Second Semester

Data Structures (23B21MA111)

Introduction to Algorithm and Data Structures, operations on Data Structures, Linear Data Structures, Linked Lists, Stacks, Queues, Nonlinear Data Structures, Tree, Binary Search Tree, Heaps, Sorting and Searching, Tree traversal, Hashing and its applications.

Course Description

Course Code	23B21MA111	**Semester:** Even	**Semester** II **Session:** 2023-24 **Month from** Jan - May 2024	
Course Name	Data Structures			
Credits	3	**Contact Hours**	3-0-0	
Faculty (Names)	**Coordinator(s)**			
	Teacher(s) (Alphabetically)			

COURSE OUTCOMES After pursuing this course, the students will be able to:		**COGNITIVE LEVELS**
CO1	demonstrate familiarity with major data structures.	Understanding Level (C2)
CO2	explain and construct linear data structure.	Applying Level (C3)
CO3	apply the concepts of tree-based data structures and hashing in various practical problems.	Applying Level (C3)
CO4	apply data-structures algorithm in sorting of data, text compression and cryptography.	Applying Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Algorithm and Data Structures	**Algorithms:** Definition, Properties, Performance Analysis-Space Complexity, Time Complexity, Asymptotic Notations. **Data structures:** Introduction, classification of Data Structures, Operations on data structures.	4

2.	Linked Lists	Traverse, Insert, Delete, operations on Singly linked lists, Circular linked lists, Doubly linked lists, Selection sort, Bubble sort, Insertion sort, Linear search, Binary search.	7
3.	Stacks	Implementation of stacks using Arrays and linked list, PUSH, POP operations, Evaluation of Infix, Postfix and Prefix Expressions.	5
4.	Queues	Implementation of Queues using Arrays and linked list, Insertion and deletion operations on Circular queues and Priority queues	5
5.	Trees	Array and Linked list Representation of Binary Trees, Properties of Binary Tree, Traversing a Binary Tree, Merge sort, Quick sort.	5
6.	Binary Search Trees	Traverse, search, Insert and Delete operations in Binary Search Tree, importance of balancing.	5
7.	Heaps	Heap Property, Max Heap, Min Heap, Heap Sort.	3
8.	Hashing	One way hashing functions and their properties, hashing as a search structure, hash table, uses of hash tables in text compression and cryptography.	6
9.	Graphs	Definition, terminology, directed and undirected graphs, properties, connectivity in graphs, applications, implementation –adjacency matrix.	2
Total number of lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments)
Total	**100**

Project based learning: Students in small groups will be assigned the problem of searching and soring of data; design algorithms for information retrieval from tree or graph. They will prepare corresponding computer programs.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc.(Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	**E. Horowitz, S. Sahni and D. Mehta,** Fundamentals of Data Structures in C++, 2nd Ed., University Press, 2016.
2.	**S. Sahni,** Data Structures, Algorithms, and Applications in C++, WCB/McGraw-Hill, 2005.
3.	**A. M. Tenenbaum,** Data Structures Using C, Pearson Ed, India, 1990.
4.	**N. Dale,** C++ Plus Data Structures, Jones & Bartlett Learning; 5th Ed. 2011
5.	**A. Drozdek,** Data Structures and Algorithms in C++, 4th Ed., Cengage Learning, 2013.
6.	**G.A.V PAI,** Data Structures and Algorithms, Concepts, Techniques and Applications, Volume1, 1st Edition, Tata McGraw-Hill, 2017.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	2	2	1	1					1	2	1	1
CO2	2	2	1	1					1	2	1	2
CO3	3	3	2	1			1		1	3	2	2
CO4	3	3	2	1	1		2	1	2	3	2	3
Avg	3	3	3	1	1		2	1	2	3	2	2

Data Structures-LAB (23B25MA111)

Introduction to Algorithm and Data Structures, operations on Data Structures, Linear Data Structures, Linked Lists, Stacks, Queues, Nonlinear Data Structures, Tree, Binary Search Tree, Sorting and Searching.

