

2. BCA-CySe Semester-I Syllabus

BCA-CySe Semester-I (First Year)

Subject Title : Programming Fundamentals
Subject Code : CAM211-1C
Subject Type : Major

Rationale:

This syllabus introduces students to the fundamentals of programming using C, including basic syntax, data types, operators, and control structures. It emphasizes practical skills through hands-on exercises with arrays, strings, math functions, and user-defined functions. Advanced topics like structures and unions prepare students to organize and manage complex data efficiently in real-world applications.

Learning Outcomes:

After completing this course, students will be able to:

- Understand and explain the structure of a C program, compiler, interpreter, and assembler.
- Apply variables, constants, operators, and expressions in solving programming problems.
- Use decision-making statements and loops to control program flow.
- Implement arrays, strings, and standard math functions for data manipulation.
- Write and invoke user-defined functions for modular programming.
- Define and use structures and unions to organize and manage complex data effectively.

Teaching and Evaluation Scheme:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
4	30	60	50	50	100

Course Content:

Unit I [Weightage=25% approx., Lectures=7, Practicals=14]

Basics of Programming: Programming concepts and problem solving using computers, steps of problem solving, definition and characteristics of an algorithm, algorithms for basic problems, flowcharts, flowcharts Standard symbols and rules, flowchart example.

Overview of C: Introduction to C language, structure of a simple C program, compilation and execution process, Role of compiler and linker.

C Tokens: keywords, identifiers, constants and variables, Data type, types of data type, Basic data types.

Unit II [Weightage=25% approx., Lectures=8, Practicals=16]

Basic input and output functions: printf(), scanf(), getchar(), putchar(), clrscr(), gets(), puts(), getch().

Operators: arithmetic, relational, logical, assignment, increment and decrement operators. Expressions and simple type casting.

Decision making statements: if, if-else, switch case statements, ternary operator.

Looping statements: while loop, do while loop, for loop, break and continue, nested loop.

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Unit III

[Weightage=25% approx., Lectures=7, Practicals=14]

Arrays: Concept, types of array one-dimensional, two-dimensional array, arrays and basic operations, application, String operation.

Functions: Concept, types of Function: Inbuilt and User Defined Functions, declaration of function, definition of function, calling of function, nested calling of function, inbuilt mathematical function, inbuilt string function.

Unit IV

[Weightage=25% approx., Lectures=8, Practicals=16]

Structures: definition, declaration and initialization, accessing structure members, nested structure.

Union: definition, declaration and accessing union members, differentiate structure and union.

Introduction to file handling: basic concepts, simple reading and writing operations. Basic of pointers.

Text Book:

Programming in ANSI C, E Balagurusamy, 9th edition, McGraw Hill.

Reference Books:

- Let us C, Yashavant Kanetkar, 20th Edition, BPB publication.
- Programming in C, by Pradip Dey & Manas Ghosh, Publisher–Oxford.
- The Complete Reference, Herbert schildt Fourth Edition.
- Programming in C, by Reenathareja Publisher–Oxford.

Reference Links:

- <https://www.w3schools.com/c/>
- <https://www.tutorialspoint.com/cprogramming/>
- <https://www.geeksforgeeks.org/c/c-programming-language/>

Practical List:

- Write a C program to print “Hello World” and demonstrate the structure of a C program.
- Write a C program to demonstrate use of variables and constants and display their values.
- Write a C program to perform basic arithmetic operations (addition, subtraction, multiplication, division) using operators.
- Write a C program to demonstrate relational and logical operators.
- Write a C program to find the largest of two numbers using if statement.
- Write a C program to find the largest of three numbers using if-else or else-if ladder.
- Write a C program to check whether a given number is even or odd using if-else.
- Write a C program to implement a menu-driven calculator using switch-case.
- Write a C program to generate the multiplication table of a given number using for loop.
- Write a C program to find the factorial of a number using while or for loop.
- Write a C program to check whether a given number is a prime number.
- Write a C program to generate the Fibonacci series up to n terms using loops.
- Write a C program to read and display elements of a one-dimensional array.
- Write a C program to find the sum and average of array elements.
- Write a C program to read and display a two-dimensional matrix.
- Write a C program to perform string operations such as length, copy, and comparison using library functions.

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- Write a C program to check whether a given string is a palindrome.
- Write a C program to draw a right-angled triangle pattern using * with for loop.
- Write a C program to draw a pyramid/triangle pattern using * with for loop.
- Write a C program to define a structure for student information (roll number, name, marks) and display the details.
- Write a C program to demonstrate the difference between structure and union using a simple example.
- Write a C programs of Structure.
- Write a C program of pointer program.
- Write a C program of pointer to access memory location using array.
- Write a C program of buffer overflow problem.
- Write a C program of file read and write with different mode.


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**Faculty of Computer Science
Kadi Sarva Vishwavidyalaya
Gandhinagar**

BCA-CySe Semester-I (First Year)

Subject Title : Programming Fundamentals

Subject Code : CAM211-1C

Subject Type : Major

Course Outcomes (COs)

- **CO1:** Understand programming fundamentals, algorithms, flowcharts, and structure of C programs.
- **CO2:** Apply data types, variables, constants, operators, and expressions to solve problems.
- **CO3:** Implement decision-making and looping constructs for program control.
- **CO4:** Develop programs using arrays and strings for data handling.
- **CO5:** Design modular programs using user-defined and inbuilt functions and present solutions effectively.
- **CO6:** Analyze and implement structures, unions, pointers, and file handling with basic secure coding practices.

