College of Computer, Science & Information Technology - Junagadh

AFFILIATED TO BHAKTA KAVI NARSINH MEHTA UNIVERSITY

✦ **Syllabus (as per NEP-2020)** ✦

B.Sc.(IT) [Bachelor of Science in Information Technology]
B.C.A. [Bachelor of Computer Application]
[Semester – I & II]

Academic Year : 2024–25

(Effective from June – 2023)

Credit Structure for Semester - 1

Sr. No.	Course Group (Major/Minor/MDC/ SEC/AEC/VAC)	Course Paper Title	Credit	Ext. Marks (Theory)	Int. Marks (Theory)	Ext. Marks (Pract.)	Int. Marks (Pract.)	Total Marks
1	Major-1	Problem Solving Methodologies & Programming in C (Theory)	04	50	50	--	--	100
2	Major-2	Problem Solving Methodologies & Programming in C (Practical)	04	--	--	50	50	100
3	Minor-1	Basics of Web Page Development	04	50	--	25	25	100
4	MDC/IDC-1	Computer Fundamental & Emerging Technology	04	50	50	--	--	100
5	SEC-1	Office Automation	02	25	25	--	--	50
6	AEC-1	English Language-1	02	25	25	--	--	50
7	VAC-1	Indian Knowledge System-1	02	25	25	--	--	50
	Total Credits		22	Total Marks				550

Credit Structure for Semester - 2

Sr. No.	Course Group (Major/Minor/MDC/ SEC/AEC/VAC)	Course Paper Title	Credit	Ext. Marks (Theory)	Int. Marks (Theory)	Ext. Marks (Pract.)	Int. Marks (Pract.)	Total Marks
1	Major-3	Data Structure using C (Theory)	04	50	50	--	--	100
2	Major-4	Data Structure using C (Practical)	04	--	--	50	50	100
3	Minor-2	Web Programming using PHP	04	50	--	25	25	100
4	MDC/IDC-2	Computer Organization & Archi.	04	50	50	--	--	100
5	SEC-2	Basic concept of Networking & Internet	02	25	25	--	--	50
6	AEC-2	English Language-2	02	25	25	--	--	50
7	VAC-2	Environmental Science	02	25	25	--	--	50
	Total Credits		22	Total Marks				550

General Instructions (Passing Standard) :

The standard of passing the B.Sc.(IT)/B.C.A. Degree Examination will be as under:

1. To pass any semester examination of the B.Sc.(IT)/B.C.A. Degree, a candidate must obtain at least 40% marks in the university examination (External & Internal) with all sections (e.g. Theory, Practical & Internal) separately in each course.

2. Class will be awarded based on Earned Grade Points, SGPA and CGPA as per rules of University.

B.Sc.(IT) & B.C.A. SEMESTER – I

MAJOR-01 : PROBLEM SOLVING METHODOLOGIES & PROGRAMMING IN C (THEORY)

Unit-1 : Introduction of C Language   [Teaching Hrs. 12]

- Introduction to Programming
- Various Computer Languages
- History & Overview of C Language
- Difference between traditional C and modern C
- C character set
- C tokens
  - Keywords
  - Constants
  - Strings
  - Identifiers and variables
  - Operators
- Operators & Hierarchy of operators
- Data types in c
- Type casting & Type Conversion
- Pre – Processors in C

Introduction of Logic Development Tools
- Introduction of Logic & Basic of Algorithm.
- Basics of Flow Chart
- Dry-run and its Use.
- Other Logic development techniques (Algorithm and Flowchart Based on Programming)

Unit-2 : Branching & Looping [Teaching Hrs. 12]
- Decision structure
  - If statements(All Types)
  - Switch statement
  - Conditional ternary operator
- Looping Structures
  - For loop
  - Do...while loop
  - While loop
  - Nesting of loops
- Jumping statements
  - Break statement
  - Continue statement
  - Go to statements

Unit-3 : Library Functions [Teaching Hrs. 12]
- Introduction of Library Function
- Brief overview of Header Files (stdio.h, conio.h, math.h, string.h, stdlib.h, ctype.h, graphic.h, process.h, dos.h)
- Types of library functions
  - **String Function:** strcpy, strncpy, strcat, strncat, strchr, strcmp, strncmp, strlen, strstr
  - **Mathematical Functions:** ceil, div, exp, fabs, floor, fmod, log, pow, sqrt
  - **Date & Time Functions:** clock, time, gmtime, localtime
  - **Graphics Functions:** initgraph, closegraph, arc, line, circle, ellipse, getx, putx, setcolor, setbkcolor
  - **I/O Formatting Functions:** printf, scanf, getc, getchar, gets, putc, putchar, puts
  - **Miscellaneous Functions:** delay, clrscr, isalnum, isalpha, isdigit, islower, isprint, isspace, isupper, toupper, tolower
  - **Standard Library functions:** abs, atof, atol, exit, free, rand
  - **Memory Allocation Functions:** malloc , realloc , calloc

User Define Functions (udf)
- Concept of User Define Function
- Types of user defined functions
- call by value & call by reference
- Nesting & Recursion
- Storage classes

Unit-4 : Array [Teaching Hrs. 12]
- Concept of Array
- Types of arrays
  - Single dimensional array
  - Two dimensional array
  - Multi-dimensional array
- String arrays
- Array with functions using UDF
- Use of Arrays in Programming

Structures
- Concept of Structure
- Initializations and declarations
- Array with structures
  - Array of Structure
  - Array Within Structure
- Udf with structures
- Nested structures
- Introduction to union
- Difference between Structure & Union

Unit-5 : Pointers [Teaching Hrs. 12]

- Concept of Pointers
- Pointer to Variables
- Pointer to Array
- Pointer within Array
- Pointer To Structure
- Pointers within structure
- Pointer to Pointer
- Use of pointers in Dynamic Programming

File Handling

- Concept of data files
- Importance of file handling
- I/O Operation
- Command line arguments

Reference Books:
1. Programming in ANSI C : E. Balagurusami
2. Let Us C : Yashwant Kanetkar.
3. Working with C : Yashwant Kanetkar.
4. Programming in C : Schaum Series publication.

