	Course Objective	<p>To understand the services provided by and the design of an operating system.</p> <p>To understand the structure and organization of the file system.</p> <p>To understand what a process is and how processes are synchronized and scheduled.</p> <p>To understand different approaches to memory management.</p> <p>Students should be able to use system calls for managing processes, memory and the file system.</p> <p>Students should understand the data structures and algorithms used to implement an OS.</p>	
6	Course Outcome	<p>1. Identify the role of Operating System. To understand the design of control unit.</p> <p>2. Understanding CPU Scheduling. Synchronization, Deadlock Handling and Comparing CPU Scheduling Algorithms. Solve Deadlock Detection Problems.</p> <p>3. Describe the role of paging, segmentation and virtual memory in operating systems.</p> <p>4. Description of protection and security and also the Comparison of UNIX and Windows based OS.</p> <p>5. Defining I/O systems, Device Management Policies and Secondary Storage Structure and Evaluation of various Disk Scheduling Algorithms.</p>	
7	Course Description	<p>Covers the classical internal algorithms and structures of operating systems, including CPU scheduling, memory management, and device management. Considers the unifying concept of the operating system as a collection of cooperating sequential processes. Covers topics including file systems, virtual memory, disk request scheduling, concurrent processes, deadlocks, security, and integrity.</p>	
8	Outline Syllabus		CO Mapping
	Unit 1		
	A	Introduction to UNIX and Linux. Linux file system. Linux commands - is, wild card, mkdir, rmdir, cd, pwd, find, du, df, cat, cp, rm, mv, wc, in, file, cmp, comm.	CO1
	B	File Access Permissions, chown, chmod, chgrp, ps.	CO1
	C	Background processing, -kill, at, batch, write, mail wall,	CO1

		date, who, man, cal, lpr, script, expr, bc, Pipe and filters, redirection, vi editor.	
	<b>D</b>	Introduction to Linux shell programming	CO1
	<b>E</b>	Definition and function of operating system.	CO2
	<b>F</b>	Types of operating system (batch processing, multiprogramming, multitasking, multiprocessing, Distributed).	CO2
	<b>G</b>	Operating system structure, operating system component and services, system call, system program, virtual machine, process concept.	CO2
	<b>H</b>	P.C.B, process transition model thread, types of thread, Difference between process and thread.	CO2
	<b>I</b>	CPU scheduling algorithm (FCFS, SJF, SRTF, round robin, priority based) both theory and numerical.	CO2
	<b>UNIT 2</b>	Memory management and Deadlock	
	<b>A</b>	Process synchronization.	CO2
	<b>B</b>	cooperative process, race The critical section problem, Condition.	CO2
	<b>C</b>	Semaphores.	CO2
	<b>D</b>	Deadlock system model, necessary condition of dead lock	CO3
	<b>E</b>	Resource allocation graph.	CO3
	<b>G</b>	Dead detection and deadlock handling	CO3
	<b>H</b>	Deadlock prevention.	CO3
	<b>I</b>	Memory management concept.	CO3
	<b>J</b>	Paging and segmentation, page replacement algorithm.	CO3
	<b>UNIT 3</b>	Security And Case Study	
	<b>A</b>	Disk scheduling concept.	CO4
	<b>B</b>	Disk scheduling method.	CO4
	<b>C</b>	Disk management recovery.	CO4
	<b>D</b>	Goals of protection, domain of protection.	CO4
	<b>E</b>	Networking and program.	CO4
	<b>Mode of examination</b>	Theory and Practical	
	<b>Reference books:</b>	Abraham Siberschatz and Peter Baer Galvin, "Operating System Concepts", Fifth Edition, Addison-Wesley 2. Milan Milankovic, "Operating Systems, Concepts and Design", McGraw-Hill. 3. Harvey M Deital, "Operating Systems", Addison Wesley 4. Richard Peterson, "Linux: The Complete Reference", Osborne McGraw-Hill	

Department of Mathematical sciences and Computer Application		Barch 2022-25	
Program: BCA(H)		Current Academic Year:2022-2023	
Branch:- Computer Applications		Semester:- II	
1	Course Code	11332	Paper Code:-
2	Course Title	Digital Electronics	
3	Credits	4	
4	Contact Hours (L-T-P)	2-0-0	
5	Course Type	Compulsory	
6	Course Objective	1. The objective of this course to acquire the basic knowledge of digital logic level and application of knowledge to understand digital electronics circuit 2.The main objective is to prepare students to perform the analysis and design of various digital electronic circuit	
7	Course Outcomes	CO1:-Use the basic logic gate and varies reduction technique of digital logic circuit in n details CO2:-Design combination and sequential circuits. CO3:-Design and implement hardware circuits to test performance and application CO4:- To understand the basic of Flip-flop, registers and counters.	
	Course Descriptions	The course covers combinational and sequential logic circuit topics include numbers system ,Boolean algebra K-Map ,POS and SOP upon completion students should be able to construct analyze, and troubleshoot digital circuit using appropriate technique and test equipment	
8	Outline Syllabus		CO Mapping
	Unit 1	<b>Digital Computer and Digital System</b>	
	A	Number system: Binary, Octal & Hex no. System	CO1
	B	Conversion of Number System	CO1
	C	Complements: r`s &( r-1) Complements	CO2
	D	Signed Binary Number, Binary Codes, Logic Gates, Boolean Algebra ,Universal Building Blocks	CO3
	E	Minimization Techniques-Map, Tabulation Method	CO1
	UNIT-II	<b>Combinational Circuits</b>	
	A	Adder s, Subtractor, Binary Parallel Adders Adder/subtractor	CO2
	B	Decimal Adder, Code Convertor	CO2
	C	Magnitude Comparator, Multiplexer, Demultiplexer	CO 2
	D	Decoder & Encoder	CO1
	UNIT-III	<b>Introduction to Flip Flops , Register and counter</b>	
	A	Types Of Flip Flop	CO1



	<b>B</b>	RS Flip Flop, D Flip Flop, JK Flip Flop, D Flip Flop	CO3
	<b>C</b>	Master Slave Flip Flop	CO3
	<b>D</b>	State Reduction And Assignment, Conversion of flip flop	CO4
	<b>E</b>	Register And Counter, Shift Register	
	<b>F</b>	Type of Register, Ripple Counter, Synchronous Counter	CO4
	<b>G</b>	Ring Counter, Johnson Counter, Mod Counter	CO4
	<b>Mode of Examination</b>	Theory	
	<b>Text Books/Reference books</b>	<ol style="list-style-type: none"> <li>1. Moris Mano, Digital Logic and Computer Design, Prentice Hal of India.</li> <li>2. Moris Mano, Digital Design, Prentice Hal of India.</li> <li>3. R.K. Gaur, Digital Electronics and Microcomputer, Dhanpat Rai Publication</li> <li>4. R.P. Jain, Modern Digital Electronics, Tata McGraw-Hil</li> <li>5. Malvino &amp; Leach, Digital Principles and Applications, Tata McGraw-Hil.</li> <li>6. Rajaraman &amp; Radhakrishnan, An introduction to Digital Computer Design, Prentice Hall of India.</li> </ol>	

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>	
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>	
<b>Branch: Computer Application</b>		<b>Semester: II</b>	
<b>1</b>	<b>Course Code</b>	11332	<b>Paper Code :20117</b>
<b>2</b>	<b>Course Title</b>	<b>Computer Hardware &amp; Networking</b>	
<b>3</b>	<b>Credits</b>	4	
<b>4</b>	<b>Contact Hours (L-T-P)</b>	2-2-2	
	<b>Course Type</b>	Compulsory	
<b>5</b>	<b>Course Objective</b>	<ol style="list-style-type: none"> <li>1. Students should possess creative problem-solving abilities, computer assembly skills, effective communication skills, and hardware troubleshooting and repair.</li> <li>2. They should have basic math skills which are important for it and have a working Knowledge of MS word, MS Excel, Power point and outlook.</li> <li>3. Students to learn , to train the officials to acquire basic knowledge in computer hardware and peripherals for installation, PC assembly, trouble shooting and maintenance</li> <li>4. Students will learn including system management and its backup and to undertake disaster prevention, a basic knowledge of TCP/IP networks work group, internet and intranet.</li> </ol>	
<b>6</b>	<b>Course Outcomes</b>	<p><b>CO1:</b> It is one of the high-paying skills and fastest-growing domains in the IT Sector.</p> <p><b>CO2:</b> The student will able to know the Basic of Computer assembling and trouble shooting.</p> <p><b>CO3:</b> This course will provide the brief knowledge of Computer networking and trouble shooting.</p> <p><b>CO4:</b> Explain the need of technical knowledge and troubleshooting of hardware and installing the computers</p> <p><b>CO5:</b> Explain different approaches technical skills maintenance.</p>	
<b>7</b>	<b>Course Description</b>	<p>Hardware and Networking Course is a demanding career in the field of Information Technology due to its rise and needs in today's world.</p> <p><b>Hardware:</b> Hardware is the collection of all the physical parts of a computer system. This includes Motherboard, Graphics card, RAM, Monitor, Keyboard, Mouse, Hard Disk Monitor, Speakers</p> <p><b>Networking:</b> it is a set of computers that are connected either with cables or having a wireless connection with the purpose of sharing resources with each other. So basically, Networking is the field of computer science that allows computers to exchange data or information.</p>	
<b>8</b>	<b>Outline syllabus</b>	<b>CO Mapping</b>	
	<b>Unit 1</b>	<b>Introduction</b>	
	<b>A</b>	Evolution of Computers, Generation of Computers, Classification of Computers Analog Digital and Hybrid Computers, Classification of Computers according to size, Supercomputers, Mainframe Computers, Personal Computers (Different Types), Characteristics of Computers.	CO1
	<b>B</b>	Block Diagram of a Digital Computer, types of OS. Computer Fundamentals History and Generations of Computer, Types of Programming Languages, software,	CO1

