DEPARTMENT OF INFORMATION TECHNOLOGYGOVERNMENT DEGREE COLLEGE BARAMULLA

NAAC Re-Accredited Grade 'A'
College with potential for Excellence

Third Semester

(Academic Session 2022-23)

1. Major/Minor
2. Skill Course

Major/Minor

COURSE TITLE	**DATA STRUCTURES AND ALGOGRITHS**
COURSE CODE	**BIT22C301**
SEMESTER	**3rd**
COURSE TYPE	**MAJOR/MINOR**
CREDITS	**06(4+2 credits)**

Objectives:

The objective of this course is to understand the basic concepts of data structures and algorithms, and perform various operations on different data structures, and compute time and space complexity of various algorithms.

Learning Outcomes

After Successful completion of the course, the students should be:

- Understand the basic concepts of algorithm analysis and data structures.
- Articulate linear data structures and operations performed on them.
- Articulate Non-linear data structures and operations performed on them.
- Implement appropriate searching and sorting algorithms.
- Understand various problem-solving paradigms.

UNIT 1: Introduction to Data Structures and Algorithms 15 Hrs

Introduction to Algorithms, Analysis of algorithms, Designing Algorithms, Growth of Functions, Asymptotic notations, Time and Space Complexity study of some basic algorithms. Abstract data types (ADTs), Introduction to Data Structures, Types of Data Structures:-Linear and Non-Linear Data Structures.

UNIT II: Linear Data Structure 15 Hrs

Array-based data structures: arrays and matrices, Memory Representation, Searching and Sorting. Strings: string manipulation, pattern matching algorithms. Linked lists: Introduction, Types: -singly linked lists, doubly linked lists, and circular linked lists.

Unit III: Stacks and Queues 15 Hrs

Stacks and queues: Introduction to stacks, Definition and stack implementation, operations on Stack (push, pop, traversal), applications of stack. Polish notation: Evaluation and their Conversions.Queues: Concept, implementation, operations, and applications.

Unit IV Trees

Introduction to Trees, Implementation of trees, Binary trees (create, insert, delete and search),Tree traversal methods (recursive only), Applications of BST.

UNIT I: Practical/Lab Course, Credits=2) 60 Hrs

1. Write a program to perform following operations on an array: a) Insertion, b) Deletion, c) Traversal
2. Write a program to search an element in an array using Linear Search
3. Write a program to search an element in an array using Binary Search
4. Write a program to sort elements of array using Bubble sort.
5. Write a program to sort elements of array using Selection sort.
6. Write a program to sort elements of array using Insertion sort.
7. Write a program to implement matrix operations using multidimensional array.
8. Write a program to perform string manipulation operations.
9. Write a program to perform the following operations on Singly Linked list: a) Creation, b) Insertion, c) Deletion, d) Traversal.
10. Write a program to perform the following operations on Doubly Linked list: a) Creation, b) Insertion, c) Deletion, d)Traversal.
11. Write a program to perform the following operations on Circular Linked list: a) Creation, b) Insertion, c) Deletion, d) Traversal.
12. Write a program to Implement Stack using array to perform the following operations: a) Push, b) Pop, c) Traversal
13. Write a program to Implement Stack using Linked List to perform the following operations: a) Push, b) Pop, c) Traversal
14. Write a program that uses stack operations to convert a given infix expression into its postfix equivalent.
15. Write a program to Implement Queue using array to perform the following operations: a) Insertion, b) Deletion, c) Traversal
16. Write a program to Implement Queue using Linked List to perform the following operations: a) Insertion, b) Deletion, c) Traversal
17. Write a program to perform the following operations on binary Search tree: a) Insertion, b) Deletion, c) Traversal

18. Write a Program to implement the tree traversal methods.
19. Write a program to search for a key element in a Binary Search tree.