Website References:
- https://www.tutorialspoint.com/cprogramming/index.htm
- http://www.eskimo.com/~scs/cclass/notes/top.html
- http://c-faq.com/
- http://www.learn-c.org/
- https://www.tutorialspoint.com/cprogramming/cprogramming_tutorial.pdf
- https://www.w3schools.in/c-tutorial/
- https://www.javatpoint.com/c-programming-language-tutorial

MAJOR-02 : PROBLEM SOLVING METHODOLOGIES & PROGRAMMING IN C (PRACTICAL)

Unit-1 : Introduction of C Language: Lab Session [Teaching Hrs. 24]

- Introduction to Programming
- Various Computer Languages
- History & Overview of C Language
- Difference between traditional C and modern C
- C character set
- C tokens
    - Keywords
    - Constants
    - Strings
    - Identifiers and variables
    - Operators
- Operators & Hierarchy of operators
- Data types in c
- Type casting & Type Conversion
- Pre – Processors in C

Introduction of Logic Development Tools

- Introduction of Logic & Basic of Algorithm.
- Basics of Flow Chart
- Dry-run and its Use.
- Other Logic development techniques (Algorithm and Flowchart Based on Programming)

Unit-2 : Branching & Looping: Lab Session [Teaching Hrs. 24]

- Decision structure
    - If statements(All Types)
    - Switch statement
    - Conditional ternary operator

- Looping Structures
  - For loop
  - Do...while loop
  - While loop
  - Nesting of loops
- Jumping statements
  - Break statement
  - Continue statement
  - Go to statements

Unit-3 : Library Functions: Lab Session   [Teaching Hrs. 24]

- Introduction of Library Function
- Brief overview of Header Files (stdio.h, conio.h, math.h, string.h, stdlib.h, ctype.h, graphic.h, process.h, dos.h)
- Types of library functions
  - **String Function:** strcpy, strncpy, strcat, strncat, strchr, strcmp, strncmp, strlen, strstr
  - **Mathematical Functions:** ceil, div, exp, fabs, floor, fmod, log, pow, sqrt
  - **Date & Time Functions:** clock, time, gmtime, localtime
  - **Graphics Functions:** initgraph, closegraph, arc, line, circle, ellipse, getx, putx, setcolor, setbkcolor
  - **I/O Formatting Functions:** printf, scanf, getc, getchar, gets, putc, putchar, puts
  - **Miscellaneous Functions:** delay, clrscr, isalnum, isalpha, isdigit, islower, isprint, isspace, isupper, toupper, tolower
  - **Standard Library functions:** abs, atof, atol, exit, free, rand
  - **Memory Allocation Functions:** malloc , realloc , calloc

User Define Functions (udf)
- Concept of User Define Function
- Types of user defined functions
- call by value & call by reference
- Nesting & Recursion
- Storage classes

Unit-4 : Array: Lab Session   [Teaching Hrs. 24]

- Concept of Array
- Types of arrays
  - Single dimensional array
  - Two dimensional array
  - Multi-dimensional array
- String arrays
- Array with functions using UDF
- Use of Arrays in Programming

Structures
- Concept of Structure
- Initializations and declarations
- Array with structures
  - Array of Structure
  - Array Within Structure
- Udf with structures
- Nested structures
- Introduction to union
- Difference between Structure & Union

Unit-5 : Pointers: Lab Session   [Teaching Hrs. 24]

- Concept of Pointers
- Pointer to Variables
- Pointer to Array
- Pointer within Array
- Pointer To Structure
- Pointers within structure
- Pointer to Pointer
- Use of pointers in Dynamic Programming

File Handling
- Concept of data files
- Importance of file handling
- I/O Operation
- Command line arguments

Reference Books:
1. Programming in ANSI C : E. Balagurusami
2. Let Us C : Yashwant Kanetkar.
3. Working with C : Yashwant Kanetkar.
4. Programming in C : Schaum Series publication.

Website References:
- https://www.tutorialspoint.com/cprogramming/index.htm
- http://www.eskimo.com/~scs/cclass/notes/top.html
- http://c-faq.com/
- http://www.learn-c.org/
- https://www.tutorialspoint.com/cprogramming/cprogramming_tutorial.pdf
- https://www.w3schools.in/c-tutorial/
- https://www.javatpoint.com/c-programming-language-tutorial

MINOR–01 : BASICS WEB PAGE DEVELOPMENT

Unit-1 : Basic of HTML [Teaching Hrs. 12]
- Fundamental of HTML
- Basic Tag and Attribute
- The Formatting Tags
- The List Tags & Link Tag
- inserting special characters,
- adding images and Sound,
- Table & Frame in HTML
- Forms

Unit-2 : Advance HTML 5 [Teaching Hrs. 11]
- HTML 5 Document Structure & Syntax (section, article, aside, header, footer, nav, dialog)
  - Attributes of HTML 5
  - Web Form (datetime, date, month, week, time, number, range, email, url)
- Audio / Video