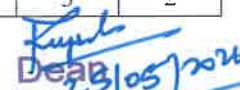
Course Outcome Mapping Table

CO No.	Course Outcome (CO)	PO(s)/PSO(s)	CL Cognitive Level	KC Knowledge Category	Class Sessions	Practical Sessions
CO1	Understand programming fundamentals, algorithms, flowcharts, and structure of C programs.	PO1, PO2, PO5, PSO2	U	C	5	10
CO2	Apply data types, variables, constants, operators, and expressions to solve problems.	PO1, PO2, PO3, PSO2	Ap	P	5	10
CO3	Implement decision-making and looping constructs for program control.	PO2, PO3, PO7, PSO2	Ap	P	5	10
CO4	Develop programs using arrays and strings for data handling.	PO2, PO3, PO4, PO7, PSO2	Ap	P	5	10
CO5	Design modular programs using user-defined and inbuilt functions and present solutions effectively.	PO2, PO3, PO6, PO9, PSO2	An	P	5	10
CO6	Analyze and implement structures, unions, pointers, and file handling with basic secure coding practices.	PO1, PO2, PO3, PO7, PO8, PO9, PO10, PSO1, PSO2, PSO3	An	P	5	10
Total hour of Instruction					30	60

Mapping of COs with POs & PSO

COs \ POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	2	0	0	1	0	0	0	0	0	0	3	0
CO2	2	2	3	0	0	0	0	0	0	0	0	3	0
CO3	0	2	3	0	0	0	2	0	0	0	0	3	0
CO4	0	2	3	2	0	0	2	0	0	0	0	3	0
CO5	0	2	3	0	0	2	0	0	2	0	0	3	0
CO6	2	2	3	0	0	0	2	2	2	2	3	3	2

3: High, 2: Medium, 1: Low


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BCA-CySe Semester-I (First Year)

Subject Title : Cyber Security Basics

Subject Code : CAM213-1C

Subject Type : Major

Rationale:

This course is designed to build a strong foundational understanding of Cyber Security principles, ethical hacking practices, identity and access management, and modern security technologies.

Learning Outcomes:

The students will be able to:

- Understand core security principles (CIA Triad) and governance frameworks.
- Analyze ethical, legal, and social implications of Cyber Security.
- Identify and mitigate Cyber Threats, vulnerabilities, and attacks.
- Apply authentication, authorization, and access control mechanisms.
- Gain exposure to real-world Cyber Security technologies and architectures.

Teaching and Evaluation Scheme:

Credits	Duration in Hours		Maximum Marks		Total
	Theory	Practical	CCE (Formative)	SEE (Summative)	
4	60	-	50	50	100

Course Content:

Unit I

[Weightage=25% approx., Lectures=15]

Fundamentals of Cybersecurity: Introduction to Cybersecurity: Need, scope, and importance in modern digital systems, Security Architecture: CIA Triad (Confidentiality, Integrity, Availability), Security Governance: Policies, standards, and organizational security practices, Security Auditing: Concepts, objectives, and types of audits, Regulations & Frameworks: Overview of Cybersecurity laws and standards.

Ethical Hacking: Concept, objectives, and legal considerations, Types of Hackers: White hat, black hat, grey hat, script kiddies, insiders, Phases of Ethical Hacking: Reconnaissance, scanning, gaining access, maintaining access, covering tracks, Penetration Testing: Concept and methodology, Types of Penetration Testing: Black-box, white-box, grey-box testing.

Unit II

[Weightage=25% approx., Lectures=15]

Cyber Ethics: Ethics v/s Law: Key differences and interrelationship, Ethical Issues in Cybersecurity: Privacy, data misuse, intellectual property, Cyberbullying: Definition, types, warning signs, and impact, Legal Aspects: Applicable Cybersecurity laws and regulations.

Cyber Threats v/s Vulnerabilities: Definitions and differentiation, Types of Cyber Threats: Phishing, ransomware, DDoS, social engineering, Emerging Cyber Threats: Analysis of current and evolving threats, Malware: Types (virus, worm, trojan, spyware, ransomware) and working, Malware Protection Techniques: Antivirus, firewalls, safe practices, Attackers & Motivations:

Hacktivists, cybercriminals, nation-state actors, Vulnerabilities: Characteristics and identification, Prevention & Protection Strategies: Risk mitigation and awareness practices.

Unit III

[Weightage=25% approx., Lectures=15]

Identity and Access Management: Introduction to Identity and Access Management, concepts and importance, Authentication vs Authorization: Definitions and differences, Authentication Mechanisms: Passwords, biometrics, multi-factor authentication, Authorization Principles: Role-based and attribute-based access control.

Access Regulation & Administration: User provisioning, privilege management, Password Security: Policies, encryption, and best practices, Identity Theft: Concept, methods, and prevention techniques, Access Control Models: DAC, MAC, RBAC (basic overview)

Unit IV

[Weightage=25% approx., Lectures=15]

Cybersecurity Technologies & Applications: Web Application Architecture: Client-server model, security risks (e.g., XSS, SQL injection), Android Application Architecture: Components and security concerns, Network Technologies: Wi-Fi Security (WPA, WPA2, WPA3 basics), Bluetooth Security risks and protections, Network Security Tools: Firewalls (Traditional & Next-Generation Firewalls), IDS (Intrusion Detection System) & IPS (Intrusion Prevention System), Network Design Concepts: DMZ (Demilitarized Zone), VPN (Virtual Private Network).

Introduction to Cryptography: Encryption, decryption, symmetric & asymmetric keys, Embedded & Chip Security: Basics of hardware-level security, Automobile (Vehicle) Hacking: Overview of threats in modern smart vehicles.

Text Book:

Cyber Security Essentials – James Graham, Richard Howard, Ryan Olson.

Reference Books:

- CEH Certified Ethical Hacker All-in-One Exam Guide – Matt Walker.
- Computer Security Principles and Practice – William Stallings.
- Network Security Essentials – William Stallings.
- The Web Application Hacker's Handbook – Dafydd Stuttard, Marcus Pinto.

Reference Links:

- <https://www.cisa.gov>
- <https://www.nist.gov/cyberframework>
- <https://www.eccouncil.org>
- <https://owasp.org>


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BCA-CySe Semester-I (First Year)

Subject Title : Cyber Security Basics

Subject Code : CAM213-1C

Subject Type : Major

Course Outcomes (COs)

- **CO1:** Explain fundamental concepts of Cybersecurity, security architecture (CIA triad), governance, auditing, and regulations.
- **CO2:** Describe ethical hacking concepts, types of hackers, phases of hacking, and penetration testing methodologies.
- **CO3:** Analyze cyber ethics, legal issues, cyber threats, vulnerabilities, and malware to propose suitable protection strategies.
- **CO4:** Apply Identity and Access Management techniques including authentication, authorization, and access control models for secure systems.
- **CO5:** Evaluate Cybersecurity technologies such as firewalls, IDS/IPS, VPN, and cryptographic mechanisms in securing systems.
- **CO6:** Analyze modern application and network security architectures including web, mobile, wireless, and emerging threats like automobile hacking.