SUGGESTED READING:

- Fundamentals of data structures – Ellis Horowitz and Sartaj Sahni
- Data Structures Files and Algorithms – Abhay K. Abhyankar
- Data Structures and Algorithms – Alfred V. Aho, John E. Hopcroft,Jeffrey D. Ullman (Pearson Education)
- Data Structures –Seymour Lipschutz

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SKILL

COURSE TITLE	**Web Development tools II (BASICS OF INFORMATION TECHNOLOGY III)**
COURSE CODE	**BIT22S302**
SEMESTER	**3rd**
COURSE TYPE	**SKILL ENHANCEMENT COURSE**
CREDITS	**2+2=4 CREDITS**

Learning Ooutcomes:

1. **To learn HTML tags and Javascript language programming conceptes and techniques.**
2. **To develop the ability to logically plan and develop web pages.**
3. **To learn how to write, test, and debug web pages using HTML and Javascript.**
4. **To strengthen career skills.**

Unit I **16 Hrs**

HTML 5

Introduction to HTML and its evolution. HTML5 new features and changes. HTML5 syntax and structure(tags, attributes, semantic markup). Important HTML5 tags and attributes. HTML Forms and Input Types. HTML5 form validation. Mujltimedia: Graphics, Audio and Video, SVG graphics, Purchasing a domain name and Hosting a website.

Unit II **16 Hrs**

CSS AND JAVASCRIPT

Introduction to CSS. CSS3 syntax, selectors, properties, classes, IDs, and cascading styles. The box model and layout principles for creating responsive, flexible designs, Flex Box and Grid Layouts, Animations and Transactions. Use of Color theory and palettes. Styling images and backgrounds.

Introduction to JavaScript, executing JS statements in the browser console. Variables, Datatypes, Classes, collections, controlling program flow with

conditionals, loop to repeat tasks, manage errors and exceptions.Understanding functions, parameters and return values. Methods, instance methods and fields, recursion, debugging a function, working with DOM.

UNIT I **32 Hrs**

1. Create a simple web page that displays name and a photo using HTML to structure the page and CSS to style it.
2. Create a registration form for student.
3. Create a html form that allows users to input there name, email address and message .Use javascript to validate the users input before submitting the form.
4. Create a simple Javascript that allows users to click on different elements on the page to score points with javascript to handle the game logic.
5. How to built a simple form.

Suggested Readings:

1. **Web design with HTML and CSS ---- Prem Kumar**
2. **Mastering HTML and CSS ------ Laura Lemay ,Rafe and Jenifer**

Government Degree College, Baramulla

Semester: 1st Major/Minor1

Subject: Information Technology

Title: Basics of Information Technology Code: BIT22M103
Credit: 03 (Theory 03) Contact Hours: 48

Unit I(Basics of IT)

Data, Information, Information Processing, Characteristics of Information, Information system, Computer, Characteristics of Computers, Evolution of Computers, Generation of computers,Types and Classification of computers. Application of computers. Block Diagram of a computer, Description of Input Unit, Output Unit, Storage Unit, Central Processing Unit, Arithmetic Logic Unit, Control Unit.

Learning to use a computer:Concept of booting :types of booting, Using Mouse, Keyboard, Understanding Desktop, Folders, Files, Creating Folders, Saving Files, Using MS Paint, Renaming, Cut-Copy- Paste, Connecting a printer, scanner, mobile phone.

Unit II (Software Concepts and Office)

Software, Relationship between Hardware and Software, Types of Software: System Software (Operating Systems, Language Translators, Utility Programs, Communications Software) Functions of System Software, Application Software (Word Processing, Spreadsheet, Database, Graphics Personal Assistance, Education, Entertainment Software) Firmware.

Using MS Word: Designing simple documents, Headings, Font, Styles, Bullets, Inserting Images, SmartArt, Tables, Setting Page Layout, Margins, Gutter, Headers and Footers, Printing, Saving as PDF.

Unit III (Office Tools)

Making small presentations: Basics of presentation, creating presentations, preparation and presentation of slides, slide show, taking printouts of presentations /handouts.

Using spreadsheet: Basics of spreadsheet, manipulation of cells, formulas and functions, editing of spreadsheet, printing of spreadsheet.

Reference Books:

1. Mansfield Ron, “Working in Microsoft Office”, Tata McGraw Hills.
2. Perry G, “MS Office2007”, Pearson Education.
3. Sanders, D.H., "Computer Today ", Mc-Graw Hill, 1988.

4. Suresh K. Basandra, “Computers Today”, Galgotia Publications Pvt. Ltd.
5. Raja Raman V., "Fundamental of Computers" (4th edition.), Prentice Hall of India, New Delhi.
6. Trainer T., et al, "Computers”, McGraw Hill. 7. Norton, Peter, “Introduction to Computers Mc-Graw-HillPublications.
7. Dr.WaseemAkram, “Basics of Information Technology”, Notion Publications,2022
8. Computer Fundamentals ,PK Sinha