<b>C</b>	Classification of software, Application software and System Software, Structured Programming, Algorithms, and Flowcharts with Examples,	CO1
<b>D</b>	Changing Desktop, Backgrounds, Mouse, Pointer, Screen Saver and Notepad ,WordPad, MS Paint, PC Boot Process and DOS Function and file system	CO1

<b>Unit 2</b>	<b>Hardware Devices</b>	
<b>A</b>	Input Devices and output devices like VDU, Printers. CPU, Motherboard, RAM/ROM, Hard Disk Drive, Optical Drive, Keyboard, Mouse, Monitor , Printer, Scanner, What is a Virus?	CO2
<b>B</b>	How Virus Attacks a Computer Types of Viruses (Boot Sector Virus, Partition Virus, File Virus, Trojans, Etc.),Malwares, Adwares, Spywares, Phishing Attacks, etc.	CO2
<b>C</b>	Prevention and Curing Virus and Spywares, Antivirus, Internet Security Tools, Updates, Use of Internet Concepts, Surfing, Mailing & Social Media,	CO2
<b>D</b>	Use of identifying different Desktop Icons. My Computer, My Documents	CO2
<b>Unit 3</b>	<b>Internet and networking</b>	
<b>A</b>	Internet Network:Introduction to Internet, Uses of Internet, Working on Internet using various browsers like IE, Chrome, Firefox, Opera, etc. Explaining URL, HTTP, HTTPS, etc	CO3
<b>B</b>	Clearing Browser Cache, Introduction to Network Devices: ADSL Router, Wi-Fi Router, Wireless Access Point and Repeater, Firewall, Configuring and securing Wireless Networks and Access Points,	CO3
<b>C</b>	Software installation and booting like Introduction to Dual Boot / Multi Boot Windows 8.1, Windows 10, Comparison between Windows XP, Win 7, Win 8.1 and Windows 10	CO3
<b>Unit4</b>	<b>Networking</b>	
<b>A</b>	Providing Wireless Client Access with Secure Key and MAC Filtering, Introduction to Networking /Types of Networking, Crimping RJ45 Connectors, Introduction to windows networking, Data Sharing	CO4
<b>B</b>	Printer Sharing. Remote Desktop Connection, Virtual Network Computing, Creating Shared Folders for each user, Assigning Access Rights and Changing Ownership for Shared,	CO4
<b>C</b>	Folders using File Server Wizard. Installing, Configuring Windows Server, DNS, ADS, DHCP Configuration.	CO4
<b>Mode of examination</b>	Theory and Practical	

	<b>Text book/s*</b>	<b>Reference Books:</b> <ol style="list-style-type: none"><li>1. The Architecture of Computer Hardware and System Software fourth edition, by Irv Englander</li><li>2. Computer Repair - A Complete Illustrated Guide To Pc Hardware by Karbo Michael</li><li>3. Computer Networking &amp; Hardware concepts by Nurul Sarkar</li><li>4. Computer Fundamentals: Pradeep K. Sinha &amp;Priti Sinha</li><li>5. <u>Upgrading and Repairing PCs</u> by <u>Scott Mueller</u></li><li>6. Data Communications And Networking (SIE) 4th Editionby Behrouz Forouzan</li></ol>	
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Department of Mathematical sciences and Computer Application		Barch 2022-25	
Program: BCA(H)		Current Academic Year:2022-2023	
Branch:- Computer Applications		Semester:- II	
1	Course Code	11332	Paper Code:-
2	Course Title	First Aid and Health	
3	Credits	4	
4	Contact Hours (L-T-P)	2-0-0	
5	Course Type	Co-curricular course	
6	Course Objective	<p>1. The objective of this course is include preserving to, preventing injury from getting worse, aiding recovery, relieving pain and protecting the unconscious.</p> <p>2.The main objective is to save lives</p> <p>3. first aid training is key doing that if properly implemented</p>	
7	Course Outcomes	<p><b>CO1:-</b>Learn The Skill Needed To assess the ill or injured person and skill to provide CPR to infant, Children and adults.</p> <p><b>CO2:-</b>Learn the skill to handle emergency child birth and Learn the Basic Sex education help young people navigate thorny questions responsibly and with confidence.</p> <p><b>CO3:-</b>Learn the Basic Sex education help youth to understand Sex is normal. It is a deep , Powerful instinct at the core of our survival as s species. Sexual Desire is a healthy drive.</p> <p><b>CO4:-</b>Help to understand natural changes of adolescence and Learn the Skill to identify Mental health status and Psychological First Aid</p>	
	Course Descriptions	First aid and health course refer to medical attention that is usually administrative immediately after the injury occurs and at the location where it occurred	
8	Outline Syllabus		CO Mapping
	Unit 1	<b>Basic First Aid</b>	
	A	<p><b>Basic First Aid</b></p> <ul style="list-style-type: none"> <li>• Aims of first aid &amp; First aid and the law.</li> <li>• Dealing with an Emergency, Resuscitation (basic CPR)</li> <li>• Recovery Positions , Initial top to toe assessment.</li> <li>• Hand washing and Hygiene.</li> <li>• Types and Content of a First aid Kit</li> <li>•</li> </ul>	CO1
	B	<p><b>First AID Technique</b></p> <ul style="list-style-type: none"> <li>• Dressings and Bandages.</li> <li>• Fast evacuation techniques (single rescuer).</li> <li>• Transport techniques.</li> <li>•</li> </ul>	CO1
	C	<p><b>First aid related with respiratory syste</b></p> <ul style="list-style-type: none"> <li>• No breathing or difficult breathing, Drowning, Choking, Strangulation and hanging,</li> <li>• Swelling within the throat, Suffocation by smoke or gases and Asthma.</li> </ul>	CO2

		Basics of Respiration.	
<b>D</b>		<p><b><i>First aid related with Heart, Blood and Circulation</i></b></p> <ul style="list-style-type: none"> <li>• Basics of The heart and the blood circulation.</li> <li>• Chest discomfort, bleeding.</li> </ul> <p><b><i>First aid related with Wounds and Injuries</i></b></p> <ul style="list-style-type: none"> <li>• Type of wounds, Small cuts and abrasions</li> <li>• Head, Chest, Abdominal injuries</li> <li>• Amputation, Crush injuries, Shock</li> </ul>	CO1
<b>E</b>		<p><b><i>First aid related with Bones, Joints Muscle related injuries</i></b></p> <ul style="list-style-type: none"> <li>• Basics of The skeleton, Joints and Muscles.</li> <li>• Fractures (injuries to bones).</li> </ul>	CO3
<b>UNIT-II</b>			
<b>A</b>		<p><b><i>First aid related with Nervous system and Unconsciousness</i></b></p> <ul style="list-style-type: none"> <li>• Basics of the nervous system.</li> <li>• Unconsciousness, Stroke, Fits – convulsions – seizures, Epilepsy.</li> </ul>	CO2
<b>B</b>		<p><b><i>First aid related with Gastrointestinal Tract</i></b></p> <ul style="list-style-type: none"> <li>• Basics of The gastrointestinal system.</li> <li>• Diarrhea, Food poisoning.</li> </ul>	CO2
<b>C</b>		<p><b><i>First aid related with Poisoning</i></b></p> <ul style="list-style-type: none"> <li>• Poisoning by swallowing, Gases, Injection, Skin</li> </ul>	CO3
<b>D</b>		<p><b><i>First aid related with Bites and Stings</i></b></p> <ul style="list-style-type: none"> <li>• Animal bites, Snake bites, Insect stings and bites</li> </ul>	CO1
<b>E</b>		<p><b><i>First aid related with Sense organs</i></b></p> <ul style="list-style-type: none"> <li>• Basic of Sense organ.</li> <li>• Foreign objects in the eye, ear, nose or skin.</li> <li>• Swallowed foreign objects.</li> </ul>	CO2
<b>F</b>		<p><b><i>Specific emergency satiation and disaster management</i></b></p> <ul style="list-style-type: none"> <li>• Emergencies at educational institutes and work</li> <li>• Road and traffic accidents.</li> <li>• Emergencies in rural areas.</li> <li>• Disasters and multiple casualty accidents.</li> <li>• Triage.</li> </ul>	CO2
<b>G</b>		<b><i>Emergency Child birth</i></b>	CO3
<b>UNIT-III</b>			
<b>A</b>		<p><b><i>Basic Sex Education</i></b></p> <ul style="list-style-type: none"> <li>• Overview, ground rules, and a pre-test</li> <li>• Basics of Urinary system and Reproductive system.</li> </ul>	CO1
<b>B</b>		<ul style="list-style-type: none"> <li>• Male puberty — physical and emotional changes</li> <li>• Female puberty — physical and emotional changes</li> </ul>	CO3