Unit-3 : Cascading Style Sheet & CSS 3 [Teaching Hrs. 11]
- Introduction to CSS
- Types of Style Sheets
- Class, ID Selector
- CSS Text & Font Properties
- CSS Background Properties
- CSS List Properties
- CSS Margin & Padding Properties
- CSS Comments
- CSS 3
  - Border Property
  - Background & Gradient Property
  - Drop Shadow Property
  - 2D & 3D Transform Property
  - Transition Property

Unit-4 : Java Script [Teaching Hrs. 11]
- Introduction to JavaScript
- Variables
- JavaScript Operators
- Conditional Statements

- JavaScript Loops
- JavaScript Break and Continue Statements
- Dialog Boxes
- JavaScript User Define Function
  - Built in Function (string, Maths, Array, Date)
- Events : onclick, ondblclick, onmouseover, onmouseout, onkeypress, onkeyup, onfocus, onblur, onload, onchange, onsubmit, onreset)
- Form Validation & E-mail Validation

Unit-5 : Practical & Viva   [Teaching Hrs. 30]
- Practical exercises based on concepts from Unit 1 to 4

Reference Books:
1. HTML in 10 steps or less Laurie Ann Ulrich, Robert G. Fuller
2. World Wide Web Design with Html C Xavier.
3. Practical Html 4.O Lee Philips.
4. Mastering In FrontPage BPB

Website References :
1. https://www.javatpoint.com/html-tutorial
2. https://www.tutorialspoint.com/html/index.htm
3. https://www.w3schools.com/html/
4. https://www.csstutorial.net

MDC/IDC-1 : COMPUTER FUNDAMENTALS & EMERGING TECHNOLOGY

Unit-1 : Introduction of Computers   [Teaching Hrs. 12]
- Basics of Computers
  - What is Computer?
  - Characteristics of Computer
  - Data Processing Cycle(Data → Process → information)
- Classification of Computer by Data Processed
  - Analog, Digital and Hybrid Computers
- History and Generations of Computers
  - First to Fifth Generation Computers
- Classification of Computer by Processing Capabilities
  - Micro, Mini, Mainframe and Super Computers
- History and Generations of Computers.
  - First to Fifth Generation Computers
- Simple Model of Computer
  - Input Devices
  - CPU (Central Processing Unit)
  - Arithmetic & Logic Unit
  - Control Unit
  - Internal Memory
- Output Devices
- Secondary Storage Devices

Internal/External parts used with Computer Cabinet
- Introduction to Mother board
- Types of Processors.
  - Dual Core, Core 2 Duo, i2, i3, etc ...
- Memory structure and Types of Memory
  - RAM (SRAM, DRAM, DDR.)
  - ROM (ROM, PROM, EPROM, EEPROM, Cache)
- Slots
  - ISA Slots / PCI Slots / Memory Slots/SATA
- Sockets
- Cables
  - Serial Cable / Parallel Cable / USB Cable/HDMI

- Ports
  - USB (2.0 &3.0)/ Serial / Parellel
- Power Devices :UPS
- Graphic Cards
- Network card, Sound Card

Unit-2 : Input Devices [Teaching Hrs. 12]
- Introduction
- Types of Input Devices
  - Keyboard / Mouse / Trackball / Glide - Pad / Game Devices Joystick, etc.) / Light Pen / Touch Screen / Mic (Sound Input) / Camera (Photo and Video Input) / POS (Point of Sale) Terminal (Scanners, etc)
  - MIDI(Musical Instrument Digital Interface) Keyboard,
  - Wireless Devices (Keyboard, Mouse, etc)
- Types of Scanners
  - OMR, MICR, OBR

Output Devices
- Introduction
- Types of Output Devices
- Types of Monitors
  - CRT Display Units
  - LCD
  - LED
  - OLED
- Types of Printers
  - Impact (Dot Matrix Printer, Daisy Wheel Printer)
  - Non Impact(Ink Jet Printer, Laser Printer)
- Plotters
- Other Devices
  - Fascimile(FAX)
  - Headphone
  - SGD (Speech Generating Device)
  - COM (Computer Output Microfilm)
  - Google Glass

Unit-3 : Data Storage [Teaching Hrs. 12]
- Introduction
- Types of Magnetic Storage Devices
  - Floppy Disk / Hard Disk / Magnetic Tape / Magnetic Disks
- Storage Mechanism of Magnetic Storage Devices
  - Tracks / Sectors / Clusters / Cylinders
- Reading / Writing Data to and from Storage Devices
- Seek Time / Rotational Delay - Latency / Access
- Time/Response Time
- Other Storage Devices
  - USB - Pen Drive/CD/DVD/Blu-Rav Disk. Flash Memory, Cloud Storage(Like Google
- Drive, OneDrive

Unit-4 : Numbering System and Codes [Teaching Hrs. 12]
- Introduction to Binary Codes /
  - Nibble / Bit / Byte / Carry Bit / Parity Bit / Sign Bit
  - KB / MB / GB / TB / HB (etc ...
- Types of Numbering System
  - Binary / Octal/Decimal / Hex-Decimal
- Conversion
  - Binary to Octal, Decimal and Hexa-Decimal
  - Decimal to Binary, Octal and Hexa-Decimal
  - Octal to Binary, Decimal and Hexa-Decimal
  - Hexa-Decimal to Binary, Octal and Decimal
- Binary / Arithmetic
  - Addition
  - Subtraction (1's Compliment and 2's Compliment)
  - Division.
  - Multiplication

- Types of Codes
  - ASCII/BCD / EBCDIC / UniCode
- Parity Check
  - Event Parity System / Odd Parity System