Course Outcome Mapping Table

CO No.	Course Outcome (CO)	PO(s)/ PSO(s)	CL Cognitive Level	KC Knowledge Category	Class Sessions	Practical Sessions
CO1	Explain fundamental concepts of Cyber Security, security architecture (CIA triad), governance, auditing, and regulations.	PO1, PO2, PO8, PSO1	U	C	10	0
CO2	Describe ethical hacking concepts, types of hackers, phases of hacking, and penetration testing methodologies.	PO1, PO2, PO3, PSO1, PSO2	U	C	10	0
CO3	Analyze cyber ethics, legal issues, cyber threats, vulnerabilities, and malware to propose suitable protection strategies.	PO2, PO5, PO8, PSO1, PSO2	An	P	10	0
CO4	Apply Identity and Access Management techniques including authentication, authorization, and access control models for secure systems.	PO2, PO3, PO7, PSO1, PSO2	Ap	P	10	0
CO5	Evaluate Cyber Security technologies such as firewalls, IDS/IPS, VPN, and cryptographic mechanisms in securing systems.	PO1, PO2, PO3, PO7, PO9, PSO1, PSO2	E	P	10	0
CO6	Analyze modern application and network security architectures including web, mobile, wireless, and emerging threats like automobile hacking.	PO1, PO2, PO3, PO7, PO8, PO9, PSO1, PSO2, PSO3	An	P	10	0
Total hour of Instruction					60	00


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Mapping of COs with POs & PSO

COs \ POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	0	0	0	0	0	3	0	0	3	0	0
CO2	3	3	2	0	0	0	0	0	0	0	3	3	0
CO3	0	3	0	0	2	0	0	3	0	0	3	3	0
CO4	0	3	2	0	0	0	3	0	0	0	3	3	0
CO5	3	3	2	0	0	0	3	0	2	0	3	3	0
CO6	3	3	2	0	0	0	3	3	2	0	3	3	2

3: High, 2: Medium, 1: Low

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BCA-CySe Semester-I (First Year)

Subject Title : Web Applications Technologies
Subject Code : CAE204-1C
Subject Type : Minor

Rationale:

This course introduces students to the fundamentals of Internet technologies and web development. It aims to develop basic skills in designing and styling web pages using HTML, CSS and JavaScript forming a foundation for advanced web technologies.

Learning Outcomes:

After completing this course, students will be able to:

- Remember & Understand basic concepts of Internet, WWW, web browsers, servers, and URLs.
- Apply HTML tags to create structured web pages with text, lists, tables, forms, and multimedia.
- Apply CSS and CSS3 to style web pages using colors, fonts, layouts, and backgrounds.
- Analyze webpage layouts using CSS box model, positioning, and visibility properties.
- Create simple, visually appealing, and responsive web pages using HTML, CSS and JavaScript

Teaching and Evaluation Scheme:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
4	30	60	50	50	100

Course Content:

Unit I [Weightage=25% approx., Lectures=7, Practicals= 14]

Introduction to Web Design, Types of Websites (Static and Dynamic Websites), Basic Structure of a Web Page, Introduction to Web Page Layout (Header, Footer, Navigation, Content), Principles of Good Web Design (Simple design, readability, user-friendly interface), Introduction to Responsive Design (concept only), Basic idea of Client Side and Server Side, Overview of Web Development Tools (Text Editor, Browser, Simple Developer Tools).

Unit II [Weightage=25% approx., Lectures=7, Practicals= 14]

HTML: Introduction to HTML, HTML Documents Structure tags, text formatting tags (Block Formatting, Character Formatting), Font Tag, Marquee Tag, Anchor Tag for linking the webpages, List Tag, Image, Audio and Video Tag, BG SOUND Tag., Div Tag HTML Tables – Operations, Spanning on rows and columns, HTML Forms: input, text area, selection list, fields.

Unit III [Weightage=25% approx., Lectures=8, Practicals= 16]

Introduction to Cascading Style Sheet (CSS): Overview, Need of CSS, CSS Syntax, CSS Inclusion, CSS Measurement units, CSS Colors, CSS Background, CSS Font and Text, CSS –

working with images, CSS Links, CSS Tables and Borders, CSS Margins, CSS List, CSS Padding, CSS Scrollbar, ID and Class Selector, Inline, Internal and External stylesheet.

Unit IV

[Weightage=25% approx., Lectures=8, Practicals= 16]

Introduction to Java Script: Introduction to JavaScript, purpose of JavaScript in web pages, difference between HTML, CSS and JavaScript, basic JavaScript syntax, variables and simple data types, inclusion of JavaScript in HTML-inline , internal and external script, display of output-alert() and document.write(), basic conditional statement-if, introduction to events-onclick, introduction to Document Object Model (DOM), access of HTML elements-getElementById(), UDF-Dynamic changes of text content.

Text Books:

- Introduction to Internet and HTML Scripting by Bhaumik Shroff, Books India Pvt. Ltd.
- JavaScript and JQuery: Interactive Front-End Web Development by Jon Duckett , Wiley India.

Reference Book:

Web Technology and design-C Xavier, New Age International publication.

Reference Links:

- www.w3schools.com.
- www.tutorialspoint.com.

Practical List:

- Programs demonstrating the structure of HTML.
- Programs with the use of different basic tags and formatting tags.
- Programs based on link, list tag, images, audio-video tag and marquee tag.
- Programs based on the table using TD, TR, TH, colspan and rowspan.
- Programs based on creating the inline frame, frame set, horizontal and vertical frameset.
- Programs based on HTML forms.
- Programs based on Cascading Style Sheet Basics using Inline, Internal style sheet with different selectors (element, ID and class).
- Programs based on External Style Sheet with using Link tag.
- Programs based on CSS Elements (measurement units, colors, background, font and text, images, links, tables, borders, list, padding and scrollbar).
- Programs based on CSS3 using Visibility, Positioning, Text effects, Rounded Corner, Border Image, Multi-background, Layouts and printing, Layers, Pseudo Classes, Type, Aural Media.
- Programs based on CSS3 with the use of color, gradients, shadows, text, 2D and 3D Transform, Multi-columns, Box sizing and User Interface.
- Create a simple HTML page with JavaScript code to display a welcome message using alert().
- Design a webpage to display text on the browser window using document.write().
- Create a webpage to demonstrate declaration of variables and display their values.
- Design a webpage to demonstrate a basic conditional statement using if.
- Create a webpage to perform a simple action on button click using the onclick event.
- Design a webpage to change text content of an HTML element using getElementById().
- Create a webpage that changes text content dynamically using a user-defined JavaScript function.

