Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Computer Science

Annual Teaching Plan 2023-24

Name of the teacher: **Dr. V. B. Waghmare**
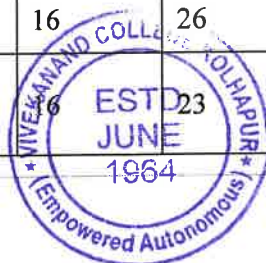
Semester: B.Sc. Sem-III,IV,V,VI

Course Title: Computer Network & Advanced Computer Network, Operating System and Linux

Month: July 2023				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-1 Introduction to Computer Network** Definition, Goals, Application, Basic Concept: Entities, Layers, Protocols, Computer Network. Classification Of Computer Network:	Transmission Techniques: Scale, Connection Method, Functional Relationship, Network Topology, services provided Protocols, Network Architecture: Protocol Hierarchy, Information flow design issues for the layers, Merits and demerits of layer architecture, service primitives, standardization network.
B.Sc. III	7	16	23		
B.Sc. II	7	16	23	**Introduction** What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Operating-System Structure **Operating-System Operations**	Process Management, Memory Management, Storage Management, Protection and Security Distributed Systems, Special-Purpose Systems, Computing Environments, Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Virtual Machines, Operating-System Generation, System Boot
Month: August 2023				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-2 Data Communication** Objectives, four analysis, Band limited signal, Maximum data rate & channel.	Transmission Impairments: Attenuation Distortion, Delay, Dispersion, Noise. Data Transmission modes: Serial & Parallel, Simplex, Half Duplex, Full Duplex & Simplex. Synchronous & Asynchronous Transmission.
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	**Process Management** **Processes-** Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC Systems	Thread- Threads
Month: September 2023				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-3 Introduction to Windows Server 2008** Managing Windows Server 2008: 1. Working with administrative tool using control panel, Graphical administrative tool & command line utility. 2. Working with computer management: Computer management system tools, Computer management storage tools, computer management services and application tools. 3. Using system console.	**Active Directory Physical Architecture:** Top level view, Local security Authority, Directory service architecture, Data storage architecture. Logical Architecture: Object, Domain, Trees & forests Trust. Managing Users & Computers, Managing Domain user account, Types of user, User account policies, Password setting, User account capabilities, Properties & Rights, Create computer account, Organization Chart.
B.Sc. III	12	16	28		

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
B.Sc. II	7	16	23	CPU Scheduling-Scheduling Criteria, Scheduling Algorithms	(First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling, Multilevel Queue Scheduling)
Month: October 2023				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	Semester Examination	
B.Sc. III					
B.Sc. II	7	16	23		
Month: November 2023				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit-1 Reference Model** ISO-OSI: principle of layers, data link, Network, Transport, Session, Presentation & Application (Each layer with its function, Protocol, Design issues, Components),	TCP/IP: Concept, history, Layers: Host to network, Internetwork, Transport, Application. Comparative study of ISO-OSI & TCP/IP
B.Sc. III	10	4	14		
B.Sc. II				Semester Examination	
Month: December 2023				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit-3 File Sharing and Security:** File sharing essential: Understanding file sharing model, using and finding shares, Hiding & controlling share access, special & administrative shares, Creating and Publishing Shared Folders, Cresting shares by using: Windows explorer Computer Management, Publish shares in active directory Managing Shares	Permissions: Understand shares permission, Configuring share permission. Managing File And Folder Permission: File & Folder ownership, permission inheritance for files & folders, Configuring files and folder permission, Auditing files & folder Access. Kerboes protocol.
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	**Memory Management** **Main Memory**-Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Example: The Intel Pentium,	Virtual Memory-Demand Paging, Copy-on-Write, Page Replacement (FIFO, Optimal, LRU, MFU,LFU), Allocation of Frames, Thrashing, Memory-Mapped Files
Month: January 2024				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit-4 Managing Group Policy** Managing Group: Understanding group, By default Group, Creating Group, Adding Member To Group, Delete Group, Modifying Group.	Group policy setting, Group policy architecture. Implementation Group Policy: Working with local group policy, Group policy management console, Default group policy object, managing group policy inheritance & processing.
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	**Storage Management**	File-System Interface-File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing, Protection,
Month: February 2024				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	Understanding Group Policy: Local & Active Directory Group Policy	Group Policy
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	File-System Structure, File-System Implementation, Directory Implementation,	Efficiency and Performance, I/O Systems-I/O Hardware,

