Kadi Sarva Vishwavidyalaya, Gandhinagar
Bachelor of Computer Applications (BCA)
Semester - I Syllabus

(Scheme of Teaching and Evaluation for BCA Programme (Basic/Honours) aligning to NEP - 2020 as per Govt. of Gujarat Dated 11/07/2023)

BCA Semester – I (First Year)

Subject Title : **Programming Fundamentals and Problem Solving**
Subject Code : **CAM201-1C**
Subject Type : **Major**

Rationale:

To develop the basic concepts of programming using world's most popular Middle Level Language through "C".

Learning outcomes:

The Students will be able to:

- Understand programming with capacity to write an algorithm and to draw a flow chart.
- Develop program to solve given programming problem.
- Know importance of an array by real life example as well as technical problem solving.
- Enrich their skill using library functions and different string handling functions.

Teaching and Evaluation Scheme:

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

Course Content:

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

Introduction to Programming and Tools of Problem Analysis: Concept and need of programming language, Concepts of Algorithm and Flowchart (with example), Translator- Compiler, Interpreter, linker, loader and assembler.

Overview of C: Introduction, History of C, Basic structure of C program, Sample of C program, executing of C program. Character Set, Usage of C tokens, Types of Tokens - Constants, Keywords, Identifiers, Variables (Declaration and Rules), Defining symbolic constants, Back Slash Character.

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

Basics of C Language: Introduction, Need of Operators-Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bit-wise Operators, Special Operators, importance of Data Types, Types of Data Types, Arithmetic Expressions, Evaluation of expressions, Precedence of arithmetic operators, implicit and explicit Type conversions in built-in data type, Operator precedence and associativity, Mathematical functions (pow(), sqrt(), ceil(), floor()).

Input Output Functions: Formatted and Non-formatted- printf(), scanf(), getchar(), putchar(), clrscr(), getch(), gets(), puts().

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

Control and Iterative Statement: Concept and Application of Decision making Statement - Simple IF statement, IF ELSE statement, Nesting of IF ... ELSE statements, ELSE IF ladder, Switch statement, ternary (? :) Operator, GOTO statement.

Decision Making Looping: Concept and Application of Looping - WHILE statement, DO- WHILE statement, FOR statement, Break and continue, Nested Looping.

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

Array and Strings: Concept and Application of Array, Declaration and initialization of One- dimensional arrays, Declaration and initialization of Two-dimensional arrays, Concept of Multidimensional arrays.

Handling of Character strings: Declaring and initializing string variables, Reading strings from terminal, writing strings to screen.

String Operations: Importance of String Handling functions - String Copy, String Compare, String Concatenation and String Length, Table of strings.

Text Book:
- Programming in ANSI C, Balagurusamy, Tata McGraw-Hill 5th Edition Reference

Reference Books:
- Programming in C, by Pradip Dey & Manas Ghosh, Publisher–Oxford.
- The Complete Reference, Herbert schildt Fourth Edition.
- Let Us C , Yashwant Kanetkar, BPB Publications
- Programming in C, by Reenathareja Publisher–Oxford

Reference Links:

- www.carrerskill.com
- www.mcqsets.com
- www.indiabix.com
- www.sanfoundry.com

Programming in C Practical List:

- Programs with the use of basic input/output functions.
- Programs with the use of Different Operators (Arithmetic, Logical, Relational, Assignment etc.)
- Programs with the use of Control Statements.
- Programs with the use of Branching Statements.
- Programs with the use of Looping Statements.
- Programs with the use of Arrays.
- Programs with the use of String Manipulation Functions.

BCA Semester – I (First Year)

Subject Title : **Internet Technology**
Subject Code : **CAM202-1C**
Subject Type : **Major**

Rationale:

The aim of this course is to provide the conceptual and technological developments in the field of internet and web designing with the emphasis knowledge of internet. The Internet, Web with its wide spread usefulness has become an integral part of the internet. Therefore, this course also puts emphasis on basic knowledge of internet, concepts of web designing and tools to design web pages.

Learning Outcomes:

The Students will be able to:

- Review the current topics in web and internet technologies.

- Describes the basic concepts for email and social networking.

- Learn the basic working scheme of the internet and WWW.

- Understand fundamental tools and technologies for web designing.

- Comprehend the technologies for HTML (Hyper Text Markup Language).

- Specify design rules in constructing web pages and sites.

- Effectively deal with designing issues and techniques with CSS.