BCA-CySe Semester-I (First Year)

Subject Title : Web Applications Technologies

Subject Code : CAE204-1C

Subject Type : Minor

Course Outcomes (COs)

- **CO1:** Understand Internet concepts and web technologies.
- **CO2:** Apply HTML to design structured web pages.
- **CO3:** Apply CSS/CSS3 for styling and layout design.
- **CO4:** Analyze webpage layouts using CSS properties.
- **CO5:** Develop interactive web pages using JavaScript and DOM.
- **CO6:** Design responsive and user-friendly web applications with basic security awareness.

Course Outcome Mapping Table

CO No.	Course Outcome (CO)	PO(s)/ PSO(s)	CL Cognitive Level	KC Knowledge Category	Class Sessions	Practical Sessions
CO1	Understand Internet concepts and web technologies.	PO1, PO2, PO5, PSO2	U	C	5	10
CO2	Apply HTML to design structured web pages.	PO2, PO3, PO4, PSO2	Ap	P	5	10
CO3	Apply CSS/CSS3 for styling and layout design.	PO2, PO3, PO4, PO7, PSO2	Ap	P	5	10
CO4	Analyze webpage layouts using CSS properties.	PO2, PO3, PO5, PSO2	An	P	5	10
CO5	Develop interactive web pages using JavaScript and DOM.	PO2, PO3, PO7, PO9, PSO2	Ap	P	5	10
CO6	Design responsive and user-friendly web applications with basic security awareness.	PO1, PO2, PO6, PO7, PO8, PO10, PSO1, PSO2, PSO3	An	P	5	10
Total hour of Instruction					30	60

Mapping of COs with POs & PSO

COs \ POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	0	0	1	0	0	0	0	0	0	3	0
CO2	0	2	3	2	0	0	0	0	0	0	0	3	0
CO3	0	2	3	2	0	0	2	0	0	0	0	3	0
CO4	0	2	3	0	1	0	0	0	0	0	0	3	0
CO5	0	2	3	0	0	0	2	0	2	0	0	3	0
CO6	3	2	0	0	0	2	2	2	0	2	2	3	2

3: High, 2: Medium, 1: Low

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BCA-CySe Semester-I (First Year)

Subject Title : Mathematics for Computer Science
Subject Code : MDC201-1C
Subject Type : MDC

Rationale:

To enhance logic by using basic concepts of mathematics such as Set-Theory, Matrix Operation. Graph, Functions.

Learning Outcomes:

The student will be able to:

- Develop analytical and problem solving skills.
- Compare the relevance between the introduced terminology and abstract ideas.
- Understand the practical applications of mathematics in solving problems of commerce, management, engineering & economics.

Teaching and Evaluation Scheme:

Credits	Duration in Hours		Maximum Marks		Total
	Theory	Practical	CCE (Formative)	SEE (Summative)	
4	60	-	50	50	100

Course Content:

Unit I

[Weightage=25% approx. , Lectures=15]

Set Theory: Introduction, Definition and Concepts, Representation of Sets, Different types of Sets (Null Set, Singleton set, Finite set, Infinite set, Power set, Subset, Universal set, Equal set), Set Operations using Venn diagram and examples : Union, Intersection, Difference, Symmetric Difference, Complement of Set, Laws of algebra of Set(Distributive, D' Morgan's), Cartesian Product of Set, Cardinality of Set.

Unit II

[Weightage=25% approx. , Lectures=15]

Matrices: Introduction, Types of Matrices(Null matrix, Equal matrix, Row matrix, Column matrix, Square matrix, Transpose of matrix, Diagonal matrix, Scalar matrix, Unit matrix, Symmetric matrix, Skew Symmetric matrix, Orthogonal matrix), Operations on Matrices (Addition, Subtraction, Scalar, Multiplication), Computations of: Determinant, Adjoint and Inverse of a Matrix.
Solution of System of Linear Equations: Cramer's Rule, Gauss Elimination Method (2x2), Matrix Inverse Method.

Unit III

[Weightage=25% approx. , Lectures=15]

Graph: Introduction to Graphs (Nodes, vertices, edges), Types of Graphs (Null Graph, Trivial Graph, Directed Graph, Non - Directed Graph, connected Graph, Disconnected Graph, Regular Graph, complete Graph, cycle Graph , cyclic Graph , acyclic Graph , Finite Graph , Infinite Graph, bipartite Graph, planar Graph , simple Graph ,Multi Graph , Pseudo Graph, Euler Graph,

Hamiltonian Graph)

Representation of Graphs: Adjacency Matrix, Incidence Matrix, Adjacency List

Graph Traversals: BFS- Breadth – first –search, DFS- Depth – first –search

Template of a graph using one Application: The vertex coloring algorithm to find a proper coloring of the map with four colors using basic examples.

Application of Graph: Different types application in computer science (Social Networks, Web Graphs, Biological Networks) and Djakarta's algorithm for shortest path with basic example.

Unit IV

[Weightage=25% approx., Lectures=15]

Functions: Relation, No. of relations, Domain of a relation, Range of a relation, Co-Domain of a relation, Relation on a set, Inverse of a relation, Function, Domain, Co-domain, Range, Types of Functions (One-one Function (Injective Function, Many-one Function, Onto Function (Surjective Function), Into Function etc.)

Algebra of real functions: Addition of two real functions, Subtraction of a real function from another and Multiplication by a Scalar.

Text Books:

- Advanced Mathematics, Authors(s): Heena Timani, Publication: Books India.
- Business Mathematics: Author(s): Prof. H. R. Vyas, Dr. C. J. Trivedi, Prof. A. B. Savjani, Publication: B. S. Shah Prakashan.