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
				Allocation Methods, Free-Space Management,	Application I/O Interface, Kernel I/O Subsystem
Month: March 2024				**Module/Unit:**	**Sub-units planned**
B.Sc. III				**Final Practical Examination**	
B.Sc. II	7	16	23	**Linux Scripting** Writing and running the shell script, read, echo, decisions and loop control structure, file tests, exit, command line arguments,	exporting shell variable, arrays, shell function, writing data entry script to create data files, data validations before storing on hard disk.
Month: April 2024				**Module/Unit:**	**Sub-units planned**
	Lectures	Practicals	Total	**Final Examination**	

Dr. V. B. Waghmare

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Head of Department

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Name of the teacher: Dr. R. Y. Patil

Semester: B.Sc. Sem-I,II,V,VI

Course Titles: DSE1006E2: Internet Technologies-I
DSE1006F2: Internet Technologies-II, Problem Solving using Computers (Python Programming)

Month: July 2023				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit -1: Introduction**	Linux History and architecture of Linux system, shell, Types of shell's, Operating system services, Kernel, Kernel shell relationship, Login, Logout, Remote login, GPU(General Purpose Utilities) clear, script, cal, who, bc, wc, head, tail.
B.Sc. III	7	16	23		
B.Sc. I	7	16	23	**UNIT-I-Introduction to Programming Languages:**	Programming languages-their classification and characteristics, language translators and language translation activities Planning the Computer Program: What is program and programming paradigms Concept of problem Solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.
Month: August 2023				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit -II: Handling Buffer Cache, File and Directories**	Buffer, headers, structure of the buffer pool, scenarios for retrieval of a buffer, advantage and disadvantage of the buffer cache, inodes, structure of regular file, change file access permissions with chmode command, directories, directory management commands- cd, mkdir, rmdir.
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	**UNIT-II-Building Blocks of Program:** Python Interpreter, Writing and executing simple program, Basic Data Types:	Data, Data Types, Data Binding, Variables, Constants, Declaration, Operations on Data such as assignment, arithmetic, relational, logical or boolean, ternary, bitwise, increment or decrement operators. Introduction to Python Programming: Features, Structure of a Python Program(Python Shell
Month: September 2023				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit -3: System calls and Process Unit -4: VI Editor**	Open, read, write, process states and transitions, process creation, signals, process termination, a

Course	Lectures	Practicals	Total	Module/Unit	Sub-units planned
B.Sc. III	12	16	28	and simple shell programming	waiting process termination, process management- ps, kill, background processing, no hang up, job scheduling using at command. Use and features of vi, modes of operation- a) Commamd mode- text management, repeat factor. b) Insert mode- insert, append, replace text. c) Ex mode- saving the text, global substitution etc. Writing and running the shell script, read, echo, decisions and loop control structure, file tests, exit etc.
B.Sc. I	7	16	23	**UNIT-III- Conditional Statements:** if, if-else, nested if –else Looping: for, while, nested loops, else clause with while and for loop Control statements: Terminating loops, skipping specific conditions	break, continue, pass
Month: October 2023				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total		
B.Sc. III				Semester Examination	
B.Sc. I	7	16	23	**Numeric Functions: Manipulation:**	abs(), ceil(), floor(), max(), min(), pow(), sqrt() String Declaring strings, String immutability, Unicode string (u'String'), escape sequences(\), Operations on String (Concatenation (+), Repetition (*), Slicing ([index]), Range Slicing([start:end] or [:end] or [start:] , Member ship operator (in, not in)), String Functions : capitalize(), len(), lower(), swapcase(), upper()
Month: November 2023				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit -1: Memory management and advanced VI** Memory management-	swapping, demand paging, deleting and moving text (d, p and P), yanking text (y), filtering the text (!), Ex mode- handling multiple files, inserting file and command outputs, moving text from one file to another.
B.Sc. III	10	4	14		
B.Sc. I				Semester Examination	
Month: December 2023				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit -2: Advanced Filters**	Sed – syntax, line addressing, multiple instructions (-e .-f) context addressing, internal commands used by sed –i, a, d, p, r, w, q, s etc., gawk- syntax, field level operations, formatted outputs, use of variables and expressions, BEGIN and END section, built-in variables, arrays,
B.Sc. III	10	16	26		