Course Description

Course Code	23B25MA111	**Semester:** Even	**Semester** II **Session -** 2023-24 **Month from** Jan - May 2024
Course Name	Data Structures-LAB		
Credits	2	**Contact Hours**	0-0-4
Faculty	**Coordinator(s)**		

(Names)	Teacher(s) (Alphabetically)		
COURSE OUTCOMES After pursuing this course, the students will be able to:			**COGNITIVE LEVELS**
CO1	demonstrate familiarity with major algorithms and data structures		Understanding Level (C2)
CO2	apply the appropriate linear data structure (stack, queue, linked list) and algorithm design method for a specified application.		Applying Level (C3)
CO3	apply sorting and searching techniques.		Applying Level (C3)
CO4	analyze the concepts of nonlinear data structures such as trees and graphs.		Analyzing Level (C4)
Module No.	**Title of the Module**	**List of Experiments**	**No. of Labs for the module**
1.	Introduction to Algorithm and Data Structures	1. Write an algorithm to find factorial of a number. 2. Write an algorithm to write Fibonacci sequence. 3. Write an algorithm to solve Tower of Hanoi. 4. Write an algorithm to find the largest among three different numbers entered by user.	4
2.	Linear Data Structures	5. Implement stack operations using array. 6. Conversion from infix to postfix expression using stack 7. Evaluation of postfix expression. 8. Implement queue operations using array.	4
3.	Linked Lists	9. Implement operations on single linked list. 10. Implement operations on double linked list. 11. Implement stack operations using linked list. 12. Implement queue operations using linked list.	4
4.	Sorting and	13. Implement selection sort, insertion	2

	Searching	sort, bubble sort, quick sort, merge sort in C++ 14. Implement Linear search and Binary search in C++	
5.	Non-Linear Data Structures	15. Implement binary tree using arrays and perform binary traversals. i) Inorder ii) preorder iii) post order 16. Write a C++ program to balance a given tree.	2
		Total number of Labs	**16**

Evaluation Criteria

Components	**Maximum Marks**
Lab Test 1	20
Lab Test 2	20
TA	60 (Quiz, Assignments, Tests, Viva)
Total	**100**

Project based learning: A group of 2 to 3 students will be formed. Each group will have a group leader to develop coordination among the group members. A problem of sorting, searching or data structures implementation will be given. The group leader will submit a report of findings with output for the same.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	**E. Horowitz, S. Sahni and D. Mehta,** Fundamentals of Data Structures in C++, 2nd Ed., University Press, 2016.
2.	**S. Sahni,** Data Structures, Algorithms, and Applications in C++, WCB/McGraw-Hill, 2005.
3.	**A. M. Tenenbaum,** Data Structures Using C, Pearson Ed, India, 1990.
4.	**N. Dale,** C++ Plus Data Structures, Jones & Bartlett Learning; 5th Ed. 2011
5.	**A. Drozdek,** Data Structures and Algorithms in C++, 4th Ed., Cengage Learning, 2013.
6.	**G.A.V PAI,** Data Structures and Algorithms, Concepts, Techniques and Applications, Volume1, 1st Edition, Tata McGraw-Hill, 2017.

CO-PO-PSO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO-CS**	**PSO-IT**	**PSO-CP**

CO1	3	2	2	1			1		1	3	1	1
CO2	3	2	2	1			1		2	3	1	2
CO3	3	3	3	1			1		2	3	2	3
CO4	3	3	3	1	1		2	2	2	3	2	3
Avg	3	3	3	1	2		1	2	2	3	2	2

Calculus (23B21MA112)

Sequence and Series, Successive differentiation and Leibnitz's theorem, Partial differentiation, Taylor's series expansion of functions of several variables, maxima and minima of functions of several variables, Jacobians, multiple integrals, gradient, divergence and curl, normal and tangent to a surface, line and surface integrals, Gauss and Stoke's theorems, second order linear ordinary differential equations.