Reference Books:

- Discrete Mathematical Structure [3rd Ed.]: Author(s): Bernard Kolman, Robert C. Busby, Sharon Roass, Publication: Prentice Hall of India.
- The Essence Of Mathematics For Business Author(s): H. A. Spooner, D. A .L. Wilson, Publication: Prentice Hall of India.
- Business Mathematics, Author(s): J.K Singh, Publication: Himalaya Publications.
- Financial Mathematics, Author(s): A. Lenin Jothi, Publication: Himalaya Publications.

Reference Links:

- <https://www.geeksforgeeks.org/>
- <https://www.mathsisfun.com//>


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BCA-CySe Semester-I (First Year)

Subject Title : Mathematics for Computer Science

Subject Code : MDC201-1C

Subject Type : MDC

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Course Outcomes (COs)

- **CO1:** Understand concepts of data, information, data literacy, and data lifecycle in real-world contexts.
- **CO2:** Identify and classify types, structures, modalities, and sources of data in computing and analytics environments.
- **CO3:** Explain data labeling techniques, data usage, and lifecycle processes in organizational decision-making.
- **CO4:** Apply techniques to detect and handle data quality issues such as missing, noisy, and imbalanced data using basic tools.
- **CO5:** Analyze data bias, ethical concerns, and responsible data usage in AI and business applications.
- **CO6:** Demonstrate practical skills in data handling, visualization, and reporting using spreadsheets and basic analytical tools.

Course Outcome Mapping Table

CO No.	Course Outcome (CO)	PO(s)/ PSO(s)	CL Cognitive Level	KC Knowledge Category	Class Sessions	Practical Sessions
CO1	Understand concepts of data, information, data literacy, and data lifecycle in real-world contexts.	PO1, PO2, PO5, PSO1, PSO2,	U	F, C	10	0
CO2	Identify and classify types, structures, modalities, and sources of data in computing and analytics environments.	PO2, PO3, PO7, PSO1, PSO2,	Ap	C, P	15	0
CO3	Explain data labeling techniques, data usage, and lifecycle processes in organizational decision-making.	PO1, PO3, PO5, PSO1, PSO2, PSO3	Ap	C, P	10	0
CO4	Apply techniques to detect and handle data quality issues such as missing, noisy, and imbalanced data using basic tools.	PO2, PO3, PO9, PSO1, PSO2, PSO3	Ap	P, M	5	0
CO5	Analyze data bias, ethical concerns, and responsible data usage in AI and business applications.	PO1, PO4, PO5, PSO1, PSO2, PSO3	U	F, C	10	0
CO6	Demonstrate practical skills in data handling, visualization, and reporting using spreadsheets and basic analytical tools.	PO2, PO3, PO7, PSO1, PSO2, PSO3	Ap	C, P	10	0
Total hour of Instruction					60	00

Mapping of COs with POs & PSO

COs \ POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	0	0	3	0	0	0	0	0	3	3	0
CO2	0	3	3	0	0	0	2	0	0	0	3	3	0
CO3	3	0	3	0	3	0	0	0	0	0	3	3	3
CO4	0	3	3	0	0	0	0	0	1	0	3	3	3
CO5	3	0	0	2	3	0	0	0	0	0	3	3	3
CO6	0	3	3	0	0	0	2	0	0	0	3	3	3

3: High, 2: Medium, 1: Low

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Faculty of Computer Science
Kadi Sarva Vishwavidyalaya
Gandhinagar

BCA-CySe Semester-I (First Year)

Subject Title : Communication Skills
Subject Code : AEC202-1C
Subject Type : AEC

Rationale:

The course has been designed in order to focus the conceptual clarity into the process of communication as well usage-oriented learning of those concepts.

Learning Outcomes:

The student will be able to learn:

- Basic concepts of the communication process.
- Elements enhancing effective communication.
- Various skills involved during communication.
- Oral and written communication in practice.

Teaching and Evaluation Scheme:

Credits	Duration in Hours		Maximum Marks		Total
	Theory	Practical	CCE (Formative)	SEE (Summative)	
2	30	-	25	25	50

Course Content:

Unit I

[Weightage=30% approx., Lectures=07]

Fundamentals of Communication : Meaning of communication, Process of Communication, 7 C's of Communication, Barriers to Effective Communication: interpersonal, intrapersonal and organizational barriers, Listening: difference between hearing and listening, importance of listening in communication, reasons for poor listening, active VS passive listening, types and barriers to listening.

Unit II

[Weightage=30% approx., Lectures=11]

Types of Communication: Verbal Communication–Oral and written communication, its advantages and disadvantages, Forms of Non-verbal Communication: Kinesics, Proxemics, Chronemics and paralanguage.

Speaking skills: Telephonic Skills, Do's and Don'ts of Telephonic skills, etiquettes.

Conversations: purposes of general conversation, features of a good conversation, tips for improvement, 3 samples and points to observe.

Reading comprehension: Purpose, reasons for poor comprehension, ways to improve them, techniques for good comprehension.

Unit III

[Weightage=40% approx., Lectures=12]

Professional Communication in Practice

Presentation skills: Defining Purpose, analyzing audience and locale, organizing content, preparing outline, visual aids, mode of delivery, body language.

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Group discussion: organizational (three techniques) as a part of selection process (Characteristics, evaluation components, tips).

Email writing: reasons for popularity, common pitfalls, guiding principles, common etiquettes.

Meetings: purpose, preparation, notices, agenda and minutes.

Reference Books:

- Business Communication by: Meenakshi Raman & Sangeeta Sharma, Oxford University Press Publication.
- Effective Technical Communication by: M Ashraf Rizvi, MC Graw Hill Publication.
- Communicative English by: Prakash Khuman, Bhupesh Gupta (Books India Publications).
- Communication Skills by: Sanjay Kumar and Pushpa Lata, Oxford University Press Publication.


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Faculty of Computer Science
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Gandhinagar

BCA-CySe Semester-I (First Year)

Subject Title : Communication Skills

Subject Code : AEC202-1C

Subject Type : AEC

Course Outcomes

- **CO1:** Discuss the major aspects of the process of communication, its importance and types of effective listening.
- **CO2:** Describe the input skills (Listening & Reading) in terms of their importance, types and improvement strategies.
- **CO3:** Distinguish between various forms of verbal and non-verbal communication, and implement their principles in diverse social and professional context.
- **CO4:** Paraphrase the major aspects of professional communication.