	<b>C</b>	<ul style="list-style-type: none"> <li>• Male-female similarities and differences</li> <li>• Sexual intercourse, pregnancy, and childbirth</li> <li>• Facts, attitudes, and myths about LGBTQ+ issues and identities</li> </ul>	CO3
	<b>D</b>	<ul style="list-style-type: none"> <li>• Birth control and abortion</li> <li>• Sex without love — harassment, sexual abuse, and rape</li> <li>• Prevention of sexually transmitted diseases.</li> </ul>	CO4
	<b>UNIT-IV</b>	<b>Mental Health and Psychological First Aid</b>	
	<b>A</b>	<ul style="list-style-type: none"> <li>• What is Mental Health First Aid?</li> <li>• Mental Health Problems in the India</li> <li>• The Mental Health First Aid Action Plan</li> </ul>	CO4
	<b>B</b>	<ul style="list-style-type: none"> <li>• Understanding Depression and Anxiety Disorders</li> <li>• Crisis First Aid for Suicidal Behavior &amp; Depressive symptoms</li> <li>• What is Non-Suicidal Self-Injury?</li> </ul>	CO4
	<b>C</b>	<ul style="list-style-type: none"> <li>• Non-crisis First Aid for Depression and Anxiety</li> <li>• Crisis First Aid for Panic Attacks, Traumatic events</li> <li>• Understanding Disorders in Which Psychosis may Occur</li> </ul> <p>Crisis First Aid for Acute Psychosis</p>	CO1
	<b>D</b>	<ul style="list-style-type: none"> <li>• Understanding Substance Use Disorder</li> <li>• Crisis First Aid for Overdose, Withdrawal</li> <li>• Using Mental Health First Aid</li> </ul>	CO1
	<b>Mode of Examination</b>	Theory and Practical	
	<b>Text Books/Reference books</b>	<ul style="list-style-type: none"> <li>• Finkelhor, D. (2009). The prevention of childhood sexual abuse. Durham, NH: Crimes Against Children Research Center. <a href="http://www.unh.edu/ccrc/pdf/CV192.pdf">www.unh.edu/ccrc/pdf/CV192.pdf</a></li> <li>• Kantor L. &amp; Levitz N. (2017). Parents' views on sex education in schools: How much do Democrats and Republicans agree? PLoS ONE, 12 (7): e0180250.</li> <li>• Orenstein, P. (2016). Girls and sex: Navigating the complicated new landscape. New York, NY: Harper.</li> <li>• Schwiegershausen, E. (2015, May 28). The Cut. <a href="http://www.thecut.com/2015/05/most-women-are-catcalled-before-they-turn-17.html">www.thecut.com/2015/05/most-women-are-catcalled-before-they-turn-17.html</a></li> <li>• Wiggins, G. &amp; McTighe, J. (2008). Understanding by design. Alexandria, VA: ASCD.</li> </ul>	

### Third Semester

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>	
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>	
<b>Branch: Computer Application</b>		<b>Semester: III</b>	
<b>1</b>	<b>Course Code</b>	11332	<b>Paper Code : 20111</b>
<b>2</b>	<b>Course Title</b>	<b>Data Structure using C++</b>	
<b>3</b>	<b>Credits</b>	4	
<b>4</b>	<b>Contact Hours (L-T-P)</b>	2-2-2	
	<b>Course Type</b>	Compulsory	
<b>5</b>	<b>Course Objective</b>	<ol style="list-style-type: none"> <li>1. 1. Allow to assess how the choice of data structures and algorithm design methods impacts the performance of programs.</li> <li>2. 2. To choose the appropriate data structure and algorithm design method for a specified application.</li> <li>3. 3. To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.</li> <li>4. 4. To efficiently implement the different data structures and solutions for specific problems.</li> </ol>	
<b>6</b>	<b>Course Outcomes</b>	<p><b>CO1:</b> Explain the concept of data structure, abstract data types, algorithms, analysis of algorithms and basic data organization schemes such as arrays and linked lists.</p> <p><b>CO2:</b> Describe the applications of stacks and queues and implement various operations on them using arrays and linked lists.</p> <p><b>CO3:</b> Describe the properties of graphs and trees and implement various operations such as searching and traversal on them.</p> <p><b>CO4:</b> Compare incremental and divide-and-conquer approaches of designing algorithms for problems such as sorting and searching.</p> <p><b>CO5:</b> Apply and analyze various design approaches such as Divide-and-Conquer,greedy and dynamic for problem solving .</p>	



7	<b>Course Description</b>	An overview of data structure concepts, arrays, stack, queues, trees, and graphs. Discussion of various implementations of these data objects, programming styles, and run-time representations. Course also examines algorithms for sorting, searching and some graph algorithms. Algorithm analysis and efficient code design is discussed.
8	<b>Outline syllabus</b>	CO Mapping
	<b>Unit 1</b>	<b>Introduction</b>
	<b>A</b>	Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space. CO1
	<b>B</b>	Array Definition, Representation and Analysis, Single and Multidimensional Array, Arrays, address calculation, application of arrays. CO1
	<b>C</b>	Character String in C++, Character string operation, Array as Parameters, Sparse Matrices. CO1
	<b>D</b>	Stack: Array Representation and Implementation of stack, Push & Pop, Array Representation of Stack. CO1, CO2
	<b>E</b>	Linked Representation of Stack, and Operations Associated with Stacks, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. CO2
	<b>F</b>	Recursive definition and processes recursion in C example of recursion, Tower of Hanoi Problem, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion. CO1,CO2
	<b>Unit 2</b>	<b>Queues, Linked list</b>
	<b>A</b>	Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. CO1, CO2
	<b>B</b>	Circular queue, Dequeue, and Priority Queue, Representation and Implementation of Singly Linked Lists. CO1, CO2
	<b>C</b>	Traversing and Searching of Linked List, Insertion and deletion to/from Linked Lists. CO1,C02
	<b>D</b>	Insertion and deletion Algorithms, Doubly linked list, Linked List in Array. CO2
	<b>E</b>	Polynomial representation and addition. CO2
	<b>F</b>	Generalized linked list, Garbage Collection and Compaction. CO2

<b>Unit 3</b>	<b>Trees</b>	
<b>A</b>	Basic terminology, Binary Trees, Binary, tree representation.	CO3
<b>B</b>	Algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked Representation of Binary trees.	CO3
<b>C</b>	Traversing Binary trees, Threaded Binary trees, Traversing Threaded Binary trees.	CO3
<b>D</b>	Huffman algorithm. Searching and Hashing, Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies.	CO4, C05
<b>E</b>	Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort.	CO4,C05

	<b>Text book/s*</b>	<b>Reference Books:</b> 1. Fundamentals of Data Structure, By S, Sawhney& E, Horowitz 2. Data Structure: By Trembley & Sorenson 3. Date Structure: By lipschuists (Schaum’s Outline Series Mcgraw Hill Publication) 4. Fundamentals of Computer Algorithm: By Ellis Horowitz and Sartaj Sawhney	
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<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>	
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>	
<b>Branch: Computer Application</b>		<b>Semester: III</b>	
<b>1</b>	<b>Course Code</b>	11332	<b>Paper Code :20112</b>
<b>2</b>	<b>Course Title</b>	Database Management System	
<b>3</b>	<b>Credits</b>	4	
<b>4</b>	<b>Contact Hours (L-T-P)</b>	2-2-2	
	<b>Course Type</b>	Compulsory	
<b>5</b>	<b>Course Objective</b>	<ol style="list-style-type: none"> <li>1. The objective of the course is to present an introduction to database management system with an emphasis on how to organize ,maintain and retrieve –efficiently and effectively– information from a DBMS</li> <li>2. The objective of this lab course is to understand the practical applicability of database management system concept</li> <li>3. Improve the database design by normalization</li> <li>4. Familiar with basic database storage structure and access techniques</li> </ol>	
<b>6</b>	<b>Course Outcomes</b>	<p><b>CO1:</b> Describe the features of a database system and its application and compare various types of data models.</p> <p><b>CO2:</b> Construct an ER Model for a given problem and transform it into a relation database schema.</p> <p><b>CO3:</b> Formulate solution to a query problem using SQL Commands, relational algebra, tuple calculus and domain calculus.</p> <p><b>CO4:</b> Explain the need of normalization and normalize a given relation to the desired normal form.</p> <p><b>CO5:</b> Explain different approaches of transaction processing and concurrency control.</p>	
<b>7</b>	<b>Course Description</b>	<p>Database form the back bone of all major application today-tightly or loosely coupled intranet or internet based, financial, social, administrative and so on. Database Management System based on relational and other model have long formed the basis for such databases. Consequently, oracle, Microsoft SQL Server, Sybase etc. have emerged as leading commercial system while MySQL, PostgreSQL etc. lead in open source and free domain.</p> <p>While DBMS Differ in the details they share a Common set of models, design paradigms and a Structured query Language. In this background the course examines data structure file organization concept and principal of DBMS.</p>	
<b>8</b>	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Introduction</b>	
	<b>A</b>	Characteristics of database approach ,data models, database users database schema	CO1
	<b>B</b>	DBMS architecture, data independence DBMS structure	CO1