Course Description

Course Code	23B21MA112	**Semester:** Even	**Semester** II **Session** 2023-24 **Month from** Jan - May 2024
Course Name	**Calculus**		
Credits	4	**Contact Hours**	3-1-0
Faculty (Names)	**Coordinator(s)**		
	Teacher(s) (Alphabetically)		

COURSE OUTCOMES After pursuing the above-mentioned course, the students will be able to:		**COGNITIVE LEVELS**
CO1	explain the concepts of convergence of sequence and series.	Understanding Level (C2)
CO2	make use of limits, continuity and differentiability in partial differentiation and solve the problems of maxima/minima.	Applying Level (C3)
CO3	apply the concepts of double and triple integrals to find area and volume of curves and surfaces.	Applying Level (C3)
CO4	make use of vector differentiation and integration to solve the problems related to Green's, Stoke's and Gauss divergence theorems.	Applying Level (C3)
CO5	solve the second order linear ordinary differential equations with constant coefficients and Cauchy-Euler	Applying Level (C3)

	equation.		
Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures**
1.	Sequence and Series	Sequence of real numbers, bounded and monotone sequences, convergence of sequences, Cauchy sequences, sub sequences, Bolzano-Weierstrass theorem. Series of real numbers, comparison test, ratio test, root test, alternating series, absolute and conditional convergence, uniform convergence, power series.	7
2.	Partial Differentiation	Concepts of limit and continuity, partial derivatives, Euler's theorem, Chain rule, change of variables, Total differential, Jacobians.	6
3.	Applications of Partial Differentiation	Taylor's Theorem, maxima and minima, Lagrange's method of multipliers, estimation of error and approximation of function of two variables.	5
4.	Multiple Integrals	Gamma and Beta functions, Double integral, change of order, change of variables, Triple integrals, Dirchilet integrals, applications.	8
5.	Vector Differential Calculus	Scalar and Vector point function, Gradient, Directional Derivative, Divergence, Curl and their applications.	4
6.	Vector Integral Calculus	Line integral, Surface integral and Volume integral, Applications to work done by the force, Green's, Stoke's and Gauss divergence theorems and their applications.	7
7.	Differential Equations	Linear differential equations of second order with constant coefficients, Cauchy-Euler equation.	5
Total Number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutorials)
Total	**100**

Project based learning: Each student in a group of 4-5 will apply the concepts of differential equations to solve real life practical problems.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	**Jain, R. K. & Iyengar, S. R. K.,** Advanced Engineering Mathematics, 5th Ed., Narosa Publishing House, New Delhi, 2019.

2.	**Kreyszig, E.,** Advanced Engineering Mathematics, 10th Edition, John Wiley& Sons, Inc., 2015
3.	**Joel R. Hass, Christopher E. Heil, Maurice D. Weir,** Thomas Calculus, 14th Ed., Pearson Education Asia (Addison Wesley), New Delhi, 2018.
4.	**Goldberg, R. R.,** Methods of Real Analysis, Oxford Publication, 1976.
5.	**Malik S. C.& Arora, S.** Mathematical Analysis, New Age International, 2010.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	1	2	1						1			
CO2	1	2	1						1			
CO3	1	2	1						2			
CO4	1	2	1		1				2			
CO5	1	2	2		2		2		2			
Avg	1	2	1		2		2		2			

Modern Physics (23B21PH112)

Special Theory of Relativity, Lorentz Transformations and Mass-Energy Equivalence, Wave-Particle Duality, Compton Scattering, Matter Waves, Uncertainty Principle, Schrodinger Equation, Particle in a Box, Potential Barrier Tunnelling, Tunnel diode and its applications, Bonding in solids, Crystal Structure, Miller indices, Bragg's Law and X-ray Diffraction, Introduction to semiconductors, classification of semiconductors, carrier concentration, energy band diagram of p and n types semiconductors, p-n junction diode: band diagram, I-V curve and its application as LED, photodiode and solar cell.

Course Description

Course Code	23B21PH112	**Semester:** EVEN		**Semester: II Session:** 2023-24 **Month from:** Jan - May 2024	
Course Name	Modern Physics				
Credits	3		**Contact Hours**	3-0-0	
Faculty (Names)	**Coordinator(s)**				

	Teacher(s) (Alphabetically)	