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
					built-in functions- system, length, substr, split etc., types of meta characters.
B.Sc. I	7	16	23	**Unit -1 Python File Input-Output: Exception Handling Regular Expressions**	Opening and closing file, Various types of file modes, reading and writing to files, manipulating directories-- What is exception, Various keywords to handle exception such try, catch, except, else, finally, raise – Concept of regular expression, various types of regular expressions, using match function

Month: January 2024				**Module/Unit:**	**Sub-units planned**
Course	**Lectures**	**Practicals**	**Total**	**Unit -3: Advanced shell programming**	Shell and subshell, set command, command line arguments, exporting shell variable, arrays, shell function, writing data entry script to create data files, data validations before storing on hard disk
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	**Unit -2 GUI Programming in Python (using Tkinter/wxPython/Qt) –**	What is GUI, Advantages of GUI, Introduction to GUIlibrary, Layout management, Events and bindings, Font, Colors, drawing on canvas (line, oval, rectangle, etc.) Widget such as : Frame, Label, Button, Checkbutton, Entry, Listbox, Message, Radiobutton, Text, Spinbox etc , Layout management, Events and bindings, Font, Colors, drawing on canvas (line, oval, rectangle, etc.) Widget such as : Frame, Label, Button, Checkbutton, Entry, Listbox, Message, Radiobutton, Text, Spinbox etc

Month: February 2024				**Module/Unit:**	**Sub-units planned**
Course	**Lectures**	**Practicals**	**Total**	**Unit -4: System administration**	Login with root, su, communicate with users-wall, news, booting and shutdown process, mangibg disk space- df, du, ulimit, find, backup- cpio, printer management- lpsched, lpstat, lpadmin, lpmove, reject, disable etc., mounting a file system, unmounting a file system.
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	**Unit -3 Database connectivity in Python**	– Installing mysql connector, accessing connector module module, using connect, cursor, execute & close functions, reading single & multiple results of query execution, executing different types of statements, executing transactions, understanding exceptions in

Course	Lectures	Practicals	Total				
					database connectivity	
	Month: March 2024			Module/Unit:		Sub-units planned	
Course	Lectures	Practicals	Total	**Final Practical Examination**			
B.Sc. III	10	16	26				
B.Sc. I	7	16	23	Algorithm, Searching and Sorting –		Searching and sorting techniques, Efficiency of algorithms	
	Month: April 2024			Module/Unit:		Sub-units planned	
	Lectures	Practicals	Total	**Final Practical Examination**			
B.Sc. I							
	Month: May 2024			Module/Unit:		Sub-units planned	
	Lectures	Practicals	Total	**Final Examination**			
B.Sc. III, I							

Dr. R. Y. Patil

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Department of Computer Science
__Annual Teaching Plan 2023-24__