Course Outcome Mapping Table

COs	Course Outcome (CO)	POs/PSOs	Cognitive Level CL	Knowledge Category KC	Class Sessions
CO1	Discuss the major aspects of the process of communication, its importance and types of effective listening.	PO5, PO6, PSO3	U	C	5
CO2	Describe the input skills (Listening & Reading) in terms of their importance, types and improvement strategies.	PO6, PO7, PSO3	U, Ap	C, P	5
CO3	Distinguish between various forms of verbal and non-verbal communication, and implement their principles in diverse social and professional context.	PO5, PO6, PO7, PSO3	U, Ap, An	C, P	8
CO4	Paraphrase the major aspects of professional communication.	PO5, PO6, PO7, PSO3	U, Ap, C	C, P	12

Mapping of COs with POs & PSO

Course AEC202-1C	POs										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CO1	-	-	-	-	3	3	-	-	-	-	-	-	3
CO2	-	-	-	-	-	3	3	-	-	-	-	-	3
CO3	-	-	-	-	3	3	3	-	-	-	-	-	3
CO4	-	-	-	-	3	3	3	-	-	-	-	-	3

3: High, 2: Medium, 1: Low

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Faculty of Computer Science
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BCA-CySe Semester-I (First Year)

Subject Title : Project Work – I

Subject Code : SEC201-1C

Subject Type : SEC

Rationale:

The core objective of the subject is to provide Project and Practical based deep learning, concept understanding, its analysis, deriving inferences and documenting it towards productive outcome of the subject Programming Fundamentals, Cyber Security Basics, Web Applications Technologies that is an integral part of the BCA-CySe curriculum.

Learning outcomes:

In reference to the subject Programming Fundamentals, Cyber Security Basics, Web Applications Technologies the student will be able to:

- Gain knowledge of Project based Practical aspect in the respective subject.
- Understand Fundamentals and Importance of the selected concept.
- Implement the learning during the specific course.
- Get real-life application experience during project execution.
- Perform teamwork and get acquainted with Project Based Learning.

Teaching and Evaluation Scheme:

Credits	Duration in Hours		Maximum Marks		Total
	Theory	Practical	CCE (Formative)	SEE (Summative)	
2	-	60	25	25	50

Course Content:

Project Work – I

[Weightage=100%, Practicals=60]

Project Work – I based on the areas pertaining to Programming Fundamentals, Cyber Security Basics, Web Applications Technologies shall be executed based on choice based domain and Project titles will be selected in groups with specific count of members. The entire project work will be studied, analysed, implemented inference learning will be derived and documented as well as presented in the three phases given below.


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Phase I: Preliminary Learning

- 1.1 Group Details
- 1.2 Project Title
- 1.3 Project Domain
- 1.4 Project Definition

Phase II: Core Learning

- 2.1 Project Overview
- 2.2 Detail Explanation
- 2.3 Advantages
- 2.4 Challenges

Phase III: Inference Learning

- 3.1 Real Life Applications
- 3.2 Conclusion
- 3.3 Future Enhancement
- 3.4 References

Please Note: The Project Work shall be submitted as a Project Work – I Presentation / Report / Project Demonstration.


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BCA-CySe Semester-I (First Year)

Subject Title : Project Work – I

Subject Code : SEC201-1C

Subject Type : SEC

Course Outcomes (COs)

- **CO1:** Identify and define problem statement, project domain, and objectives.
- **CO2:** Analyze fundamental concepts and technologies of selected domain.
- **CO3:** Design and develop project solution using appropriate tools and techniques.
- **CO4:** Evaluate project results, challenges and derive inferences.
- **CO5:** Demonstrate teamwork, documentation and communication skills.
- **CO6:** Propose real-life applications, future enhancements and ethical aspects.

Course Outcome Mapping Table

CO No.	Course Outcome (CO)	PO(s)/ PSO(s)	CL Cognitive Level	KC Knowledge Category	Class Sessions	Practical Sessions
CO1	Identify and define problem statement, project domain, and objectives	PO1, PO2, PO3, PO4, PO5, PO8, PO9, PSO1, PSO2, PSO3	U, A	C	0	8
CO2	Analyze fundamental concepts and technologies of selected domain	PO1, PO2, PO3, PO9, PSO1, PSO2, PSO3	A	C	0	10
CO3	Design and develop project solution using appropriate tools and techniques	PO1, PO2, PO3, PO4, PO5, PO7, PO9, PO10, PSO1, PSO2, PSO3	Ap, C	P	0	16
CO4	Evaluate project results, challenges and derive inferences	PO2, PO5, PO9, PO10, PSO1, PSO2, PSO3	E	A	0	10
CO5	Demonstrate teamwork, documentation and communication skills	PO6, PO7, PO10, PSO1, PSO2, PSO3	Ap	P	0	8
CO6	Propose real-life applications, future enhancements and ethical aspects	PO5, PO8, PO9, PSO1, PSO2, PSO3	C, E	M	0	8
Total hour of Instruction					00	60

Mapping of COs with POs and PSO

COs \ POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	3	1	3	0	0	1	3	0	3	3	3
CO2	3	3	3	0	0	0	0	0	3	0	3	3	3
CO3	3	3	3	1	3	0	2	0	3	3	3	3	3
CO4	0	3	0	0	3	0	0	0	3	3	3	3	3
CO5	0	0	0	0	0	1	2	0	0	3	3	3	3
CO6	0	0	0	0	3	0	0	2	3	0	3	3	3

3: High, 2: Medium, 1: Low

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BCA-CySe Semester-I (First Year)

Subject Title : Introduction to IKS
Subject Code : IKS201-1C
Subject Type : IKS

Rationale:

To identify concepts of Indian knowledge systems have a strong foundation in Indian culture, philosophy, and spirituality and have evolved through thousands of years. These knowledge systems including Ayurveda, Yoga, Vedanta and Vedic sciences are still applicable in the modern world in several ways.