COURSE OUTCOMES After pursuing the above-mentioned course, the students will be able to:		**COGNITIVE LEVELS**
CO1	Recall the basic principles of physics related to relativity, quantum mechanics, solid state physics and semiconductors.	Remembering Level(C1)
CO2	Illustrate the various physical phenomena with interpretation based on the mathematical expressions involved.	Understanding Level (C2)
CO3	Apply the concepts/principles to solve the problems related to relativity, quantum mechanics, solid state physics and semiconductors.	Applying Level (C3)
CO4	Analyze and examine the solution of the problems using physical and mathematical concepts involved.	Analyzing Level (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Relativity**	Frame of references, Galilean Transformations, Michelson-Morley experiment, Lorentz transformations, Addition of velocities, Mass variation with velocity, Mass-energy relation.	8
2.	**Quantum Mechanics**	Wave-particle duality, Compton scattering, Matter waves, Heisenberg's uncertainty principle, Schrödinger wave equation and its applications to the free particle in a box (1D+3D), potential barrier and tunnel diode as its application	16
3.	**Solid State Physics**	Basic ideas of Bonding, Ionic bonding, covalent bonding and Metallic Bonding, Lattice points and space lattice, Basis and crystal structure, Unit cell and Primitive cell, Seven crystal systems and Fourteen, Bravais space lattice, Coordination number, nearest neighbor distance, atomic radius and packing factor in crystal structure, Calculation of lattice constant, Lattice planes and Miller indices, Separation between lattice planes, Derivation and examples, X-ray diffraction, Bragg's law of X- ray diffraction,	10
4.	**Semiconductors**	Introduction to semiconductors, direct and indirect band gap semiconductors, intrinsic and extrinsic semiconductors, carrier concentration, energy band diagram of p and n types semiconductors, p-n junction diode: band diagram, I-V curve and its application as LED, photodiode and solar cell	6
Total number of Lectures			**40**

Evaluation Criteria	
Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutorials)
Total	**100**

Project based learning: The students will be given small projects (in groups) on various topics like relativity, Quantum mechanics, solid state physics and semiconductors to explore their applications in modern technology to understand the role of physics. This will help the students to connect the concept studied in the class with their application in technology and will enhance their analytical skills.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Reshnick, Relativity, New Age.
2.	A. Beiser, Concepts of Modern Physics, Mc Graw Hill International.
3.	David J. Griffiths, Introduction to Quantum Mechanics, Second Edition, Pearson.
4.	Ghatak and Lokanathan, Quantum Mechanics, 5th Edition, Macmillan India.
5.	S. O. Pillai, Solid State physics, New Age International (P) Limited.
6.	B. G. Streetman and S. Banerjee, Solid State Electronic Devices, Prentice-Hall India.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1												
CO2												
CO3												
CO4												
Avg												

Environmental Science (23B12BT111)

The Multidisciplinary nature of environment, principles of Biodiversity & conservation, overview of various Natural resources including Energy, their consumption & conservation strategies, different

forms of Pollution, hazardous waste management, Urban planning, Disaster management, Environmental Policies, Laws, Regulations, ethics and a Field Work component that appraises students with issues in environment in current context.

Course Description

Subject Code	23B12BT111	**Semester:** Even	**Semester:** II **Session:**2023-2024 **Month from:** Jan-June-2024
Subject Name	**Environmental Science**		
Credits	**2**	**Contact Hours**	**2-0-0**
Faculty (Names)	**Coordinator(s)**		
	Teacher(s) (Alphabetically)		

COURSE OUTCOMES After pursuing the above-mentioned course, the students will be able to:		**COGNITIVE LEVELS**
CO1	explain fundamental principles of environment, ecosystem resources, biodiversity and conservation.	Understand Level (C2)
CO2	identify hazards related to environmental pollution and learn environmentally safe and sustainable practices.	Apply Level (C3)
CO3	interpret modern techniques for Disaster management, global environmental concerns, Government regulations, Environmental Policies, Laws & ethics.	Understand Level (C2)
CO4	make use of ground situation on specific environmental aspects, examine risks involved, make a field report and present the findings.	Apply Level (C3)