C	<i>E-R Modeling: Entity types, Entity set, attribute and key Relationships</i>	C02
D	relation types roles and structural constraints, weak entities	CO2
E	enhanced E-R and object modeling enhanced E-R and object modeling Subclasses; Superclasses	CO2
F	Inheritance, Specialization, Generalization, <i>EER and ER to relational mapping</i> , Data base design, relational language	CO2
<b>Unit 2</b>	<b><i>File Organization</i></b>	
A	Indexed sequential access files, implementation using B & B++ trees	CO2
B	Hashing, hashing functions, collision resolution, extendible hashing, dynamic hashing approach implementation and performance	CO2
C	<i>Relational Data Model</i> , Relational model concepts.	CO1
D	Relational constraints relational algebra.	CO3
E	<i>SQL</i> , SQL queries, programming using SQL	CO3
<b>Unit 3</b>	<b>Normalization</b>	
A	Database Normalization Functional Dependencies	CO4
B	Normal form up to 3 <sup>rd</sup> normal form	CO4
C	<i>Concurrency Control</i> , Transaction processing, locking techniques	CO5
D	database recovery, security and authorization	CO5
E	Database Security, Recovery Techniques	CO5
<b>Mode of examination</b>	Theory and Practical	
<b>Text book/s*</b>	<b>Reference Books:</b> 1. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill. 2. Date C J, "An Introduction to Database Systems", Addison Wesley. 3. Elmasri, Navathe, "Fundamentals of Database Systems", Addison Wesley. 4. O'Neil, "Databases", Elsevier Pub. 5. Ramakrishnan, "Database Management Systems", McGraw Hill. 6. Leon & Leon, "Database Management Systems", Vikas Publishing House. 7. Bipin C. Desai, "An Introduction to Database Systems", Gagotia Publications. 8. Majumdar & Bhattacharya, "Database Management System", McGraw Hill.	

# Tour guide and heritage

## Course Objective

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The Industrial visit is very helpful in our future practical

Life.

It bring a positive change in our thinking & practical behavior regarding Education & specializing our technical skills.

The Industrial visit Got practical knowledge about the advancement in advanced technology of machines.

The Industrial visit is very usefull for new programming in field of Computer Application

Information on different parts of server machines with multiple nodes.

Management of manpower and machines.

Different courses offered by training section

<b>DEPT OF MATHEMATICAL SCIENCES AND COMPUTER APPLICATIONS</b>		<b>Batch : 2022-25</b>	
<b>Program: BCA</b>		<b>Current Academic Year:2022-23</b>	
<b>Subject: Mathematics</b>		<b>Semester: III</b>	
<b>1</b>	<b>Course Code</b>	11332	<b>Paper code: 21141</b>
<b>2</b>	<b>Course Title</b>	Human Values and Environment studies	
<b>3</b>	<b>Credits</b>	4	
<b>4</b>	<b>Contact Hours (L-T-P)</b>	2-1-0	
	<b>Course Type</b>	compulsary	
<b>5</b>	<b>Course Objective</b>	<p>To create an awareness on Engineering Ethics and Human Values.          To instill Moral and Social Values and Loyalty          To appreciate the rights of others.          To create awareness on assessment of safety and risk</p>	
<b>6</b>	<b>Course Outcomes</b>	<p><b>CO-1</b> The mission of the course on Human Values and Environmental Studies is to create morally articulate  <b>CO-2</b> solutions to be truthful and just and to become responsible towards humanity. The course seeks to establish  <b>CO-3</b> a continuous interest in the learners to improve their thought process with intent to develop a new  <b>CO-4</b> generation of responsible citizens capable of addressing complex challenges faced by the society due to disruptions in human interactions effecting human values.Building fundamental knowledge of the interplay of markets, ethics, and law, Look at various challenges faced by individual to counter unethical issues.</p>	
<b>7</b>	<b>Course Description</b>	The course intends to create a sense of how to be more responsible towards the environment. Upon finishing of the course students will be able to come up with using ethical reasoning for decision making and frame ethical issues as well as operationalise ethical choices. The course integrates various facts of human values and environment..	
<b>8</b>	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>HumanValues</b>	

<b>A</b>	Introduction-Values,Characteristics,Types ,Developing Value system in Indian Organisation,Values in Business Management , value based Organisation,Trans-cultural Human values in Management. Swami Vivekananda's philosophy of Character Building, Gandhi's concept of Seven Sins, APJ Abdul Kalam view on role of parents and Teachers.	CO-1
<b>B</b>	Human Values and Present Practices – Issues : Corruption and Bribe , Privacy Policy in Web and Social Media, Cyber threats	CO-1

	Online Shopping etc. Remedies UK Bribery Act, Introduction to sustainable policies and practices in Indian Economy.	
<b>C</b>	Principles of Ethics Secular and Spiritual Values in Management- Introduction- Secular and Spiritual values, features , Levels of value Implementation. Features of spiritual Values , Corporate Social Responsibility- Nature, Levels ,Phases and Models of CSR, Corporate Governance. CSR and Modern Business Tycoons Ratan Tata, Azim Premji and Bill Gates.	CO-1,CO-2
<b>Unit 2</b>	<b>Decision Making</b>	
<b>A</b>	Holistic Approach in Decision making- Decision making, the decision making process, The Bhagavad Gita: Techniques in Management , Dharma and Holistic Management.	CO-2
<b>B</b>	Discussion through Dilemmas – Dilemmas in Marketing and Pharma Organisations, moving from Public to Private –monopoly context , Dilemma of privatisation, Dilemma on liberalization, Dilemma on social media and cyber security , Dilemma on Organic food , Dilemma on standardization ,Dilemma on Quality standards.	CO-2,CO-3
<b>Unit 3</b>	<b>Ecosystem</b>	
<b>A</b>	Concept, structure & functions of ecosystem : producer, consumer,decomposer, foodweb, food chain, energy flow, Ecological pyramids	CO-3
<b>B</b>	Conservation of Biodiversity- In-situ & Ex- situ conservation of biodiversity Role of individual in Pollution control Human Population & Environment Sustainable Development	CO-3
<b>C</b>	India and UN Sustainable Development Goals Concept of circular economy and entrepreneurship	CO-3
<b>Unit 4</b>	<b>Environmental Laws</b>	

	<b>A</b>	Environmental Laws? International Advancements in Environmental Conservation Role of National Green Tribunal Air Quality Index	CO-4	
	<b>B</b>	Importance of Indian Traditional knowledge on environment 8 Bio assessment of Environmental Quality Environmental Management System Environmental Impact Assessment and Environmental Audit	CO-4	
	<b>Mode of examination</b>	Theoretical		
		CA	MTE	ETE

	<b>Weightage Distribution</b>	30%	20%	50%	
	<b>Text book/s* &amp; Other References</b>	1. A foundation course in Human Values and Professional Ethics by RR. Gaur, R. Sangal et.al 2. JUSTICE: What's the Right Thing to Do? Michael J. Sandel. 3. Human Values by A. N. Tripathi New Age International 4. Environmental Management by N.K. Uberoi 5. <a href="https://www.un.org/sustainabledevelopment/sustainable-">https://www.un.org/sustainabledevelopment/sustainable-</a>			Page 1



### Fourth Semester

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>
<b>Branch: Computer Application</b>		<b>Semester: I V</b>
1.	<b>Course Code</b>	11332 <span style="float: right;"><b>Paper Code : 20116</b></span>
2.	<b>Course Title</b>	<b>Programming in JAVA</b>
3.	<b>Credits</b>	04
4.	<b>Contact Hours (L-T-P)</b>	2-2-2
<b>Course Type</b>		Compulsory
5.	<b>Course Objective</b>	<ol style="list-style-type: none"> <li>1. To impart the basic concepts of JAVA Programming</li> <li>2. To understand concepts about AWT and other Package</li> <li>3. To Understand basic concepts about Thread, Exception Handling, Applet Programming, JDBC, SWING ,SERVLET.</li> <li>4. To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental and advance level programming.</li> </ol>
6.	<b>Course Outcomes</b>	CO1:- Explain the organization of basic computer Pogramming, its design and the flow of program. CO2: :- Demonstrate the working of JVM and JDBC Architecture. CO3: Describe the operations for web application development CO4: Understand the organization of memory and memory management. CO5: Elaborate advanced concepts of JAVA Programming.
7.	<b>Course Description</b>	This course aims to provide students with the special knowledge necessary for basic concepts of java programming . More precisely it enable students to learn basic concepts about web application development and internet programming
8.	<b>Outline syllabus</b>	CO Mapping
<b>Unit 1</b>		<b>INTRODUCTION</b>
	A	Object Oriented Programming: objects, classes, Abstraction, Encapsulation, Inheritance, Polymorphism, OOP in Java, Characteristics of Java,
	B	The Java Environment, Java Source File Structure, and Compilation. Fundamental Programming Structures in Java: Defining classes in Java,
	C	constructors, methods, access specifies, static members, Comments, Data Types, Variables, Operators, Control Flow, Arrays.
	D	Inheritance: Super classes, sub classes, Protected members, constructors in sub classes, Object class, abstract classes and methods. I
<b>Unit 2</b>		<b>Interfaces, and Packages:</b>
	A	Interfaces: defining an interface, implementing interface, differences between classes and interfaces and extending interfaces, Object cloning, inner classes
	B	Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages, Import and Static Import Naming Convention For Packages, Networking java.net package
	C	Exception Handling, I/O: Exceptions: exception hierarchy,