Languages, Operating Systems and Software Packages

- Introduction
- Translator (Assembler / Compiler / Interpreter)
- Types of Languages
  - Machine Level Language
  - Assembly Level Language
  - High Level Language (3GL, 4GL, 5GL, etc.)
- Types of Operating Systems
  - Batch Operating System
  - Multi Processing Operating System
  - Time Sharing Operating System
  - Online and Real Time Operating System
- Uses and applications of Software Packages
  - Word Processing Packages
  - Spread Sheet Packages
  - Graphical Packages
  - Database Packages I
  - Presentation Packages
  - Animation / Video / Sound Packages

Unit-5 : Emerging Technologies and Virus   [Teaching Hrs. 12]
- Different Communication methods
  - GIS / GPS / COMA / GSM/ VOLTE
- Communication Devices
  - Cell Phones / Modem / Infrared / Bluetooth / WiFi / LiFi
- Virus
  - Introduction to Virus and related terms
  - Origin and History
  - Types of Virus
  - Problems and Protection from Virus
- Cloud Computing
  - What is Cloud Computing?
  - Characteristic & Service Models(Iaas, Paas, Saas)
  - Architecture
  - Security & Privacy

Reference Books:
1. Computer Fundamentals By P.K.Sinha
2. Fundamental of IT for BCA By S.Jaiswal
3. Engineering Physics By V.K.Gaur
4. Teach Yourself Assembler By Goodwin.

Website References:
- https://www.javatpoint.com/computer-fundamentals-tutorial
- https://www.tutorialspoint.com/computer_fundamentals/index.htm
- https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf
- http://www.kvadilabad.org/admin/downloads/1788662251computer_fundamentals_tutorial.pdf

SEC-01 : OFFICE AUTOMATION

Unit-1 : Wordprocessing & Basics of Spreadsheet   [Teaching Hrs. 08]
Introduction
Objectives
Word Processing Basics
- Opening Word Processing Package
- Title Bar, Menu Bar, Toolbars & Sidebar
- Creating a New Document

- Opening and Closing Documents
- Opening Documents
- Save and Save As
- Closing Document
- Using The Help
- Page Setup
- Print Preview
- Printing of Documents
- PDF file and Saving a Document as PDF file

Text Creation and manipulation
- Document Creation
- Editing Text
- Text Selection
- Cut, Copy and Paste
- Font, Color, Style and Size selection
- Alignment of Text
- Undo & Redo
- Auto Correct, Spelling & Grammar
- Find and Replace

Formatting the Text
- Paragraph Indentation
- Bullets and Numbering
- Change case
- Header & Footer

Table Manipulation
- Insert & Draw Table
- Changing cell width and height
- Alignment of Text in cell
- Delete/Insertion of Row, Column and Merging & Splitting of Cells Border and Shading

BASICS OF SPREADSHEET
Introduction
Objectives
Elements of Spread Sheet
Creating of Spread Sheet
- Concept of Cell Address [Row and Column]and selecting a Cell
- Entering Data [text, number, date in Cells
- Page Setup
- Printing of Sheet
- Saving Spreadsheet
- Opening and Closing

Unit-2 : Advanced Spreadsheet Management & Presentation   [Teaching Hrs. 07]
Manipulation of Cells & Sheet
- Modifying/ Editing Cell Content
- Formatting Cell (Font, Alignment, Style)
- Cut, Copy, Paste & Paste Special
- Changing Cell Height and Width
- Inserting and Deleting Rows, Column
- Auto Fill
- Sorting Filtering
- Freezing panes

Formulas, Functions and Charts
- Using Formulas for Numbers (Addition, Subtraction, Multiplication & Division, IF)
- AutoSum
- Functions (Sum, Count, MAX, MIN, AVERAGE)
- Charts(Bar, Pie, Line)

PRESENTATION
Introduction
Objectives
Creation of Presentation
- Creating a Presentation Using a Template
- Creating a Blank Presentation
- Inserting & Editing Text on Slides
- Inserting and Deleting Slides in a Presentation
- Saving a Presentation

Manipulating Slides
- Inserting Table
- Adding Clip Art Pictures
- Inserting Other Objects
- Resizing and Scaling an Object
- Creating & using Master Slide

Presentation of Slides
- Choosing a Set Up for Presentation
- Running a Slide Show
- Transition and Slide Timings
- Automating a Slide Show
- Providing A esthetics to Slides & Printing
- Enhancing Text Presentation
- Working with Color and Line Style
- Adding Movie and Sound
- Adding Headers, Footer sand Notes
- Printing Slides and Handouts

Unit-3 : Practical Lab Session   [Teaching Hrs. 30]

- Practical exercises based on Unit – 1 to 2

Reference Books:

No.	Name	Author / Publication
1	Microsoft Office for Beginners	By M. L. Humphrey
2	Microsoft Office 2019 Beginner	By M. L. Humphrey
3	Mastering MS Office	By Bittu Kumar
4	Microsoft Office Training Guide	By Prof. Satish Jain M. Geetha Kratika, BPB Publications
5	Working in Microsoft Office	By Ron Mansfield
6	Windows 10 Step By Step	By Joan Lambert
7	Windows 10 Inside Out	By Ed Bott and Craig Stinson

Website References:
- https://edu.gcfglobal.org/en/subjects/office/#
- https://www.customguide.com/training/
- https://www.guru99.com/free-microsoft-courses-certifications.html
- https://alison.com/tag/microsoft-office
- https://www.makeuseof.com/tag/microsoft-office-tutorials-courses/
- https://www.udemy.com/topic/microsoft-word/free/
- https://www.w3schools.com/excel/index.php

AEC : AEC101 : ENGLISH LANGUAGE-1

Table of Contents

Prescribed Text: *Confluence* by K.N.Shoba published by Cambridge University Press, New Delhi