Module No.	**Subtitle of the Module**	**Topics in the module**	**No. of Lectures for the module**
1.	The Multidisciplinary nature of environment	Definition, scope and importance, Need for public awareness, Types of Ecosystems, World Biomes, Ecosystem functioning, Case studies.	3
2.	Biodiversity & conservation	Diversity of flora and fauna, species and wild life diversity, Biodiversity hotspots, threats to biodiversity, Case studies	3
3.	Natural resources, Energy consumption &	Water, Land, Energy (Renewable, non-renewable, wind, solar, hydro, Biomass) resources, Global Conventions on Energy, Kyoto protocol, Case studies.	8

	conservation		
4.	Pollution, hazardous waste management	Air, Water & Land, pollution, sources & causes, effects, Electronic waste, nuclear hazards, Case studies.	6
5.	Urban planning, Disaster management	Sustainable building, Disaster Management and Contingency Planning, Critical issues concerning Global environment Urbanization, global warming, climate change, acid rain, ozone depletion etc Case studies	4
6	Environmental Policies, Laws, Regulations & ethics	Environmental Policy and laws, Different Acts such as: Environmental Protection Act, Air and Water Acts, Wildlife and Forest Acts), SPCB and CPCB, their roles and responsibilities.	4
7	Field Work/	Explore the current environment related occurrences at national and international level, Study of successful sustainable measures, a know-how of industries in local region and their possible effects, measure of water, air and land quality, Visit to a local polluted site-Urban/Rural /Industrial / Agricultural, Study of simple ecosystems.	2
		Total number of Lectures	**30**

Evaluation Criteria

Components	**Maximum Marks**
Mid	30
End	40
Teachers Assessment (TA)	30
Total	**100**

PBL: Visit to a local polluted site-Urban/Rural /Industry/Agricultural, Survey ground situation on specific environmental aspects, and their possible impacts on water, air and land quality, identify risks involved, make a field report and present the findings

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Benny Joseph, Environmental Studies Simplified, 3rd Edition, McGraw Hill Education, India, Published 2nd August, 2017
2.	Erach Bharucha, Textbook of Environmental Studies for UG Courses, 3rd Edition,

	Orient Black Swan, Published 1st Jan 2013
3.	Issues of the Journal: Down to Earth, Published by Centre for Science and Environment (CSE), Delhi

CO-PO and CO-PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1					3							
CO2				1	2	3		1	2			
CO3				2	2	3		1	2			
CO4					3	2	2	3	2			
Avg				2	3	3	2	2	2			

Object Oriented Programming using C++ (24B28MA111)

Course Description

Course Code	**24B28MA111**	**Semester:** Even	**Semester:** II **Session** 2023-24 **Month from:** Jan-May 2024
Course Name	Object Oriented Programming using C++		
Credits	**3**	**Contact Hours**	**2-0-2**
Faculty (Names)	**Coordinator(s)**		
	Teacher(s) (Alphabetically)		

COURSE OUTCOMES: After pursuing the course, the students will be able to:		**COGNITIVE LEVELS**
CO1	explain the fundamental principles of object-oriented programming.	Understanding Level (C2)
CO2	developing and understanding the C++ code.	Understanding Level (C2)
CO3	construct the classes and objects for solving problems.	Applying Level (C3)
CO4	make use of operator overloading and Polymorphism in C++.	Applying Level (C3)

Module No.	Title of the Module	Topics in the Module	No. of Lectures
1.	Introduction to OOPs concepts	Object oriented programming paradigm, basic concepts of object oriented programming, benefits of object oriented	3

		programming, object oriented languages and its applications.	
2.	Control Structures	Data types, type compatibility, variables, operators in C++, implicit conversions, operator overloading, operator precedence.	4
3.	Classes & Objects, Functions in C++	Objects, classes, internal representations of objects, the main function, function prototyping, call by reference, return by reference, inline functions, function overloading, friend and virtual functions. specifying a class, member functions,	9
4.	Constructors & Destructors, Operator Overloading, Inheritance	Constructors and destructors, defining operator overloading, overloading operators, rules for overloading operators, type conversions.	7
5.	Pointers, Virtual Functions & Polymorphism,	Pointers to objects, this pointer, pointer to derived classes, virtual functions, Polymorphism.	5
		Total Number of Lectures	28
Object Oriented Programming using C++ - LAB			
Module No.	Title of the Module	List of Experiments	No. of Labs for the module
1.	Control structures in C++	Develop C++ programs using conditional structure (if, if-else, nested if), and iterative control structure (do-while, while, for). Implement switch case statement.	4
2.	Object oriented concepts using C++	Write output-based C++ programs to implement the concepts of objects, classes, encapsulation, constructors, destructors, function and operator overloading, static and friend functions.	3
3.	Inheritance using C++	Write programs in C++ to implement concepts of base class, derived class, method overriding, private and public inheritance, multiple inheritance.	4
4.	Polymorphism using C++	Write programs in C++ using virtual functions, pure virtual functions, abstract classes, operator overriding.	3
		Total number of Labs	14