		throwing and catching exceptions, built-in exceptions, creating own exceptions	CO5
	D	Stack Trace Elements. Input / Output Basics: Byte streams and Character streams, Reading and Writing, Console Reading and Writing Files	CO3,CO4
	<b>Unit 3</b>	<b>Multithreading, Generic and Event Driven Programming</b>	
	A	Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups.	CO1,CO2
	B	Generic Programming: Generic classes, generic methods, Bounded Types: Restrictions and Limitations	CO4, CO5
	C	Event Driven Programming: Graphics programming: Frame, Components, working with 2D shapes,Using colors, fonts, and images. Basics of event handling: event handlers, adapter classes, actions, mouse events, AWT event hierarchy	CO1,CO2,C O3
	D	Introduction to Swing: layout management, Swing Components: Text Fields, Text Areas, Buttons, Check Boxes, Radio Buttons, Lists, choices, Scrollbars, Windows Menus and Dialog Boxes.	CO1,CO2, CO5
	<b>References Book</b>	<ol style="list-style-type: none"> <li>1. Herbert Schildt, "Java The complete reference  ", McGraw Hill Education, 8th Edition, 2011.</li> <li>2. Cay S. Horstmann, Gary Cornell, "Core Java Volume –I Fundamentals", Prentice Hall, 9th Edition,2013.</li> <li>3. Steven Holzner, "Java Black Book", Dreamtech.</li> <li>4. Balagurusamy E, " Programming in Java", McGraw Hill</li> <li>5. Naughton, Schildt, "The Complete reference java2", McGraw Hill</li> <li>6. Khalid Mughal, "A Programmer's Guide to Java SE 8 Oracle Certified Associate (OCA)", AddisonWesley.</li> </ol>	

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>
<b>Branch: Computer Application</b>		<b>Semester: IV</b>
1.	<b>Course Code</b>	11332 <b>Paper Code : 20117</b>
2.	<b>Course Title</b>	<b>Computer Networks</b>
3.	<b>Credits</b>	04
4.	<b>Contact Hours (L-T-P)</b>	2-2-2
	<b>Course Type</b>	Compulsory
5.	<b>Course Objective</b>	<ol style="list-style-type: none"> <li>1. Provide students with an overview of networking.</li> <li>2. Gain insight into the issues, challenges and work at all level of reference models</li> <li>3. Provide the students with practice on applying network design</li> <li>4. Enhance students communication and problem solving skills</li> </ol>
6.	<b>Course Outcomes</b>	<p>Students will be able to:</p> <p><b>CO1:</b>Demonstrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model</p> <p><b>CO2:</b>Investigate and explore fundamental issues driving network design including error control, IP addressing, access control, flow and congestion control</p> <p><b>CO3:</b>Have a basic knowledge of the use of cryptography and network security;</p> <p><b>CO4:</b>Understand and analyze working of various routing algorithms</p>
7.	<b>Course Description</b>	To familiarize with the basic taxonomy and terminology of computer networking area.
8.	<b>Outline syllabus</b>	<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Introduction</b>
	A	Introduction to computer networks, applications and uses, classification of Networks based on topologies, geographical distribution and communication techniques.
	B	<b>Reference models:</b> OSI model, TCP/IP model , Overview of Connecting devices (Hub, Repeaters, Switches, Bridges, Routers, Gateways)
	C	<b>Transmission Media:</b> wired , wireless, Multiplexing techniques-FDM, TDM
	D	<b>Data Link Layer :</b> Functions, Framing, Error Control- ,Error Detection codes(Parity Bit, CRC), Error correction codes (Hamming code)
	E	Flow Control- Stop and Wait Protocol, Sliding window – Go-back- N and Selective repeat(ARQ)
	<b>Unit 2</b>	<b>MAC- Sub layer</b>
	A	Protocols: ALOHA, CSMA, CSMA/CD protocols,
	B	Design issues , IPV4 addressing basics and Header format, CIDR, sub-netting and sub-masking
	C	Routing, optimality Principle Routing protocols-,
		CO1,CO2,CO4

		distance vector routing , link state routing	
	D	Congestion control-Leaky bucket , Token Bucket	CO1,CO2
	<b>Unit 3</b>	<b>Transport Layer</b>	
	A	Need of transport layer with its services, Quality of service, connection oriented and connection less	CO1,CO2
	B	Transmission Control Protocol and User Datagram Protocol (UDP): Segment structure and header format,	CO1,CO2
	C	<b>Application Layer</b> Domain Name System (DNS), HTTP, FTP, SMTP	CO1,CO2
	D	Network Security services, cryptography, Symmetric Asymmetric cryptographic algorithms	CO1,CO2,CO3
	References Book	<ol style="list-style-type: none"> <li>1. Andrew S. Tenebaum, "Computer Networks", 4<sup>th</sup> Edition, PHI</li> <li>2. Forouzan, B., "Communication Networks and Networking", TMH, Latest Edition</li> <li>3. William Stallings, "Data and Computer Communication" Macmillan Press</li> </ol>	

Department of Mathematical Science and Computer Application		Batch 2022-25
Program: BCA(H)		Current Academic Year:2022-23
Branch: Computer Application		Semester: IV
1	Course Code	Paper Code :
2	Course Title	Communication and Soft skill
3	Credits	4
4	Contact Hours (L-T-P)	2-2-2
	Course Type	Compulsory
5	Course Objective	The soft skills training provides strong practical orientation to the students and helps them in building and improving their skills in communication, the effective use of English, business correspondence, presentations, team building, leadership, time management, group discussions, interviews, and interpersonal skills. This training also helps students in career visioning and planning, effective resume writing and dealing with placement consultants and headhunters.
6	Course Outcomes	<p><b>CO1 : Communication Skills:</b> Components of effective communication, Types of Communication-Oral Communication Skills, Written, reading and body language, Handling of communication, Barriers of communication, listening tools &amp; Speaking tools, Non-Verbal communication and its importance, Public Speaking, Describe the applications of stacks and queues an, SWOT analysis, Self-Learning and Management, Motivation and image building techniques, Time Management, Telephone Etiquettes, Stress Management, Role Play</p> <p><b>CO2:</b> To learn the skill of presentation, how to prepare the presentation, knowing the audience and their requirements, effective ways to deliver the presentations, how to prepare the multimedia presentation Operations on them using arrays and linked lists.</p> <p><b>CO3:</b> Understand the nature of the organization, Structure and Communication channel of the organization, Clarity about the roles and responsibilities in an organization, how to be a team member, Leadership, how to draft reports.</p> <p><b>CO4:</b>Pronunciation, Functional Grammar, Reading Writing, Speaking, Spoken English</p> <p><b>CO5:</b> Discussions on current affairs, Job Description, Practice of making Resume or curriculum Vitae, Letters of application &amp; referencing to previous communication.</p>
7	Course Description	the Course students helps them in building and improving their skills in communication, the effective use of English, business correspondence, presentations, team building, leadership, time management, group discussions, interviews, and interpersonal skills. This training also helps students in career visioning and planning,

<b>8</b>	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Communication Skills and Personality Development</b>	
	<b>A</b>	Components of effective communication, Types of Communication- Oral Communication Skills, Written, reading and body language, Handling of communication, Barriers of communication, listening tools & Speaking tools, Non-Verbal communication and its importance, Public Speaking, Team Building, Art of Negotiation, SWOT analysis,	CO1
	<b>B</b>	Components of effective communication, Types of Communication- Oral Communication Skills, Written, reading and body language, Handling of communication, Barriers of communication, listening tools & Speaking tools, Non-Verbal communication and its importance, Public Speaking, Team Building, Art of Negotiation,	CO1
	<b>C</b>	Interviews and its types, Preparing for the interviews, Stages of Interview, Group Discussions, Do's and Don'ts in an interview. Mock Interview, Case studies on Interview sessions.	CO1
	<b>D</b>	Barriers of communication, listening tools & Speaking tools, Non-Verbal communication and its importance, Public Speaking, Team Building, Art of Negotiation.	CO1
	<b>E</b>	How to call the meeting, know how for Organizing Meetings in smooth manner, how to design agenda and prepare minutes for meetings.	CO1
	<b>F</b>	Self-Learning and Management, Motivation and image building techniques, Time Management, Telephone Etiquettes, Stress Management, Role Play	CO1
	<b>Unit 2</b>	<b>Presentation Skills and Organization skills</b>	
	<b>A</b>	Components of effective communication, Types of Communication-: To learn the skill of presentation, how to prepare the presentation, knowing the audience and their requirements Oral Communication Skills, Written, reading and body language.	CO1, CO2
	<b>B</b>	SWOT analysis, Self-Learning and Management, Motivation and image building techniques, Time Management, Telephone Etiquettes, Stress Management, Role Play effective ways to deliver the presentations, how to prepare the multimedia presentation.	CO1, CO2