Unit No.	Syllabus Contents
1	**Prose** - Ethics: Humanities Vs Sciences by S.Radhakrishnan (Chpt..1.1) - Learning: Wings of Fire (Extract) by A.P.J.Abdul Kalam (Chpt. 1.2) **Short Stories** - Attitude: Witches' Loaves by O.Henry (Chpt.3.1) - Fantasy: The Country of the Blind by H.G.Wells (Chpt. 3.2)

	Grammar:
2	- Tenses (Chpt.1.1) - Coordinating Conjunctions: for, and, nor, but, or, yet, and so. (Chpt. 1.2) **Writing:** - Developing a creative paragraph. (Chpt. 3.2)

Suggested Reading:
1. Business Communication by Urmila Rai and S.M. Rai. Himalaya Publishing House
2. Effective Technical Communication by M Ashraf Rizvi. Tata Mc Graw hill
3. Spoken English: A Foundation Course by Kamlesh Sadanand and Susheela Punitha (Part I and Part II)
4. Intermediate English Grammar: Reference and Practice for South Asian Students by Raymond Murphy. Cambridge University Press
5. Malgudi Days by R.K. Narayan. Indian Thought Publications
6. The Best of Ruskin Bond published by Penguin Books
7. The Collect Short Stories of Khushwant Singh published by Ravi Dayal Publisher
8. W. Somerset Maugham The Complete Short Stories Vol-I published by Heinemann : London

VAC : PHISE101 : INDIAN KNOWLEDGE SYSTEM-1

Units	Content	Teaching Hours.

Unit-1	**Introduction to IKS**
	- **Introduction to IKS & Its importance**
	  - Introduction & importance of IKS
	  - Various IKS Systems
	- **Shashtra – Foundational Literature of Bharatvarsha**
	  - What is Shashtra?
	  - Importance of Shashtra
	  - Classification of Shashtra – Vaidic & Avaidic (With examples of imp. Literature)
	- **Base of IKS proliferation**
	  - Bharatiya Education System and its philosophy
	  - History of BSE From Ancient to modern
	  - Domains of Educations : Gurukul, Pathshala, Vidhyalay, Vishvavidhyalay
		15

Unit-2	**Contribution of IKS to the world**
	- **Mathematics & Astronomy**
	  - Number System
	  - Algebra & Arithmetic
	  - Geometry
	  - Trigonometry
	  - Planetary System
	  - Speed of Light
	  - Eclipse
	- **Life Sciences**
	  - Physics
	  - Chemistry
	  - Botany
	- **Metal Technology**
	  - Mining Techniques
	  - Types of Metals
	  - Equipments and techniques of Metal Smelting
		15

B.Sc.(IT) & B.C.A. SEMESTER – II

MAJOR-03 : DATA STRUCTURE USING C (THEORY)

Unit-1 :   **[Teaching Hrs. 12]**

Introduction to Data Structure
- Data Management concepts
- Foundation terms of a data structure : Interface and Implementation
- Characteristics of a Data Structure : Correctness, Time Complexity & Space Complexity
- Need for Data Structure : Data Search, Processor speed and Multiple requests
- Basic Terminology of data structure : Data, Data Item, Group Items, Elementary Items, Attributeand Entity, Entity Set, Field, Record, File
- Data types – primitive and non-primitive
- Types of Data Structures- Linear & Non Linear Data Structures.

Array
- Representation of arrays
- Applications of arrays

Pointers
- Declaring and initializing pointers
- Pointer arithmetic

Structure
- Declaring and using structure

Sorting & Searching
  Sorting
  - Bubble Sort
  - Selection Sort
  - Quick Sort
  - Merge Sort

  Searching
  - Linear Search
  - Binary Search

Unit-2 :   **[Teaching Hrs. 12]**

Stack and Queue
- Stack
  - Stack-Definitions & Concepts
  - Operations On Stacks
  - Applications of Stacks
  - Polish Expression
  - Reverse Polish Expression and their Compilation
- Queue
  - Representation Of Queue
  - Operations On Queue
  - Circular Queue
  - Priority Queue
    - Array representation of Priority Queue
    - Double Ended Queue
    - Applications of Queue

Unit-3 :   **[Teaching Hrs. 12]**

Dynamic Memory allocation:
- What is Dynamic memory allocation?
- malloc( ), calloc( ), realloc( ) and free( ) function

Linked List:
- Singly Linked List:
  - Building a linked list
  - Traversing a linked list
  - Insertion in a linked list
    - As a first node
    - As a last node
    - At specific location

- o Deletion of a node
  - ▪ First node
  - ▪ Last node
  - ▪ Specific node
- o Searching of linked lists
- o Sorting of linked list
- o Merging linked list
- Doubly Linked list (traversing, insertion and deletion)
- Linked list implementation of Stack
- Linked list implementation of Queue
- Applications of linked list.

Unit-4 :   [Teaching Hrs. 12]
Non Linear Data Structure
- Tree
  - o Definitions and Concepts
  - o Representation of binary tree
  - o Binary tree traversal (inorder, postorder, preorder)
- Graph
  - o Basic concepts and definitions
  - o Elementary Graph operations
  - o Breadth First Search
  - o Depth First Search
  - o Spanning Trees
  - o Shortest path

Unit-5 :   [Teaching Hrs. 12]
File Structure
- Basic concepts of File and file systems
- File system services Disk
- space allocation MS_DOS
- FATfile system File
- allocation table
- tree-structured directory system

Reference Books:

1	Data Structures through C	Yashwant Kanetkar (BPB)
2	Expert Data Structure with C	R B Patel (Khanna Publication).
3	Data Structure through C/C++	Tennaunbuam
4	Pointer in C	Yashwant Kanetkar
5	Let us C	Yashwant Kanetkar

