

Kadi Sarva Vishwavidyalaya Gandhinagar

Bachelor of Science (Computer Science) (B.Sc. CS)

Semester - I Syllabus

(Scheme of Teaching and Evaluation for B.Sc CS Programme (Basic/Honours) aligning to NEP – 2020 as per Government of Gujarat Dated 11/07/2023)

B.Sc. (CS) Semester – I (First Year)

Subject Title : Programming in C
Subject Code : CSM201-1C
Subject Type : Major

Rationale:

To acquaint the students with graphical flow diagrams to represent logic and learn basic principles of programming

Learning Outcomes:

After studying this subject, student will be able to

- Draw flowcharts
- Develop program in C
- Able to know importance of an array by real life example as well as technical problem solving.
- Able to develop functions and enrich their skill to library function and user define side.
- Able to develop a small type of data storing with File Handling
- Able to know the importance pointer

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]

Program Concept, Characteristics of Programming, Various stages in Program Development Programming Aids Algorithms, Flow Charts - Symbols, Rules for making Flow chart, Programming Techniques – Top down, Bottom up, Modular, Structured - Features, Merits, Demerits, and their Comparative study. Programming Logic- Simple, Branching, Looping, Recursion, Cohesion & Coupling, Programming Testing

& Debugging & their Tools.

Unit - II

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

C language basics: C character set, Identifiers and keywords, Data types, Enumeration type, constants, variables, declarations, qualifiers – long, short and unsigned declarations, expressions, symbolic constants, input/output

functions, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, increment and decrement operators, Precedence and order of evaluation, conditional operators, bit operators, type casting, using library functions in math.h

Control flow: If statement, if... else statement, nested if...else statement, switch statements, looping – for loop, while loop, do ... while statements, nested loop structure, break, continue and go to statements.

Unit - III

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

Arrays & Strings: Single dimensional arrays, multidimensional arrays, initializing array using static declaration, Searching and sorting of Arrays, Array of Characters, Character arrays and strings, String handling Functions.

Unit - IV

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

Structures: Definition of Structures, declaration, structure passing to functions, array of structures, arrays with in structures, unions, typedef statements.

Pointers: Introduction to pointers, Benefits of using pointers, Concept of pointer, Declaring pointer variable, Initialization of pointer variable.

Text Books:

- Programming in ANSI C 4E , E. BalaGuruswamy, TMH
- Programming in C, Byron S Gottfried, Shaum's Outline series. TMH

References:

- Computer Fundamentals By P K Sinha &Priti Sinha Fourth Edition.
- B. Kernighan and D. Ritchie, "The ANSI C Programming Language", PH

Practical list:

- Programs using Basic Constructs.
- Programs using Control Structure.
- Programs using Arrays.
- String Manipulation Programs.
- User Defined Function Programs.
- Programs using Structure.
- Programs using Pointer.
- Program based on file management.

B.Sc. (CS) Semester – I (First Year)

Subject Title : Internet Fundamentals
Subject Code : CSM202-1C
Subject Type : Major

Rationale:

In this subject, students will learn about basic understanding of the components of Internet and its technologies.

Learning Outcomes:

After studying this subject, student will be able to

- Create WebPages.
- Apply different styles on that WebPages.
- Create and maintain Website.

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

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

HTML5: Fundamental Elements of HTML, Formatting Text in HTML, Organizing Text in HTML, Links and URLs in HTML, Tables in HTML, Images on a Web Page, Image Formats, Image Maps, Colors, FORMs in HTML, Interactive Elements, Working with Multimedia - Audio and Video File Formats, HTML elements for inserting Audio / Video on a web page

Unit - III

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

CSS: Why CSS, what is 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, CSS Functions.

Unit - IV

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

JavaScript: Introduction, Variables, Expressions and Operators, Control Structures (Flow control and conditionals, Loops and iteration, Jumps), Strings, Arrays, Functions.

JavaScriptAdvance: Document Object Model: Introduction, DOM Nodes and trees, Traversing and modifying a DOM tree, DOM collections, Dynamic Styles, using a Timer and Dynamic Styles to create Animated Effects.