Teaching and Evaluation Scheme:

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

Course Content:

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

Introduction to Internet, Extranet, Intranet: Advantages of internet, Access of internet - Dial Up, Cable Modem Connection and WIFI. WWW, Web page, Website, Hyperlink, URL, Introduction to Internet Domain Name System, FTP, Web Browser and Web Server. Uploading and Downloading files, Search Engine, Do's and Dont's for Search Engine, Email Communication and Social Networking (Uses, advantages and disadvantages)

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

Basics of 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, BGSOUND Tag.

Advance HTML: HTML Tables – Operations, Spanning on rows and columns, HTML Frames: HORIZONTAL AND VERTICAL FRAMESET, Inline frame and noframe, 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]**

Advance CSS and CSS3: CSS – Visibility, Positioning, layers, Pseudo Classes, Text effects, Media Type, Aural Media, Layouts, Printing, CSS – Rounded corner, Border Image, Multi-background, CSS3 – color, gradients, shadows, text, 2D and 3D Transform, Multicolumn, User Interface and Box sizing.

Text Book:
- Introduction to Internet and HTML Scripting by Bhaumik Shroff, Books India Pvt. Ltd

Reference Book:
- Web Technology and design – C Xavier, New Age International publication.

Reference Links:
- www.w3schools.com
- www.tutorialspoint.com

Programming Internet Technology 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, Media 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.

BCA Semester – I (First Year)

Subject Title : **Digital Electronics**
Subject Code : **CAE201-1C**
Subject Type : **Minor**

Rationale:

To acquaint students with basic structure of computer system and concepts of Number Systems, Codes, Logic Gates and Boolean Algebra.

Learning Outcomes:

The student will be able to understand:

- Basic attributes of computer and the hardware configuration.
- Numbering systems and their conversion into different systems like binary, Hex-decimal, Octal.
- Techniques of designing logical circuits using logical GATES.

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]

Components of a Computer : Generation of Computer (1st, 2nd, 3rd, 4th & 5th), Classification of Computer System (Super – Mainframe – Personal Computer) , Computer block diagram , input device (Key Board, Mouse, Joystick, Track Ball, Light Pen, Scanner , OMR –Bar Code Reader, MICR-OCR, Processing Device (CPU, ALU, CONTROL UNIT) , Output device (Printer , Monitor , Plotter) , storage unit (RAM, ROM, PROMS, EPROM, secondary storage device (Floppy Disk, Optical Disk, Magnetic Disk, Magnetic Tape , Hard Disk).

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

Number systems and Codes: Decimal odometer, Binary odometer, Number code, binary to decimal conversion, decimal to binary conversion, hexadecimal numbers, hexadecimal to binary conversion, hexadecimal to decimal conversion, decimal to hexadecimal conversion, BCD numbers.

Unit III   **[Weightage=25% approx. , Lectures=15]**

Logic gates and arithmetic logic unit : Basic Gates like OR gate, AND gate, Boolean algebra, NOR gate, De Morgan's first theorem, NAND gate, De Morgan's second theorem, EXCLUSIVE-OR gate, EXCLUSIVE-NOR gate, Multiplexers, inverter.

Unit IV   **[Weightage=25% approx. , Lectures=15]**

Boolean algebra: Instruction Set Design (Accumulator, Stack Based, Register Based),Instruction Cycle/CPU Operation, Binary addition binary subtraction, half adders, full adders, binary adders, 2's complement adder subtracted. Flip-Flops (RS Latch, D, JK Master-Slave)

Text Books:

- Digital computer electronics by- Malvino and brown, Tata McGraw-Hill edition.
- "O" level, made simple it tools and application by Satish Jain, BPB publication.
- Computer architecture and organization by, B Govindarajalu.

Reference Books:

- Digital principal and application by Albert Paul Malvino and Donald p. Leach, Tata McGraw-Hill edition.
- Fundamental of digital circuits by A. Anand Kumar, prentice- Hall of India.

Reference Links:

- http://www.indiabix.com/digital-electronics/boolean-algebra-and-logic-simplification/
- http://www.indiabix.com/digital-electronics/integrated-circuit-technologies/

BCA 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 ofthe 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/

BCA 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.

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.

BCA 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 Fundamental of Programming and Problem Solving, Internet Technology and Digital Electronics, that is an integral part of the BCA curriculum.

Learning outcomes:

In reference to the subject Fundamental of Programming and Problem Solving, Internet Technology and Digital Electronics, 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 Fundamental of Programming and Problem Solving, Internet Technology and Digital Electronics 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.

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.

BCA 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.

BCA 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 Vedāngajyotiṣa, 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 (Viṣuvadvṛtta 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 Books:
- Indian Astronomy- An introduction by S. Balachandra Rao, Orient Longman Ltd (2000).

Reference Books:
- The Aryabhati 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.