Website References:
- https://www.tutorialspoint.com/data_structures_algorithms/data_structure_overview.htm
- https://www.geeksforgeeks.org/data-structures/
- https://www.includehelp.com/c-programming-data-structure-examples.aspx
- https://www.sitesbay.com/data-structure/c-data-structure

MAJOR-04 : DATA STRUCTURE USING C (PRACTICAL)

Unit-1 :   [Teaching Hrs. 24]
Introduction to Data Structure
- Data Management concepts
- Foundation terms of a data structure : Interface and Implementation
- Characteristics of a Data Structure : Correctness, Time Complexity & Space Complexity
- Need for Data Structure : Data Search, Processor speed and Multiple requests
- Basic Terminology of data structure : Data, Data Item, Group Items, Elementary Items, Attributeand Entity, Entity Set, Field, Record, File
- Data types – primitive and non-primitive
- Types of Data Structures- Linear & Non Linear Data Structures.

Array
- Representation of arrays
- Applications of arrays

Pointers
- Declaring and initializing pointers
- Pointer arithmetic

Structure
- Declaring and using structure

Sorting & Searching

Sorting
- Bubble Sort
- Selection Sort
- Quick Sort
- Merge Sort

Searching
- Linear Search
- Binary Search

Unit-2 :   [Teaching Hrs. 24]

Stack and Queue
- Stack
  - Stack-Definitions & Concepts
  - Operations On Stacks
  - Applications of Stacks
  - Polish Expression
  - Reverse Polish Expression and their Compilation
- Queue
  - Representation Of Queue
  - Operations On Queue
  - Circular Queue
  - Priority Queue
    - Array representation of Priority Queue
    - Double Ended Queue
    - Applications of Queue

Unit-3 :   [Teaching Hrs. 24]

Dynamic Memory allocation:
- What is Dynamic memory allocation?
- malloc( ), calloc( ), realloc( ) and free( ) function

Linked List:
- Singly Linked List:
  - Building a linked list
  - Traversing a linked list
  - Insertion in a linked list
    - As a first node
    - As a last node
    - At specific location
  - Deletion of a node
    - First node
    - Last node
    - Specific node
  - Searching of linked lists
  - Sorting of linked list
  - Merging linked list
- Doubly Linked list (traversing, insertion and deletion)
- Linked list implementation of Stack
- Linked list implementation of Queue
- Applications of linked list.

Unit-4 :   [Teaching Hrs. 24]

Non Linear Data Structure
- Tree
  - Definitions and Concepts
  - Representation of binary tree
  - Binary tree traversal (inorder, postorder, preorder)

- Graph
  - Basic concepts and definitions
  - Elementary Graph operations
  - Breadth First Search
  - Depth First Search
  - Spanning Trees
  - Shortest path

Unit-5 :   [Teaching Hrs. 24]
File Structure
- Basic concepts of File and file systems
- File system services Disk
- space allocation MS_DOS
- FATfile system File
- allocation table
- tree-structured directory system

Reference Books:

1	Data Structures through C	Yashwant Kanetkar (BPB)
2	Expert Data Structure with C	R B Patel (Khanna Publication).
3	Data Structure through C/C++	Tennaunbuam
4	Pointer in C	Yashwant Kanetkar
5	Let us C	Yashwant Kanetkar

Website References:
- https://www.tutorialspoint.com/data_structures_algorithms/data_structure_overview.htm
- https://www.geeksforgeeks.org/data-structures/
- https://www.includehelp.com/c-programming-data-structure-examples.aspx
- https://www.sitesbay.com/data-structure/c-data-structure

MINOR–02 : WEB PROGRAMMING USING PHP

Unit-1 :   [Teaching Hrs. 12]
Web Programming
- Static and Dynamic Web
- Client side &Server side Scripting
- Introduction to other Server side languages
- Webserver (IIS & Apache)
- Web Hosting, Virtual Host, Multi-Homing
- Distributed Web Server Overview

PHP Basic
- Introduction to PHP
- PHP configuration in IIS & Apache Web server
- Understanding of PHP.INI file
- Understanding of PHP .htaccess file
- PHP variable
- Static & Global variables
- GET & POST method
- PHP Operators
- Conditional Structure & Looping Structure
- Array

PHP Function
- **User Defined Functions:**
  argument function, default argument function,
  variable function, return function
- **Variable Length Argument Functions:**
  func_num_args, func_get_arg, func_get_args
- **Variable Functions:**
  gettype, settype, isset, unset, strval, floatval, intval, print_r

- o **String Functions:**
  chr, ord, strtolower, strtoupper, strlen, ltrim, rtrim trim, substr, strcmp, strcasecmp,strpos, strrpos, strstr, stristr, str_replace, strrev, echo, print, explode, implode, join,md5, str_split, str_shuffle, ucfirst, ucwords.
- o **Math Functions:**
  abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand, bindec, decbin, hexdec, dechex,is_finite, is_infinite
- o **Date Functions:**
  date, getdate, setdate, checkdate, time, mktime, date_add, date_create, date_format,gmdate, localtime, strftime
- o **Array Functions:**
  count, list, in_array, current, next, previous, end, each, sort, rsort, assort, arsort,array_merge, array_reverse, array_diff, array_unique, array_key_exists, array_push,array_pop, array_search
- o **Miscellaneous Functions:**
  define, constant, include, require, header, die, exit
- o **File Handling Functions:**
  fopen, fread, fwrite, fclose, file_exists, is_readable, is_writable, fgets, fgetc, file,file_get_contents, fputs, file_put_contents, ftell, fseek, rewind, copy, unlink, rename,move_uploaded_file

Unit-2 :   [Teaching Hrs. 11]