<b>C</b>	Understand the nature of the organization, Structure and Communication channel of the organization	CO2
<b>D</b>	Clarity about the roles and responsibilities in an organization, how to be a team member, Leadership, how to draft reports.	CO2
<b>Unit 3</b>	<b>English Literacy &amp; Career Vision</b>	
<b>A</b>	Pronunciation, Functional Grammar, Reading Writing, Speaking, Spoken English	CO3
<b>B</b>	Discussions on current affairs, Job Description, Practice of making Resume or curriculum Vitae, Letters of application & referencing to previous communication.	CO3

	<b>Text book/s*</b>	<b>References:</b> <ol style="list-style-type: none"> <li>1. <b>Peggy Klaus</b>, The Hard Truth about Soft Skills.</li> <li>2. <b>Nitin Bhatnagar</b>. Effective Communication and Soft Skills. Pearson Education India.</li> <li>3. <b>Eric Garner</b>. Team Building.</li> <li>4. <b>Wendy Palmer and Janet Crawford</b>. Leadership Embodiment.</li> <li>5. <b>Prashant Sharma, Soft Skills</b>: Personality Development for Life Success BPB Publications, ISBN 978-93-91392-09-3</li> <li>6. <b>Barun K. Mitra</b>: Personality Development and Soft Skills by Oxford Publication</li> <li>7. <b>Jeff Butterfield</b>: Soft Skills for everyone by Cengage.</li> <li>8. <b>Renu Shorey</b>: Soft Skills for a Big Impact: Banish Self Doubt, Improve Workplace Ethics, Communication, and Relationship, Resolve Conflicts, Achieve Breakthrough Success(Hand Book on Soft Skills)</li> </ol>	
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Department of Mathematical Science and Computer Application		Batch 2022-25	
Program: BCA(H)		Current Academic Year:2022-23	
Branch: Computer Application		Semester: IV	
1	Course Code	11332	Paper Code :
2	Course Title	Physical Education and Yoga	
3	Credits	4	
4	Contact Hours (L-T-P)	2-2-2	
	Course Type	Compulsory	
5	Course Objective	<ol style="list-style-type: none"> <li>1. Demonstrate basic skills associated with yoga activities including strength and flexibility, balance and coordination.</li> <li>2. Demonstrate the ability to perform yoga movements in various combination and forms.</li> <li>3. Understand and apply the knowledge of basic sequencing, and effective group management.</li> <li>4. Demonstrate the ability to create and present various yoga sequences. Demonstrate an understanding of health-related fitness components.</li> </ol>	
6	Course Outcomes	<p><b>CO1:</b> Describe basic skills associated with yoga and Pilates.</p> <p><b>CO2:</b> Describe the ability to perform yoga movements in various combination and forms..</p> <p><b>CO3:</b> Understand and apply the knowledge of basic choreography, and effective group management.</p> <p><b>CO4:</b> Explain the ability to create and present various yoga activities</p> <p><b>CO5:</b> Identify opportunities for participation in yoga activities in the community</p>	
7	Course Description	Students will practice Yoga focusing on yoga for strength, flexibility, and relaxation. The class will also cover techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance. Breathing exercises and healthy fitness activities will also be taught.	
8	Outline syllabus		CO Mapping
	Unit 1	<b>Physical Education</b>	
	A	Meaning, Definition, Aim and Objective.	CO1
	B	Misconception About Physical Education	CO1
	C	Need, Importance and Scope of Physical Education in the Modern Society	C01
	D	Physical Education Relationship with General Education	CO1
	E	Physical Education in India before Independence. Physical Education in India after Independence	CO1
	Unit 2	<b>Concept of Fitness and Wellness</b> <b>Weight Management</b>	



	<b>Lifestyle</b>	
<b>A</b>	Meaning, Definition and Importance of Fitness and Wellness. Components of Fitness. Factor Affecting Fitness and Wellness	CO2
<b>B</b>	Meaning and Definition of Obesity. Causes of Obesity. Management of Obesity. Health problems due to Obesity	CO2
<b>C</b>	Meaning, Definition, Importance of Lifestyle. Factor affecting Lifestyle. Role of Physical activity in the maintains of Healthy Lifestyle.	CO2
<b>Unit 3</b>	<b>Yoga and Meditation</b>	
<b>A</b>	Historical aspect of yoga.	CO3
<b>B</b>	Definition, types scopes & importance of yoga.	CO3
<b>C</b>	Yoga relation with mental health and value education	CO3
<b>D</b>	Yoga relation with Physical Education and sports	CO4
<b>E</b>	Definition of Asana, differences between asana and physical exercise.	CO4
<b>F</b>	Definition and classification of pranayama. Difference between pranayama and deep breathing.	CO4
<b>Unit 4</b>	<b>Traditional Games of India Recreation in Physical Education</b>	
	Meaning. Types of Traditional Games-Gilli-Danda Kanche Stapu Gutte, etc.Importance/ Benefits of Traditional Games.How to Design Traditional Games.	CO5
	Meaning, Definition of Recreation.Scope and Importance of Recreation.General Principles of Recreation.Types of Recreational Activities.Aerobics and Zumba.( Fir India Movement)	CO5
<b>Mode of examination</b>	Theory	
<b>Text book/s*</b>	<b>Reference Books:</b> 1.Singh, Ajmer, Physical Education and Olympic Abhiyan, "Kalayani Publishers", New Delhi, Revised Addition, 2006 2.Patel, Shri krishna, Physical Education, "Agrawal Publishers", Agra, 2014-15 3.Panday, Preeti, Sharirik Shiksha Sankalan, " Khel Sanskriti Prakashan, Kanpur 4. Kamlesh M.L., "Physical Education, Facts and	

		<p>foundations”, Faridabad P.B. Publications.</p> <p>5. B.K.S. Yengar, "Light and Yog. Yoga Deepika", George Allen of Unwin Ltd., London,1981.6</p> <p>6. Braj Bilari Nigam, Yoga Power "The Kpath of Personal achievement" Domen and Publishers, New Delhi, 2001.</p> <p>7. Indira Devi, "Yoga for You", Gibbs, Smith Publishers, Salt Lake City, 2002 Domenand Publishers, New Delhi - 2001.</p> <p>8. Jack Peter, "Yoga Master the Yogic Powers", Abhishek Publications, Chandigarh, 2004. Janice Jerusalem, "A Guide To Yoga", Parragon Bath, Baiihe-2004.</p>	
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## Fifth Semester

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>
<b>Branch: Computer Application</b>		<b>Semester: V</b>
9.	<b>Course Code</b>	11332 <span style="float: right;"><b>Paper Code : 30111</b></span>
10.	<b>Course Title</b>	<b>Computer graphics &amp; Multimedia</b>
11.	<b>Credits</b>	04
12.	<b>Contact Hours (L-T-P)</b>	2-2-2
	<b>Course Type</b>	Compulsory
13.	<b>Course Objective</b>	This course is designed to provide a broad introduction to computer graphics and animation. A comprehensive introduction to graphics techniques, two-dimensional systems and mapping, important drawing algorithms, two-dimensional transformation, clipping, filling, and 3-D graphics. This course also provides students with the fundamental skills to build knowledge of multimedia and principles of multimedia.
14.	<b>Course Outcomes</b>	Students will be able to: <b>CO1:</b> Analyse and classify the components and building approaches of computer graphics systems. <b>CO2:</b> Illustrates the technology requirement for a computer graphics system. <b>CO3:</b> Design interactive computer graphics API programs. <b>CO4:</b> Apply in-depth knowledge of display systems, image synthesis, shape, modelling, and interactive control of 3D computer graphics applications. <b>CO5:</b> Formulate an understanding of mapping from a world coordinates to device coordinates, clipping, and projections. <b>CO6:</b> Discuss the application of computer graphics and multimedia concepts in the development of computer games, information visualization, and business applications.
15.	<b>Course Description</b>	Computer Graphics and multimedia is a study of the h/w and s/w principles of interactive raster graphics and multimedia techniques. Topics include an introduction to the basic concepts, 2-D and 3-D modelling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems.
16.	<b>Outline syllabus</b>	<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Graphic System Primitives</b>
	A	Definition, classification & Applications. Display devices, Input and Output Devices. <span style="float: right;">CO1, CO2</span>
	B	Output Primitives: Points and Lines, Pixels, Pixel addressing and Object Geometry, Planes, Frame buffers, vector and character generation <span style="float: right;">CO1, CO2</span>
	C	Line drawing: DDA and Brenham's algorithms and their comparison. Circle generation- Bresenham's and <span style="float: right;">CO1, CO3</span>