Java Script Event Handling: Introduction, Reviewing the load event, Even the mousemove and the event object, Rollover with mouseover and mouseout, From Processing with focus, blur, submit and reset, Event bubbling.

Text Books:

- ‘The Internet’, Douglas. E. Comer, Prentice hall of India – Third Edition
- HTML Black Book

References:

- Internet Complete Reference, Harley Hahn.

Websites:

- <https://www.w3schools.com>
- <https://www.tutorialspoint.com>

Practical List for HTML, CSS and JavaScript:

- Write a HTML code to create a web page using following tags a) Text b) Marquee c) Character formatting tags
- Write a HTML code to create a web page using font Color, font face, font size, background color
- Write a HTML code to create a web page using Paragraph tags such as P tag and BR tag.
- Write a HTML code to create a web page using Nesting of lists.
- Write a HTML code to create a web page using Image tags with height and width and also Used for background image.

- Write a HTML code to create a web page using Table tags a) Create table of 3 rows and Columns b) Having border, border size, border color c) Image in a particular cell.
- Write a HTML code to create a web page using Table tags a) Using row span and column span b) Background Image in a table.
- Write a HTML code to create a web page using Form tag. example: - Admission Form.
- Create a web page using frame tag a) rows and columns b) border and border color.
- Create a web page, when user clicks on the link it should go to the bottom of the page.
- Write an HTML code to create a frameset having header, navigation and content sections.
- Write an HTML code to demonstrate the usage of inline CSS.
- Write an HTML code to demonstrate the usage of internal CSS.
- Write an HTML code to demonstrate the usage of external CSS.
- Write a Java script to prompt for user's name and display it on the screen.
- Design HTML form for keeping student record and validate it using Java script
- Write programs using Java script for Web Page to display browsers information.
- Using HTML, CSS create display an image overlay effect on hover
- Using HTML, CSS create display a text on top of an image using an overlay
- Using HTML, CSS create an animated underline effect when the user hovers over the text.

B.Sc. (CS) Semester – I (First Year)

Subject Title : Computer Networks
Subject Code : CSE201-1C
Subject Type : Minor

Rationale:

One of the major components of computer-based information systems is computer networks. Through computer networks we can share hardware, Software, Processing, Data and Applications besides getting global connectivity for internet-based communication and services.

For diploma students it is important to understand the function of computer networks and obtain requisite knowledge about hardware and software requirements of networks and acquire skills to establish a network using necessary hardware & software tools and configure various services over it. The objectives of this course are to make students learn the technology of establishing, commissioning (making operational) and maintaining computer networks.

Learning Outcomes:

After successful completion of the course students should be able to:

- Describe various protocols, models in networks.
- Explain operations of TCP, HTTP, and DNS.
- Illustrate use of Subnets, Ipv4 and Ipv6 in computer networks.
- Design simple computer networks.
- Establish and Commission simple computer networks
- Identify and solve network operational problems.

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=8, Practicals= 16]

Basics of Computer Network

Definition & history of networks, Usage of Computer Networks, Standard Organizations and Protocols, Line Configuration, Network Topology: Star, Ring, Bus, Mesh, Tree, Hybrid, Categories of network: Based on scope, Based on Connection, Applications and features of different types of servers: File server, Print Server, Mail Server, Web Server, Proxy Server.

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

The Reference Model for network communication

OSI model & function of each Layer, TCP/ IP model, Connection oriented v/s Connectionless approach, Comparison of OSI & TCP/IP Models

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

Transmission Media

Types of Transmission Media, Guided Media: Twisted Pair, Coaxial Cable, Fiber, Un Guided Media: Electromagnetic spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission, Satellite Communication

Network devices

Repeaters, Hubs, Switches, Routers, Access Points, Gateways, Bridges, Difference between Layer 2 and Layer 3 Switches, Introduction of Network Management software

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

IP Protocol and Network Applications

IP Protocol – IP v4, IP v6, Addressing Schemes, Subnet & masking, DNS, Email, FTP, HTTP

Text Books:

1. Computer Networks Andrew S Tanenbaum& David J Wetherall, Pearson, 2012
2. Data Communication & Networking, Forouzen, Tata McGraw Hill
3. Data & Computer Communication, Williams Stallings, Prentice Hall of India
4. Networks for Computer Scientists and Engineers, YouluZheng & ShakilAkhtar Oxford University Press, 2

Practical List

- Familiarization with Networking Components and Devices: LAN Adapters, Hubs, Switches, Routers, etc.
- Familiarization with Transmission Media and Tools: Co-axial Cable, UTP Cable, Crimping Tool, Connectors, etc.