Learning Outcomes:

The student will be able to learn:

- Historicity of Indian Knowledge System.
- About four Vedas.
- Broad classification of Indian philosophical systems.
- About the Indian Education System.

Teaching and Evaluation Scheme:

Credits	Duration in Hours		Maximum Marks		Total
	Theory	Practical	CCE (Formative)	SEE (Summative)	
2	30	-	25	25	50

Course Content:

Unit I

[Weightage=50% approx., Lectures=15]

Indian Knowledge System: An Overview, the Vedic Corpus Importance of Ancient Knowledge Definition, The IKS Corpus – A Classification Framework, Historicity of IKS, Some Unique Aspects of IKS, Introduction to Vedas, The Four Vedas, The Four Divisions of Each Veda, Vedic Life: Distinctive Features.

Unit II

[Weightage=50% approx., Lectures=15]

Indian Education System: Preservation of culture, tradition and Dharma through education. Svadhyaya, Pravachana. Continuity of the family and the Vamsha, who are the carriers of Knowledge, Tradition and Dharma

Reference Book:

Introduction to Indian Knowledge System Concepts and Applications, B Mahadevan,
Vinayak Rajat Bhat, Nagendra Pavana, PHI Learning Private Limited, New Delhi.


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BCA-CySe Semester-I (First Year)

Subject Title : Introduction to IKS
Subject Code : IKS201-1C
Subject Type : IKS

Course Outcomes (COs)

- **CO1:** Understand the meaning, origin, and importance of the Indian Knowledge System (IKS).
- **CO2:** Identify and explain the structure and significance of the four Vedas and their divisions.
- **CO3:** Analyze the historical context and classification of IKS and its unique features.
- **CO4:** Explore the core components and philosophical ideas of the Indian Knowledge Corpus.
- **CO5:** Understand the traditional Indian Education System and its role in preserving culture, tradition, and Dharma.
- **CO6:** Explain the concepts of Svadhyaya, Pravachana, and the role of family (Vamsha) in transmitting knowledge across generations.

Course Outcome Mapping Table

CO No.	Course Outcome (CO)	PO(s)/ PSO(s)	CL Cognitive Level	KC Knowledge Category	Class Sessions	Practical Sessions
CO1	Understand the meaning, origin, and importance of the Indian Knowledge System (IKS).	PO1, PO5, PO8, PSO3	U	F,C	5	0
CO2	Identify and explain the structure and significance of the four Vedas and their divisions.	PO1, PO4, PO8, PSO3	R,U	F,C	5	0
CO3	Analyze the historical context and classification of IKS and its unique features.	PO5, PO8, PSO3	AN	C,P	5	0
CO4	Explore the core components and philosophical ideas of the Indian Knowledge Corpus.	PO1, PO3, PO5, PO8, PSO3	AN, AP	C,P	5	0
CO5	Understand the traditional Indian Education System and its role in preserving culture, tradition, and Dharma.	PO1, PO6, PO7, PO8, PSO3	U	C	5	0
CO6	Explain the concepts of Svadhyaya, Pravachana, and the role of family (Vamsha) in transmitting knowledge across generations.	PO1, PO6, PO8, PSO3	U	C, F	5	0
Total hour of Instruction					30	00

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Mapping of COs with POs and PSO

COs \ POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	0	0	0	2	0	0	3	0	0	0	0	3
CO2	3	0	0	1	0	0	0	3	0	0	0	0	3
CO3	0	0	0	0	2	0	0	3	0	0	0	0	3
CO4	3	0	1	0	2	0	0	3	0	0	0	0	3
CO5	3	0	0	0	0	2	1	3	0	0	0	0	3
CO6	3	0	0	0	0	2	0	3	0	0	0	0	3

3: High, 2: Medium, 1: Low


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Faculty of Computer Science
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BCA-CySe Semester-I (First Year)

Subject Title : Indian Astronomy-I
Subject Code : IKS202-1C
Subject Type : IKS

Learning Outcomes:

- Understanding the universe explained in the Upanishads by ancient scholars like Aryabhata and Brahmagupta.
- Be acquainted with the Indian knowledge system that weaves together threads of ancient wisdom and scientific discovery.
- Inspirational drive to know and understand through the treasure trove of Indian knowledge systems, where science and spirituality converge to illuminate the path to enlightenment with potential applications in our daily lives.

Teaching and Evaluation Scheme:

Credits	Duration in Hours		Maximum Marks		Total
	Theory	Practical	CCE (Formative)	SEE (Summative)	
2	30	-	25	25	50

Course Content:

Unit I

[Weightage=50% approx., Lectures=15]

Historical Introduction & Celestial Sphere : Introduction, Ancient Indian Astronomy, The Vedic Period and Vedāṅgajyotiṣa, Siddhanta, Aryabhaṭa I (476 AD), Astronomers after Aryabhata, Contents of the Siddhantas, Continuity in Astronomical Tradition, Diurnal Motion of Celestial Bodies, Motion of Celestial Bodies Relative to Stars, Celestial Horizon, Meridian, Pole Star and Directions, Zodiac and Constellations, Equator and Poles (Viśuvadvṛtta and Dhruva), Latitude of a Place and Altitude of Pole Star, Ecliptic and the Equinoxes.

Unit II

[Weightage=50% approx., Lectures=15]

Co-ordinate Systems & Rāsi and Nakṣatra Systems: Introduction, Celestial Longitude and Latitude (Ecliptic System), Right Ascension and Declination (Equatorial System), Azimuth and Altitude (Horizontal System), Hour Angle and Declination (Meridian System), Phenomenon of Precession of Equinoxes, Ancient Indian References to the Precession, Effects of Precession on Celestial Longitude, Tropical (Sayana) and Sidereal (Nirayana) Longitudes, Zodiac and Rāsis, Nakṣatra System.

Text Book:

Indian Astronomy- An introduction by S. Balachandra Rao, Orient Longman Ltd. (2000).

Reference Books:

- The Aryabhata of Aryabhata an Ancient Indian Work on Mathematics and Astronomy, Walter Eugene Clark.
- Indian Astronomy - A Source Book (Based Primarily On Sanskrit Texts), Compiled By B. V. Subbarayappa & K. V. Sharma, Nehru Center, Bombay.