		mid-point circle Drawing algorithm.	
	D	Area filling algorithms: Boundary fill, flood fill algorithm, Scan line algorithm, Anti-aliasing techniques.	CO1,CO3
	<b>Unit 2</b>	<b>2D Transformations and Viewing Transformation:</b>	
	A	Basic Transformations, Composite Transformations. General Fixed-Point Scaling, Other Translations-Reflection, Shear.	CO3,CO4,CO5
	B	Window, Viewport, Window-To-Viewport Coordinate transformation,	CO4,CO6
	C	Clipping Operations: Point Clipping, Line Clipping: Cohen-Sutherland Line Clipping, Midpoint Subdivision Line Clipping Algorithm, and Cyrus Beck clipping. Polygon clipping: Sutherland Hodgeman algorithm.	CO5,CO6
	D	3-D transformation: Translation, Rotation, Scaling, Shearing, Reflecting. Composite Transformations, Rotation about an arbitrary line, Reflection through an arbitrary plane.	CO1,CO2
	E	Light sources, diffuse reflection, specular reflection, reflected light, intensity levels, Phong shading and Ground shading. Color models like RGB, CMY and HSV	CO1,CO2
	<b>Unit 3</b>	<b>Parallel Projections, Hidden surface Removal &amp; Multimedia</b>	
	A	Parallel Projections Orthographic Projections, Oblique Projections, , Perspective Projections, One Point, Two, Three Point vanishing points	CO1,CO2
	B	Back Face Detection, Depth Buffer Method, Depth Sorting Method (Painter's algorithm)	CO4,CO5, CO6
	C	Multimedia components, multimedia H/W, SCSI, IDE, MCI	CO1,CO2,CO3
	D	Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG.	CO1,CO2, CO6
	E	Multimedia tools, presentations tools, Authoring tools, presentations.	CO1, CO5,CO6
	<b>References Book</b>	<ol style="list-style-type: none"> <li>1. D.Hearn and M.P. Baker "Computer Graphics" (2nd ed), PHI.</li> <li>2. S. Harrington – "Computer Graphics - a Programming approach" (2nd ed) McGrawhill.</li> <li>3. Roger S. David "Procedural Elements for Computer Graphics", McGraw Hill.</li> <li>4. Tay Vaugham" Multimedia Making it Work" 5th Ed. 2001, Tata McGraw Hill.</li> <li>5. Drew, "Fundamentals of Multimedia", Pearsons</li> </ol>	

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>
<b>Branch: Computer Application</b>		<b>Semester: V</b>
9.	<b>Course Code</b>	11332 <b>Paper Code : 30113</b>
10.	<b>Course Title</b>	<b>Artificial Intelligence</b>
11.	<b>Credits</b>	04
12.	<b>Contact Hours (L-T-P)</b>	2-2-2
	<b>Course Type</b>	Compulsory
13.	<b>Course Objective</b>	<p>5. The objective of the course is to introduce basic fundamental concepts in</p> <p>6. Artificial Intelligence (AI), with a practical approach in understanding them. To</p> <p>7. visualize the scope of AI and its role in futuristic development.</p>
14.	<b>Course Outcomes</b>	<p>Students will be able to:</p> <p>CO1: Compare AI and non-AI solutions.</p> <p>CO2: Apply AI techniques in problem solving.</p> <p>CO3: Analyze the best search technique and implement it in real-life applications.</p> <p>CO4: Classify supervised and unsupervised learning and knowledge representation.</p> <p>CO5: To explore the scope of AI in various application domains.</p>
15.	<b>Course Description</b>	This course introduces basic aspects of Artificial intelligence comparing the AI and conventional solutions to real world problems, utilizing and analyze AI techniques for identifying optimal solutions to search strategies.
16.	<b>Outline syllabus</b>	<b>CO Mapping</b>
	<b>Unit 1</b>	<b>INTRODUCTION TO AI</b>
	A	Foundation of AI, Goals of AI, History and AI course line,
	B	Introduction to Intelligent Agents; Environment; Structure of Agent,
	C	AI Solutions Vs Conventional Solutions; a philosophical approach; a practical approach.
	D	Problem solving using Search Techniques; Problems; Solutions; Optimality,
	<b>Unit 2</b>	<b>PROBLEM SOLVING AGENTS</b>
	A	Informed Search Strategies; Greedy Best-First; A* Search; Heuristic Functions,
	B	Uninformed Search Strategies; BFS; DFS; DLS; UCS; IDFS; BDS. Local Search algorithms: Hill Climbing, genetic Algorithms.
	C	Knowledge-Based Agents; clause form, First-Order Logic; Syntax-Semantics in FOL;
		Representation revisited, ; Simple usage; Inference Procedure; Inference in FOL;

<b>Unit 3</b>	<b>KNOWLEDGE &amp; REASONING</b>	
A	Forward Chaining; Backward Chaining; Resolution	CO1,CO2
B	Common Sense Vs Learning; Components; Representations; Forms of learning, Feedback, Learning Types: Supervised; Unsupervised;	CO1,CO2
C	Reinforcement Learnings, Decision trees, Artificial Neural Networks: Introduction, types of networks; Single Layer and Multi-Layer n/w.	CO1,CO2, CO5
D	case studies on NLP, Image Processing;, Robotics – Hardware; Vision; Navigation based case studies, Water jug problem and similar case studies	CO1,CO2,CO3
References Book	<ol style="list-style-type: none"> <li>1. Russell S &amp; Norvig P, Artificial Intelligence: A Modern Approach, Prentice Hall.</li> <li>2. Rich E&amp; Knight K, Artificial Intelligence, Tata McGraw Hill, Edition 3.</li> <li>3. Dan W. Patterson, Artificial Intelligence &amp; Expert Systems, Pearson Education with Prentice Hall India. Indian Edition.</li> </ol>	

## Six Semester

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>	
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>	
<b>Branch: Computer Application</b>		<b>Semester: VI</b>	
17.	<b>Course Code</b>	11332	<b>Paper Code : 30117</b>
18.	<b>Course Title</b>	<b>Machine Learning</b>	
19.	<b>Credits</b>	04	
20.	<b>Contact Hours (L-T-P)</b>	2-2-2	
	<b>Course Type</b>	Compulsory	
21.	<b>Course Objective</b>	This course provides an introduction to machine learning and statistical pattern recognition in a way to solve the problem in real-time	
22.	<b>Course Outcomes</b>	After completion of this course, student will be able to:- CO1: Understand learning problems and Identify fundamental problems in machine learning. CO2: Conceptualize various algorithms for machine learning. CO3: Select and Apply appropriate tools for developing solutions for real world problems using machine learning algorithms. CO4: Create and Evaluate hypothesis for problems and to implement solutions for them	
23.	<b>Course Description</b>	Introduction and concept of learning task, Decision Tree and Artificial Neural Networks, Evaluating hypothesis and Bayesian learning, Computational Learning Theory and Instance Based Learning , Genetic Algorithms and Reinforcement Learning	
24.	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>INTRODUCTION</b>	
	A	Learning, Types of Learning, Well defined learning problems, Designing a Learning System, History of ML,	CO1, CO2
	B	Machine Learning Approaches – (ANN, Clustering, Reinforcement Learning, Decision Tree Learning, Bayesian networks, SVM, Genetic Algorithm), Issues in Machine Learning and Data Science Vs Machine Learning;	CO1, CO2
	C	Linear Regression and Logistic Regression. Bayes theorem, Concept learning, Bayes Optimal Classifier, Naïve Bayes classifier, Bayesian belief networks, EM algorithm	CO1, CO3
	<b>Unit 2</b>	<b>SUPPORT VECTOR MACHINE</b>	
		Introduction, Types of support vector kernel – (Linear kernel, polynomial kernel, and Gaussian kernel), Hyperplane – (Decision surface), Properties of SVM, and Issues in SVM.	CO1, CO3
	A	Decision tree learning algorithm, Inductive bias, Inductive inference with decision trees, Entropy and information theory, Information gain, ID-3 Algorithm, Issues in Decision tree learning.	CO3, CO4
	B	<b>INSTANCE-BASED LEARNING</b> – k-Nearest Neighbour Learning, Locally Weighted Regression, Radial basis function networks, Case-based learning	CO4, CO3
	C	<b>ARTIFICIAL NEURAL NETWORKS</b> – Perceptron's, Multilayer	CO3, CO4

		perceptron, Gradient descent and the Delta rule, Multilayer networks, Derivation of Backpropagation Algorithm, Generalization, Unsupervised Learning – SOM Algorithm and its variant;	
	<b>Unit 3</b>	<b>DEEP LEARNING</b>	
	A	Introduction,concept of convolutional neural network , Types of layers – (Convolutional Layers , Activation function , pooling , fully connected)	CO1,CO2
	B	Concept of Convolution (1D and 2D) layers, Training of network, Case study of CNN for eg on Diabetic Retinopathy, Building a smart speaker, Self-driving car etc.	CO4,
	C	Introduction to Reinforcement Learning , Learning Task,Example of Reinforcement Learning in Practice, Learning Models for Reinforcement – (Markov Decision process , Q Learning - Q Learning function, Q Learning Algorithm), Application of Reinforcement Learning, Introduction to Deep Q Learning.	CO1,CO2,C O3
	D	GENETIC ALGORITHMS: Introduction, Components, GA cycle of reproduction, Crossover, Mutation, Genetic Programming, Models of Evolution and Learning, Applications.	CO1,CO2
	<b>References Book</b>	<ol style="list-style-type: none"> <li>1. Tom M. Mitchell, —Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.</li> <li>2. Ethem Alpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), MIT Press 2004.</li> <li>3. Stephen Marsland, —Machine Learning: An Algorithmic Perspective, CRC Press, 2009.</li> <li>4. Bishop, C., Pattern Recognition and Machine Learning. Berlin: Springer-Verlag.</li> <li>5. M. Gopal, “Applied Machine Learning”, McGraw Hill Education</li> </ol>	