- Study of various LAN topologies and their creation using network devices, cables, and computers.
- Subnet planning and its implementation
- To study the installation of networks, file sharing and printer sharing
- Study of network applications: DNS, FTP, SMTP, POP, IMAP, MIME, and DHCP
- Using **Wireshark**, the network analyzer sets the filter for ICMP, TCP, HTTP, UDP, and FTP and performs the respective protocol transactions to show or prove that the network analyzer is working.
- Study of Network Simulator (NS) and the following using NS
 - Implement an Ethernet LAN using n nodes, set multiple traffic nodes, and plot a congestion window for different sources and destinations.
 - Write a TCL script for connecting two nodes and sending packets in a wired network.
 - Write a TCL script for the given STAR topology using SFQ on the queue at the intermediate node and use different colors for packets originated from different nodes.
 - Write a TCL script for the given RING topology in a wired network using the for loop and making the topology dynamic.

B.Sc. (CS) Semester – I (First Year)

Subject Title : Basics of Electronics
Subject Code : MDC241-1C
Subject Type : MDC

Rationale:

The students need to learn basic concepts of digital circuits and system which leads to design of complex digital system such as microprocessors. The students need to know combinational and sequential circuits using digital logic fundamentals.

Learning Outcomes:

After studying this subject, student will able to learn

- Students will able to explain Number systems and logic circuits.
- The student should be able to solve logic function minimization.
- The students should be able to differentiate between combinational and sequential circuits such as decoders, encoders, multiplexers, demultiplexers, flipflops, counters, registers.
- Determine the behavior of analog and digital communication systems.

Teaching and Evaluation Scheme:

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

Course Content

Unit –I

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

Number systems, Operations and Codes: - Decimal numbers – Binary Numbers – Decimal to binary conversion – Binary arithmetic – 1's and 2's complement of binary numbers – Signed numbers – Arithmetic operations with signed numbers – hexadecimal numbers – octal numbers – binary coded decimal – digital codes – error detection and correction codes.

Unit - II

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

Logic gates: - The inverter – AND – OR – NAND – NOR – Exclusive OR – Exclusive NOR Gates.

Boolean algebra and logic simplification: - Laws and rules of Boolean algebra – De-Morgan’s theorems – simplification of logic expressions using Boolean algebra – SOP and POS expressions – the Karnaugh map – Karnaugh map minimizations.

Unit - III

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

Combinational Logic: - Implementation of a logic circuit from a Boolean expression – Implementation of a logic circuit from a truth table – Minimizing a logic circuit – The Universal property of NAND and NOR gates

Logic Functions: - Adders – Parallel Binary Adders – Comparators – Decoders – Encoders – Code Converters – Multiplexers – De-multiplexers – Parity Generators/Checkers.

Unit - IV

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

Flip Flops: - Latches – Edge triggered flip flops – Master-Slave Flip Flops -- Flip-Flop Operating Characteristics – Flip-Flop Applications. Counters: - Asynchronous Counter Operation – Synchronous Counter Operation.

Shift Registers: - Serial In/Serial Out Shift Registers – Serial In/Parallel Out Shift Registers – Parallel In/Serial Out Shift Registers – Parallel In/Parallel Out Registers.