Handling Form, Session Tracking & PHP Components
- o Handling form with GET & POST
- o Cookie
- o Session
- o Server Variable
- o PHP Components:
  PHP GD Library
  PHP Regular expression
  Uploading file
  Sending mail using mail()
  Sending mail using smtp()

AJAX
- What is AJAX
- PHP with AJAX
- How AJAX works with PHP
- Working with AJAX as background process
- Using JQuery with PHP
  JQuery AJAX with PHP

Unit-3 :   [Teaching Hrs. 11]

Introduction of SQL, MySQL Functions
- Working with MySQL using PhpMyAdmin
- SQL DML Statement (Insert, Update, Select, Delete) Command
- MySQLi Functions:
- mysqli_connect,mysqli_select_db, mysqli_query, mysqli_affected_rows, mysqli_num_rows, mysqli_autocommit, mysqli_commit, mysqli_fetch_array, mysqli_fetch_assoc, mysqli_fetch_object, mysqli_fetch_row, mysqli_prepare

Unit-4 :   [Teaching Hrs. 11]

Web Services
- XML and JSON
- Introduction to JSON
- Installation & Configuration
- Resource Types
- JsonSerializable
- JSON Functions: json_decode, json_encode

jQuery
- What is jQuery?
- Query Syntax
- jQuery Selector:
  Element Selector   Class Selector   ID Selector

- jQuery Events:
  click, dbclick, keypress, keydown, keyup, submit, change, focus, blur, load, resize, scroll, unload
- jQuery Effects:
  hide show, fade, slide

Unit-5 : Practical   [Teaching Hrs. 30]

Reference Books: No.	Name	Author/Publication
1	Modern PHP: New Features and Good	Josh Lockhart(ORELLY)
2	PHP Cookbook: Solutions & Examples for PHP Programmers	David Skylar and Adam Trachtenberg (ORELLY)
3	Programming PHP	Kevin Tatroe and Peter MacIntyre (ORELLY)
4	PHP for the Web: Visual QuickStart Guide (4th Edition)	Larry Ullman (Peachpit Press).

MDC-2 : COMPUTER ORGANIZATION & ARCHITECTURE

Unit-1 :   [Teaching Hrs. 12]
Digital Logic Circuits
- Block diagram of Digital Computers
- Logic Gates
  - AND
  - OR
  - INVERTER
  - BUFFER
  - NAND
  - NOR
  - XOR
  - XNOR
  - Above gates with graphic symbol, algebraic function and truth table
- Boolean Algebra
  Boolean Function, truth table, logic diagram, Boolean expression, Basic identities of Boolean algebra, DeMorgans Theorem, Complement of a function, simplification of Boolean expression using Boolean algebra
- Map Simplification
  minterms, adjacent squares, two, three and four variable function simplification, product of sum simplification, NAND and NOR implementation, Don't care conditions, example of map simplification using two, three and four variable, sum of product concept

Unit-2 :   [Teaching Hrs. 12]
Combinational circuits, Flip flop and Sequential circuits
- Combinational Circuit
  - Block diagram of Combinational Circuit
  - analysis and design of combinational circuit like Half Adder and Full Adder
- Flip Flops
  - Concept of Clock pulse
  - SR Flip-flop
  - D Flip-flop
  - JK Flip-flop
  - T Flip-flop
  - Edge-Triggered
  - Master-slave Flip-flop
  - Excitation table of Flip-flop
- Sequential Circuit
  - Concept and meaning of Sequential circuit
  - Flip-flop Input equation
  - State table
  - State diagram
  - example of Designing of different sequential circuit

Unit-3 : [Teaching Hrs. 12]

Digital Components

- Integrated circuits : Concept of IC, SSI, MSI, LSI, VLSI, TTL, ECL, MOS, CMOS
- Decoders
  Concept of decoder, 2 to 4 line decoder, 3 to 8 line decoder, decoder with enable input, NAND gate decoder, Decoder expansion
- Encoders : Concept of encoder, Octal to binary encoder
- Multiplexer
  Concept of Multiplexer, 2 to 1 line multiplexer, 4 to 1 line multiplexer, quadruple 2 to 1line multiplexer
- De-multiplexer : Concept of De-Multiplexer: 1 to 4 line de-multiplexer
- Register
  Concept of Register, loading of register, 4-bit register, register with parallel load, shift register, bidirectional shift register with parallel load,
- Counter
  Concept of Binary counter, 4-bit synchronous binary counter, 4-bit binary counter with parallel load

Unit-4 : [Teaching Hrs. 12]

Central Processing Unit:

- Introduction of CPU
- Major components of CPU
- Concept of different Computer register
- Registers for the Basic Computer (DR, AR, AC, IR, PC, TR, INPR, OUTR)
- Register symbol, name, number of bits and function is brief
- General Register Organization
  - Control word
- Stack Organization:
  - Register stack
  - Memory stack
  - Polish Notation
- Reverse Polish Notation

Unit-5 : [Teaching Hrs. 12]

Input-Output Organization and Memory Organization:
Input-Output Organization

- IO Interface
  - Concept of I/O interface
  - I/O Bus and Interface modules
- I/O versus Memory Bus, example of I/O interface unit
- DMA
  - Concept of DMA
    - bus request
    - bus grant
    - burst transfer
    - cycle stealing
  - DMA Controller
  - DMA transfer
- IOP
  - Concept of IOP
  - I/O processing
  - block diagram of computer with I/O processor

Memory Organization

- Memory Hierarchy
  - Memory hierarchy in a computer system
- Only brief concept of
  - Auxiliary memory
  - cache memory
  - Main Memory
  - Bootstrap loader
  - computer start-up
- RAM and Rom Chips
- Typical RAM chip block diagram and function table
- Typical ROM chip block diagram