Name of the teacher: **Dr. I. K. Mujawar**

Semester: B.Sc. Sem-I,II,V,VI

Course Title: DSE1006E1: Introduction to JAVA

DSE1006F1: Data Science using Python, Database Management System

	Month: July 2023			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-1: Fundamental of PHP**	1.1 Concept of PHP 1.2 Constants, variables declaration 1.3 Comments 1.4 Data types 1.5 Operators 1.6 Command line arguments
B.Sc. III	7	16	23		
B.Sc. I	7	16	23	**Introduction to DBMS:**	Database, DBMS – Definition, Overview of DBMS, File processing system vs DBMS, Limitation of file processing system, Advantages of DBMS, Levels of abstraction, Data independence, DBMS Architecture, Users of DBMS, Data models - Object Based Logical Model, Record Based Logical Model (relational, hierarchical, network)
	Month: August 2023			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-2: Branching and Looping statements**	2.1 Conditional statements 2.1.1 If-else 2.1.2 Switch 2.1.3 Ternary operators 2.2 Looping statements 2.2.1 For loop 2.2.2 While loop 2.2.3 Do-while loop
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	**Entity Relationship Model -**	Entities, attributes, entity sets, relations, relationship sets, Additional constraints (key constraints, participation constraints, weak entities, aggregation / generalization, Conceptual Design using ER (entities VS attributes, Entity Vs relationship, binary Vs ternary, constraints beyond ER), Entity Relationship Diagram (ERD)
	Month: September 2023			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit 3: Arrays in PHP**	Creating arrays 3.2 Inserting elements in arrays 3.3 Retrieving elements from array 3.4 Displaying arrays 3.5 Sorting array elements
B.Sc. III	12	16	28		
B.Sc. I	7	16	23	**MySQL - Unit-4:Developing Applications in PHP using MySQL**	DDL Statements - Creating Databases, Using Databases, MySQL datatypes, Creating Tables (with integrity constraints – primary key, default, check, not null), Altering Tables, Renaming Tables, Dropping Tables,

					Truncating Tables, Backing Up and Restoring databases

<table>
<tr><td colspan="4">Month: October 2023</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Lectures</td><td>Practicals</td><td>Total</td><td rowspan="2">Semester Examination</td><td></td></tr>
<tr><td>B.Sc. III</td><td></td><td></td><td></td><td></td></tr>
<tr><td>B.Sc. I</td><td>7</td><td>16</td><td>23</td><td>DML Statements – Viewing the structure of a table insert, update, delete, Select – all columns, specific columns, unique records, conditional select, in clause, between clause, limit, aggregate functions (count, min, max, avg, sum), group by clause, having clause.</td><td>Functions – String Functions (concat, instr, left, right, mid, length, lcase/lower, ucase/upper, replace, strcmp, trim, ltrim, rtrim), Math Functions (abs, ceil, floor, mod, pow, sqrt, round, truncate) Date Functions (adddate, datediff, day, month, year, hour, min, sec, now, reverse) DCL Statements (creating/dropping users, privileges introduction, granting/revoking privileges, viewing privileges)</td></tr>
<tr><td colspan="4">Month: November 2023</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Lectures</td><td>Practicals</td><td>Total</td><td>Unit- I- Introduction To Java</td><td rowspan="2">1.1 History and features of Java Programming 1.2 Difference between Java & C++ 1.3 Java Environment
1.4 Java tokens, constants, variables, data types, type casting 1.5 Operators and Expressions 1.6 Implementing Java Program 1.7 Branching and looping statements 1.8 Class, objects, methods 1.9 Constructors and destructor</td></tr>
<tr><td>B.Sc. III</td><td>10</td><td>4</td><td>14</td><td></td></tr>
<tr><td>B.Sc. I</td><td></td><td></td><td></td><td>Semester Examination</td><td></td></tr>
<tr><td colspan="4">Month: December 2023</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Lectures</td><td>Practicals</td><td>Total</td><td>Unit-II- Inheritance and Packages</td><td rowspan="2">2.1 Defining sub class, subclass constructor 2.2 Inheritance- Multiple and hierarchical 2.3 Defining packages, system packages 2.4 Creating & accessing packages 2.5 Adding a class to package 2.6 Polymorphism- function overloading and over ridding, its difference</td></tr>
<tr><td>B.Sc. III</td><td>10</td><td>16</td><td>26</td><td></td></tr>
<tr><td>B.Sc. I</td><td>7</td><td>16</td><td>23</td><td>Relational data model– ER to The Relational Model -</td><td>Domains, attributes, Tuples and Relations, Relational Model Notation, Characteristics of Relations, Relational Constraints - primary key, referential integrity, unique constraint, Null constraint, Check constraint
Entity to Table, Relationship to tables with and without key constraints.</td></tr>
<tr><td colspan="4">Month: January 2024</td><td>Module/Unit:</td><td>Sub-units planned</td></tr>
<tr><td>Course</td><td>Lectures</td><td>Practicals</td><td>Total</td><td>Unit-III- Multithreading and Exception Handling</td><td>3.1 Creating threads, extending a thread class- declaring the class,</td></tr>
</table>