Text Books:

- Digital Fundamentals – Eighth edition – Floyd and Jain – Pearson education

References:

- Digital logic and computer design – Morris Mano PHL
- Digital computer fundamentals - Bartee T

B.Sc. (CS) Semester – I (First Year)

Subject Title : Foundation course in English Language
Subject Code : AEC203-1C
Subject Type : AEC

Learning Outcomes:

After successful completion of the course students should be able to:

- Day to day conversations and functional use of basic structures
- Concepts of grammar and usage
- Routine correspondence
- Comprehension and presentation skills

Teaching and Evaluation Scheme:

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

Course Content

Unit –I

[Weightage=35% approx., Lectures=12]

Speaking / Enhancing Speaking Skills

Introducing oneself, talking about friends and family members-suggested conversations, contracted forms, describing oneself using adjectives

Talking to and about friends and family members in various social situations- suggested conversations, using simple present and present continuous, using suggested vocabulary to talk about family, talking about future, using since and for, tag questions.

Talking about daily activities

Suggested vocabulary and conversations, adverbs of frequency,

Talking about Job interviews -suggested conversations, expressing opinions

small talks- suggested conversations, using present perfect

Talking about Holidays and travel-suggested conversations and special usages, small talks- suggested conversations, using present perfect

Talking about Holidays and travel-suggested conversations and special usages

Unit –II

[Weightage=30% approx., Lectures=10]

Grammar

Parts of speech, Noun, Pronoun, Verb, Adverb, Adjective, Preposition, Connectives, Tenses

Using Tenses: simple present or present progressive, Present perfect or simple past, simple past or past perfect, simple future or future progressive, future perfect

present perfect continuous, Past perfect continuous, future perfect continuous

Modals: Use of 'Be', 'Do', 'Have', Can – Could, Shall – Should, Will – Would

May – Might, Must – Ought to, Dare – Need

Subject – Verb Agreement

Active-Passive Voice, Active-Passive Voice

Basic Rules, Omissions of the objects, Passive voice: Transitive verb, Two Objects, Preposition, Imperative sentences

Unit –III

[Weightage=25% approx., Lectures=6]

Writing skills

Note taking and note making

-Importance, features of a good note, making effective class-notes, five methods of preparing notes, useful tips.

Circulars and memo writing

-informative and official circulars, inter office memo- structure and style

Unit –IV

[Weightage=10% approx., Lectures=2]

Art of Book Reviews: Writing to Presentation

Book reviews: process of writing

Writing reviews and making presentations tips

Reference Books

- Spoken English for My world By: Sabina Pillai, Oxford University Press Publication
- Communication Skills By Sanjay Kumar and PushpaLata, Oxford University Press publication
- English For Academic and Professional Skills, By: AnandMahanad, Tata McGraw Hill Publishing Company Limited, New Delhi, 2013

B.Sc. (CS) Semester – I (First Year)

Subject Title : Project - I
Subject Code : SEC241-1C
Subject Type : SEC

Rationale:

By studying the different theoretical and fundamental concept, students must ensure their learning by developing real time or scenario-based applications on the fundamental concept. The project development as a subject will help them to learn and understand the applications of the concept which they are learning from different subjects in the semester.

- Primarily, student must gain the knowledge about the applications of the fundamentals.
- Importantly, they need to also learn the technology trends and develop their skills on those technologies during project development.

Learning Outcomes:

Students will be able to learn and perform the daily professional, communication and operational task useful for employment purpose.

Teaching and Evaluation Scheme:

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

Course Content

Students with specific count of members will select a Project Title related to real life application development using HTML, CSS and JavaScript. They will develop web pages, utilizing their skills of HTML, CSS and JavaScript, relevant to the selected application.

Project report shall be submitted including following details:

- Project Title
- Group Details
- Project Domain
- Project Definition
- Project Overview
- Detail Explanation

- Future Enhancement
- References

Note: Project will be evaluated based on Presentation / Live Project Demonstration.

B.Sc. (CS) 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:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
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.

B.Sc. (CS) 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:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
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 (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 Books:

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

Other Reference Books

- 1) THE ARYABHATI of ARYABHATA An Ancient Indian Work on Mathematics and Astronomy, Walter Eugene Clark
- 2) Indian Astronomy- A source book (Based primarily on Sanskrit Texts), Compiled by B V Subbarayappa & K V Sharma, Nehru Center, Bombay