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Faculty of Computer Science
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BCA-CySe Semester-I (First Year)

Subject Title : Indian Astronomy-I
Subject Code : IKS202-1C
Subject Type : IKS

Course Outcomes (COs)

- **CO1:** Describe the contributions of ancient Indian astronomers and identify key concepts from Vedic and Siddhanta traditions in the development of astronomy.
- **CO2:** Explain the apparent motion of celestial bodies and determine astronomical directions and positions using concepts like celestial horizon, meridian, and equinoxes.
- **CO3:** Compare different celestial coordinate systems and analyze the impact of precession on celestial measurements and traditional systems like Rāsi and Nakṣatra.

Course Outcome Mapping Table

CO No.	Course Outcome (CO)	PO(s)/ PSO(s)	CL Cognitive Level	KC Knowledge Category	Class Sessions	Practical Sessions
CO1	Describe the contributions of ancient Indian astronomers and identify key concepts from Vedic and Siddhanta traditions in the development of astronomy.	PO1, PO2, PO4, PO5, PO8, PSO1	U	C	11	0
CO2	Explain the apparent motion of celestial bodies and determine astronomical directions and positions using concepts like celestial horizon, meridian, and equinoxes.	PO1, PO2, PO3, PO5, PO6, PSO1, PSO2	U	C	9	0
CO3	Compare different celestial coordinate systems and analyze the impact of precession on celestial measurements and traditional systems like Rāsi and Nakṣatra.	PO1, PO2, PO3, PO6, PSO1, PSO2	An	C	10	0
Total hour of Instruction					30	00

Mapping of COs with POs and PSO

COs \ POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	0	2	3	0	0	2	0	0	3	0	3
CO2	3	3	3	0	3	3	0	0	0	0	3	3	3
CO3	3	3	3	0	0	3	0	0	0	0	3	3	3

3: High, 2: Medium, 1: Low


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Faculty of Computer Science
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BCA-CySe Semester-I (First Year)

Subject Title : Indian Ethos for Professional Excellence
Subject Code : IKS208-1C
Subject Type : IKS

Rationale:

The course introduces students to the Indian value system and ethical foundations rooted in Indian Knowledge Systems (IKS), which guide professional behavior. It integrates traditional Indian wisdom, philosophy, and value traditions to develop discipline, integrity, responsibility, and ethical decision-making in professional environments.

Learning Outcomes:

The Students will be able to learn:

- Understand Indian ethos and its connection with Indian Knowledge Systems (IKS).
- Develop ethical and responsible professional behavior based on Indian wisdom.
- Apply value-based decision-making in workplace situations.
- Build discipline, integrity, and teamwork attitude inspired by Indian philosophical traditions.

Teaching and Evaluation Scheme:

Credits	Duration in Hours		Maximum Marks		Total
	Theory	Practical	CCE (Formative)	SEE (Summative)	
2	30	-	25	25	50

Course Content:

Unit I

[Weightage=50% approx., Lectures=15]

Foundations of Indian Ethos & Indian Knowledge System (IKS): Introduction to Indian Ethos and its relationship with Indian Knowledge System (IKS), Meaning and scope of Indian Knowledge System in value education, Core principles of Indian tradition: Dharma, Karma, Rta, Satya, Value-based living in Indian philosophical traditions, Ethical foundations derived from Indian wisdom literature, Work ethics and professional responsibility in Indian knowledge traditions, Self-discipline, character building, and holistic personality development in IKS context

Unit II

[Weightage=50% approx., Lectures=15]

Indian Ethos in Professional & Modern Context: Application of Indian value systems in modern professional life, Ethical practices in IT, business, and organizational environment, Leadership, teamwork, and cooperation through Indian ethical perspective, Decision making using value-based and ethical frameworks, Case studies inspired by Indian Knowledge System principles, Professional excellence through integration of Indian ethos in workplace behavior

Text Book:

Indian Ethos and Values in Management, B. P. Banerjee, S. Chand Publishing.

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Reference Books:

- Indian Ethos in Management, A. C. Fernando, Pearson Education.
- Ethics in Management, S. K. Chakraborty, Oxford University Press.
- Introduction to Indian Knowledge System: Concepts and Applications, B. Mahadevan et al., PHI Learning.

Reference Links:

- <https://www.education.gov.in>
- <https://iksindia.org>
- <https://ugc.gov.in>
- <https://nptel.ac.in>


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**Faculty of Computer Science
Kadi Sarva Vishwavidyalaya
Gandhinagar**

BCA-CySe Semester-I (First Year)

Subject Title : Indian Ethos for Professional Excellence

Subject Code : IKS208-1C

Subject Type : IKS

Course Outcomes (COs)

- **CO1:** Understand Indian Ethos and IKS concepts.
- **CO2:** Explain Indian values and ethical principles.
- **CO3:** Apply ethical principles in professional behavior.
- **CO4:** Analyze situations using ethical frameworks.
- **CO5:** Develop teamwork, leadership, and integrity based on Indian ethos.

Course Outcome Mapping Table

CO No.	Course Outcome (CO)	PO(s)/ PSO(s)	CL Cognitive Level	KC Knowledge Category	Class Sessions	Practical Sessions
CO1	Understand Indian Ethos and IKS concepts.	PO1, PO5, PO8, PSO3	U	C	6	0
CO2	Explain Indian values and ethical principles.	PO5, PO8, PSO3	U	C	6	0
CO3	Apply ethical principles in professional behavior.	PO2, PO6, PO8, PSO3	Ap	P	6	0
CO4	Analyze situations using ethical frameworks.	PO2, PO5, PO8, PO9, PSO3	An	C	6	0
CO5	Develop teamwork, leadership, and integrity based on Indian ethos.	PO6, PO7, PO8, PO10, PSO3	Ap	P	6	0
Total hour of Instruction					30	00

Mapping of COs with POs & PSO

COs \ POs/PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	0	0	0	3	0	0	3	0	0	0	3	3
CO2	0	0	0	0	3	0	0	3	0	0	0	3	3
CO3	0	2	0	0	0	2	0	3	0	0	0	3	3
CO4	0	2	0	0	3	0	0	3	2	0	0	3	3
CO5	0	0	0	0	0	2	2	3	0	2	0	3	3

3: High, 2: Medium, 1: Low


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