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
B.Sc. III	10	16	26		run() method 3.2 Stopping and blocking threads 3.3 Life cycle of thread 3.4 Using thread method 3.5 Thread priority 3.6 Introduction to exception 3.7 Syntax of exception handling code 3.8 Multiple catch statement 3.9 Using finally statement 3.10 Throwing exception
B.Sc. I	7	16	23	**Introduction to Functional Dependencies and Normalization –** **1NF, 2NF, 3NF** **Relational Algebra**	operations (selection, projection, set operations union, intersection, difference, cross product, Joins – conditional, equi join and natural joins, division)
Month: February 2024				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit-IV- Applets Programming & Introduction to AWT**	4.1 Introduction to applets 4.2 Building applet code 4.3 Applet life cycle 4.4 Adding applet code to HTML file 4.5 Introduction to Abstract Window Toolkit (AWT)
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	**MySQL Joining Tables – Subqueries**	inner join, outer join (left outer, right outer, full outer) – sub queries with IN, EXISTS, sub queries restrictions, Nested sub queries, ANY/ALL clause, correlated sub queries
Month: March 2024				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total		
B.Sc. III	10	16	26	**Final Practical Examination**	
B.Sc. I	7	16	23	**Database Protection: MySQL –**	Security Issues, Threats to Databases, Security Mechanisms, Role of DBA, Discretionary Access Control Stored functions, procedures, cursor, trigger, views (creating, altering dropping, renaming and manipulating views)
Month: April 2024				**Module/Unit:**	**Sub-units planned**
	Lectures	Practicals	Total	**Final Practical Examination**	
B.Sc. I					
Month: May 2024				**Module/Unit:**	**Sub-units planned**
	Lectures	Practicals	Total	**Final Examination**	
B.Sc. III, I					

Dr. I. K. Mujawar

Dr. V. B. Waghmare
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	Month: December 2023			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unified Process Model Static Modelling Notation:**	Views, UML Diagrams: Class diagrams, Object diagrams, Statechart diagram. Package Diagrams, Composite Structures, Component Diagrams, Deployment Diagrams
B.Sc. III	10	16	26	,	

	Month: January 2024			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Dynamic Modelling Notation: Mapping Object Model to Database Schema:**	Use Case Diagrams, Activity Diagrams, Interaction Diagrams System Design process, Partitioning the analysis model, Concurrency and subsystem allocation, Task, Data and Resource management.
B.Sc. III	10	16	26		

	Month: February 2024			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Object Oriented Design: Object Oriented Analysis:**	Iterative Development, Unified process & UP Phases: Inception, Elaboration, Construction and Transition.
B.Sc. III	10	16	26		

	Month: March 2024			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Object Oriented Testing:**	Types of Testing, Object oriented Testing strategies, Test case design for OO software
B.Sc. III	10	16	26		

	Month: April 2024			Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Final Practical Examination**	
B.Sc. III					