<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>	
<b>Program: BCA(H)</b>		<b>Current Academic Year:2022-23</b>	
<b>Branch: Computer Application</b>		<b>Semester: VI</b>	
1.	<b>Course Code</b>	11332	<b>Paper Code : 30118</b>
2.	<b>Course Title</b>	<b>Cryptography and Network Security</b>	
3.	<b>Credits</b>	04	
4.	<b>Contact Hours (L-T-P)</b>	2-2-2	
	<b>Course Type</b>	Compulsory	
5.	<b>Course Objective</b>	To have a good understanding of how applications can communicate securely and what tools and protocols exist in order to offer different levels of security.	
6.	<b>Course Outcomes</b>	On successful completion of this module students will be able to <b>CO1:</b> Illustrate network security services and mechanisms. <b>CO2:</b> Evaluate Symmetrical and Asymmetrical cryptography. <b>CO3:</b> Apply Data integrity, Authentication, Digital Signatures. <b>CO4:</b> Analyze various network security applications, IPSec, Firewall, IDS, Web security, Email security, and malicious software etc. <b>CO5:</b> Demonstrate various factors which affect the security of network <b>CO6:</b> Estimate the measure adapted towards network security	
7.	<b>Course Description</b>	This course introduces aspects of cyber security, encompassing the principles, to analyze the data, identify the problems, and choose the relevant countermeasures to apply.	
8.	<b>Outline syllabus</b>		<b>CO Mapping</b>
	<b>Unit 1</b>	<b>Security in Computing Environment and Cryptography</b>	
	A	Need for Security, Security Attack, Security Services, Information Security, Methods of Protection	CO1, CO2
	B	Terminologies used in Cryptography, Substitution Techniques, Transposition Techniques.	CO3, CO5, CO6,
	C	Cryptanalysis, Steganography, Stream and block ciphers. Shannon's theory of confusion and diffusion	CO1, CO2
	D	Encryption: Data Encryption Standard (DES) Algorithm, Double and Triple DES, Security of the DES, Advanced Encryption Standard (AES) Algorithm, DES and AES Comparison	CO2, CO6, CO4
	<b>Unit 2</b>	<b>Security</b>	
	A	Characteristics of Public Key System, RSA Technique, Key Exchange, Diffie-Hellman Scheme,	CO1, CO2, CO3
		Cryptographic Hash Functions: MD5 Message Digest Algorithm, Secure hash algorithm (SHA), Secure Hash Algorithm (SHA-1), Digital Signature.	CO1,CO6, CO3, CO4
	B	Kerberos, X.509 Authentication Service, X.509 Certificates, Revocation of X.509 Certificates. Electronic mail security: pretty good privacy (PGP), S/MIME	CO3,CO4,CO6, CO5
	C	IP Security: Architecture, Authentication header (AH), Encapsulating security payloads (ESP), Key management.	CO2,CO4,CO6
	<b>Unit 3</b>	<b>Authentication Applications:</b>	

	A	Web Security Requirements, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction (SET)	CO1,CO3,CO5
	B	System Security: Introductory idea of Intrusion, Intrusion detection.	CO1,CO2, CO6
	C	Viruses and related threats.	CO1,CO2, CO6
	D	Firewalls – Types, Comparison of Firewall Types, Firewall Configurations.	CO1,CO2, CO6, CO5
	References Book	<ol style="list-style-type: none"> <li>1. J. SEBERRY AND J. PIEPRZYK, Cryptography: An Introduction to Computer Security, Prentice-Hall, Upper Saddle River, New Jersey, 1989.</li> <li>2. William Stallings, "Cryptography and Network Security", Second edition, Prentice Hall, 1999.</li> <li>3. Atul Kahate, "Cryptography and Network Security," TMH</li> <li>4. William Stallings, "Cryptography and Network Security", Third Edition, Pearson Ed</li> <li>5. Introduction to network security, Krawetz, Cengage</li> <li>6. John E. Canavan, " The Fundamentals of Network Security," Artech House, February 2001, 350 pages</li> </ol>	

<b>Department of Mathematical Science and Computer Application</b>		<b>Batch 2022-25</b>
<b>Program: BCA(H)</b>	<b>Current Academic Year:2022-23</b>	
<b>Branch: Computer Application</b>	<b>Semester: VI</b>	
<b>1</b>	<b>Course Code</b>	<b>Paper Code :</b>
<b>2</b>	<b>Course Title</b>	<b>Communication Skills And Personality Development</b>
<b>3</b>	<b>Credits</b>	4
<b>4</b>	<b>Contact Hours(L- T-P)</b>	2-2-2
	<b>Course Type</b>	Compulsory
<b>5</b>	<b>Cour se Objec tive</b>	<ol style="list-style-type: none"> <li>1. The objective of the course is to present an introduction to communication skill and personality development.</li> <li>2. The program comprises several short courses, each focusing on a specific personality development knowledge or skill requirement such as creative thinking, communication, risk taking, and resilience and helping them become career ready, whether it is communication skill.</li> <li>3. To learn to manage oneself while communicating and acquiring good communication skill and personality development</li> </ol>
<b>6</b>	<b>Cours e Outco mes</b>	<p><b>CO1:</b> Describe the features of a personality development Meaning and concept of personality development</p> <p><b>CO2:</b> determinants of personality and describe the dress for success and art of accessorizing</p> <p><b>CO3:</b> Meaning and types of interview and interview procedure describing resume writing. Meaning and method of group discussion.</p> <p><b>CO4:</b> concepts of human behavior and individual and group behavior. Dimensions of body language</p> <p><b>CO5:</b> what is social media etiquette? Describe virtual meeting etiquette and business etiquette and body language.</p>
<b>7</b>	<b>Course Descrip tion</b>	<ul style="list-style-type: none"> <li>• To understand the personality and learn what personal grooming pertains.</li> <li>• To learn to make good resume and prepare effectively for interview</li> <li>• To explore communication beyond language</li> <li>• To acquire good communication skill and develop confidence.</li> </ul>
<b>8</b>	<b>Outline syllabus</b>	<b>CO Mapping</b>

<b>Unit 1</b>	<b>Personality and personal grooming</b>	
<b>A</b>	<ul style="list-style-type: none"> <li>• Meaning and concept of Personality and personal grooming</li> <li>• Types of personality</li> <li>• Determinants of personality</li> <li>• Assessment of personality</li> </ul>	CO1
<b>B</b>	<ul style="list-style-type: none"> <li>• Grooming Self</li> <li>• Dress of success</li> <li>• Makeup and skin care</li> <li>• Hair care and styles for formal look</li> <li>• Art of accessorizing</li> <li>• Oral hygiene</li> </ul>	CO1
<b>Unit 2</b>	<b>Interview preparation and group discussion</b>	
<b>A</b>	<b>Meaning and types of interview</b>	<b>CO2</b>
<b>B</b>	<b>Interview procedure [opening, listening, closure]</b>	<b>CO2</b>
<b>C</b>	<b>Preparation of interview and resume writing</b>	<b>CO2</b>
<b>D</b>	<b>LinkedIn etiquette</b>	<b>CO2</b>
<b>E</b>	<b>Meaning and methods of group discussion</b>	<b>CO2</b>
<b>Unit 3</b>	<b>Body language and behavior</b>	
<b>A</b>	<b>Concept of human behavior, individual and group behavior</b>	<b>CO3</b>
<b>B</b>	<b>Developing self awareness and behavior and body language</b>	<b>CO3</b>
<b>C</b>	<b>Concurrency Control, Transaction processing, locking techniques</b>	<b>CO3</b>
<b>Unit4</b>	<b>Art of good communication</b>	
<b>A</b>	<b>Types of communication assertive , aggressive passive aggressive</b>	<b>CO4</b>
<b>B</b>	<b>Listening skills art of small talk and email writing</b>	<b>CO4</b>

Mode of examination	<b>Theory and Practical</b>	
Text book/s*	<b>Reference Books:</b> <b>1. Cloninger,S.C . Theory of personality : pearson”</b> <b>2. Personality Development and Soft Skills BY BARUN MITRA</b> <b>3. Communication Skills and Personality Development</b> <b>BY J.R. Kadam, V.G. Patil, S.A. Dhenge</b>	