SEC-02 : BASIC CONCEPTS OF NETWORKING & INTERNET

Unit-1 :   **[No. of Lectures 10]**

Introduction to Computer Network
- Basics of Computers
- Computer Network
- Type of Computer Network
- Network Topology
- OSI Reference Model (Introduction)
- TCP/IP
- Internet Terminology
- ISP (Internet Service Provider)
- Intranet
- VSAT (very small aperture terminal)URL

Unit-2 :   **[No. of Lectures 10]**

Basics of Internet
- Evolution of World Wide Web (WWW)
- Types and uses of various Search Engines
- Remote Communication
    - Login
    - Applications
    - advantages
    - disadvantages
- Electronic Mail (Email)
- Concept and use of :
    - E-Commerce
    - E-Business
    - E-Governance
    - Mobile Commerce
- **Website Basics**
  WebPages, Hyper Text Transfer, URL , Domain Names, Domain name server, Internet Protocol, File Transfer Protocol, Protocol Address, Website(Static, Dynamic, Responsive), Web browser, Web Servers, Web Hosting, web portal

Unit-3 :   **[No. of Lectures 10]**

- **Network Security Concepts:**
    - Cyber Law
    - Firewall
    - Cookies
    - Hackers and Crackers
- **Types of Payment System:**
    - Digital Cash
    - Electronic Cheque
    - Smart Card
    - Debit/Credit Card
    - Net banking
    - UPI

References:

Reference Books: No.	Name	Author / Publication
1	Internet The Complete Reference	Young.
2	Internet for Every One	Leon.

Website References:
- https://www.geeksforgeeks.org/basics-computer-networking/
- https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer_science_internet.htm

AEC : ENGLISH LANGUAGE – 2

Table of Contents

Prescribed Text: *Confluence* by K.N.Shoba published by Cambridge University Press, New Delhi

Unit No.	Syllabus Contents
1	**(A) Short Stories:** • Humour: The Boy Who Broke the Bank by Ruskin Bond (Chpt.3.3) • Social Justice: The Squirrel by Ambai (Chpt.3.4) **(A) Non Fiction;** • Artificial Intelligence: AI and Literature: The Muse in the Machine by John Thornhill (Chpt.4.1) • Social Media: Facebook is Making Us Miserable by Daniel Gulati (Chpt.4.2)
2	**(A) Grammar:** • Direct and Indirect Speech (Chpt.3.3) **(B) Writing:** • Filling Forms (Chpt. 3.4) • Informal Letters (Chpt. 3.4)

Suggested Reading:

1. Intermediate English Grammar: Reference and Practice for South Asian Students by Raymond Murphy. Cambridge University Press
2. Business Communication by Urmila Rai and S.M. Rai. Himalaya Publishing House
3. Effective Technical Communication by M Ashraf Rizvi. Tata Mc Graw hill
4. Spoken English: A Foundation Course by Kamlesh Sadanand and Susheela Punitha (Part I and Part II)

VAC : ENVIRONMENTAL SCIENCE

Units	Content	Teaching Hours.
Unit-1	પર્યાવરણના વૈશ્વિક પ્રશ્નો • તેજાબી વર્ષા (એસિડ રેઇન) – અસર, સમીકરણો • ગ્રીન હાઉસ ઇફેક્ટ, અસરો, ગ્રીન હાઉસ વાયુઓ, પ્રકારો • ઓઝોનના સ્તરમાં ક્ષતિ, અસરો	**50%**
Unit-2	કુદરતી આફતો અને તેના પ્રકાર ભૂકંપ/ધરતીકંપ • વ્યાખ્યા, ધરતીકંપ, એપીસેન્ટર, હાઇપો સેન્ટર, આફ્ટરશોક • ધરતીકંપના પ્રકારો – ટેકટોનિક / નોન ટેકટોનિક • સિસ્મોગ્રાફ • ધરતીકંપ દરમ્યાન બચાવ/રાહતના સૂચનો • ધરતીકંપ આવે ત્યારે શું કરવું અને શું ના કરવું.	**50%**

Suggested Reading:

1. પર્યાવરણ શાસ્ત્ર – બીપીનભાઈ જોશી
2. પર્યાવરણ અને ભૂકંપ ઇજનેરી – ડો. એમ. બી. ગોહિલ, અનિલ કે. પોપટ
3. પર્યાવરણ સાથે – રમેશ સાવલિયા
4. પર્યાવરણ – ડો. એમ. બી. ગોહિલ
5. પર્યાવરણ શિક્ષણ – પ્રો. પંકજભાઈ પરમાર
6. Ecology and Environment – P. D. Sharma, Rastogi.

Evaluation Scheme and Distribution of Marks

Paper Style (For the Subject with Credit 2)

Ques. No.	Particulars	From which Unit	Marks
1	Questions (Any Two Out of Four)	1	10
2	Questions (Any Two Out of Four)	1	10
3	Questions (Any Two Out of Four)	From each Unit	05
Total Marks			**25**

Paper Style (For the Subject with Credit 4)
(Major/Minor/MDC Paper Evaluation Scheme and Distribution of marks)

EXTERNAL ASSESSMENT BY UNIVERSITY		
Que. No.	Particulars	Marks
Q-1	Questions from Unit-1(Any Two out of Four)	10
Q-2	Questions from Unit-2(Any Two out of Four)	10
Q-3	Questions from Unit-3(Any Two out of Four)	10
Q-4	Questions from Unit-4(Any Two out of Four)	10
Q-5	Questions from Unit-5(Any Two out of Four)	10
Total Marks		**50**