	Month: May 2024			Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Final Examination**	
B.Sc. III					

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Dr. V. B. Waghmare
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Academic Year: 2023-24   **Semester:** B.Sc. Sem-III & IV

Subject: Computer Science   **Course Title:** OOP and Data Structure using Python

Name of the teacher: Mr. V. B. Pujari

Month: July 2023			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit-1 Introduction to Object Oriented Programming	Programming Paradigms, What Is Object-Oriented Programming?, Features of OOP, Advantages and disadvantage of OOP, Function Overloading, Operator Overloading, Static and Dynamic Binding, Constructors and Destructors, Techniques of Object-Oriented Programming, When to use OOP?, Applications of OOP.
7	4	11		
Month: August 2023			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	Unit-2 Classes and Objects	Python Classes, Objects, Specifying attributes and behaviors, instance methods, instance attributes, static methods constructor, types of constructors (default, parameterized), class methods as alternative constructor, constructor overloading , method overloading.
10	4	14		
Month: September 2023			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	Unit-3 Inheritance and Polymorphism	Inheritance in Python (Syntax, Advantages,)Access Modifiers in Python, Types of Inheritance (single, multiple, multilevel, hierarchical and hybrid)
13	4	17		
Month: October 2023			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	Polymorphism-Method.	Overriding, magic methods and Operator Overloading
10	4	14		
Month: November 2023			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	Semester Examination	
Month: December 2023			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	Unit-1 Abstract Data Type Introduction: Abstractions, Abstract Data Types, Data Structures, General Definitions; Application: Student Records, Designing a Solution, Implementation	**The Date Abstract Data Type:** Defining the ADT, Using the ADT, Preconditions and Postconditions, Implementing the ADT; **Bags:** The Bag Abstract Data Type, Selecting a Data Structure, List-Based Implementation; **Iterates:** Designing an Iterator, Using Iterators;
7	4	11		
Month: January 2024			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	**Algorithm Analysis: Complexity Analysis:** Big-O Notation, Evaluating Python Code; Evaluating the Python List; Amortized Cost; **Application:** The Sparse Matrix, List-Based Implementation, Efficiency Analysis	**Unit-2 Linked Structure** **The singly Linked List:** Traversing the node, Searching for a node, Prepending Nodes, Removing Nodes ;**The Bag ADT Revisited:**A linked List Implementation, Comparing Implementations, Linked list iterators; **More Ways to Build a Linked List:**Using a Tail Reference,
8	4	12		

				The sorted linked list; **The Sparse Matrix Revisited** : An array of Lined list implementation, Comparing the Implementations;

Month: February 2024			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	**Applications** : Polynomials, Polynomial Operations, The Polynomial ADT, Implementation. **Advanced Linked List:**	**The Doubly Linked List:** Organization, List Operations ;**Circular Linked List:** Organization, List Operation Multi-Linked Lists: Multiple Chains, The sparse Matrix ;**Complex Iterators ; Application:** Text Editor, Typical Editor Operations, The EDIT Buffer ADT, Implementation
4	4	8		

Month: March 2024			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	**Unit-3 Stacks** **The Stack ADT:** Implementing the stack, using a python list, using a linked list, Stack Applications: Balanced Delimiters, Evaluating Postfix Expression; **Applications:** Solving a Maze: Backtracking, Designing a solution, The Maze ADT, Implementation	**Queues** **The Queue ADT;**Implementing the Queue:Using a Python List, Using a Circular Array, Using a Linked List **Priority Queues:** The priority Queue ADT, Implementation: Unbounded Priority Queue, Implementation :Bounded Priority Queue ;**Application :** Computer Simulation : Airline Ticket Counter, Implementation
4	4	8		

Month: April 2024			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	**Final Practical Examination**	

Month: May 2024			**Module/Unit:**	**Sub-units planned**
Lectures	Practicals	Total	**Final Examination**	

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