Evaluation Criteria

Components	Maximum Marks
Mid Term	30 (Lab Exam)
End Semester Examination	40
TA	30 (Quiz, Assignments, Tutorials)
Total	100

Project based learning: Each student in a group of 3-4 will have to develop a mini project based on object-oriented programming concepts. The students have to design the class diagram for any real-world application. The students have to implement the mini project using C++language. Project development and its presentation will enhance the knowledge and employability of the students in IT sector.	
Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc)	
Text Books	
1	Schildt H., C++: The Complete Reference, McGraw-Hill Osborne Media, 4th Edition, 2017.
2	Lafore R., Object-Oriented Programming in C++, Sams Publishing, 4th Edition, 2001.
3	Balagurusamy E., Object-Oriented Programming with C++, TMH, 8th Edition, 2021.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	2	2	2	2	1		2	1	1	3	3	3
CO2	3	3	3	2			1	1	2	3	3	3
CO3	3	3	3	2	1	1	2	2	2	3	3	3
CO4	3	3	3	2			1	1	2	3	3	3
Avg	**2.75**	**2.75**	**2.75**	**2**	**1**	**1**	**1.5**	**1.25**	**1.75**	**3**	**3**	**3**

UNIX Workshop (23B58CS125)

The course lays emphasis on UNIX environment. A number of concepts are taught in UNIX which aids in managing network systems such as file, web, database, printer, etc servers. It is increasingly used in engineering and design and for some home users. The most common use is in networks administration and security.

Course Description

Course Code	23B58CS125	**Semester: Even**	**Sem:** II **Session:** 2023-24 **Month from:** Jan-June 2024
Course Name	UNIX Workshop		
Credits	2	**Contact Hours**	1-0-2
Faculty	**Coordinator(s)**		

(Names)	Teacher(s) (Alphabetically)	

COURSE OUTCOMES After pursuing the above-mentioned course, the students will be able to:		COGNITIVE LEVELS
CO1	demonstrate use of common Unix/Linux commands	Understand Level (Level 2)
CO2	apply Unix/Linux file redirection and pipelining to combine utilities to perform complex tasks	Apply Level (Level 3)
CO3	develop shell scripting using Selection, Case & Conditional Statements	Apply Level (Level 3)
CO4	build shell scripts to solve various problems using commands like grep, line number, test, expressions, compare, command line input, etc.	Apply Level (Level 3)
CO5	build and manage files and directories, file permissions, and navigate the Unix/Linux file system	Apply Level (Level 3)

Module No.	Title of the Module	List of Experiments	No. of Labs for the module
1.	The UNIX File System & Basic Commands	1. Understanding the UNIX File System & Execute Basic Commands: To make a study of UNIX Environment and execute basic commands.	1
2.	UNIX Editor & Operations	2. Working with UNIX Editor & understand UNIX processes Operations: To understand working with UNIX Editor and UNIX Processes, Process Utilities.	1
3.	UNIX File Handling & Regular Expressions	3. Working with Directories: To work with Directories such as creation, searching, moving, deleting etc. 4. Working with Files: To work with Files such as creation, searching, moving, deleting etc. 5. Using Regular Expressions for Searching: Using Regular Expressions for Searching in a File or Directory.	3
4.	UNIX Advanced Filters	6. Working with UNIX pipe: Using UNIX pipe to connect two or more commands. 7. Working with UNIX filters: Working with filters to process text in different ways. 8. Working with UNIX advance filters: Working with advance filters, performing Advanced Pattern Matching with Stream-oriented & Non-Interactive Text Editor.	3

5.	UNIX Shell Scripting	9. Working with UNIX Shell: Working with UNIX Shell for basic problems using variables and naming conventions. 10. Performing UNIX Shell Scripting: Performing UNIX Shell Scripting with Conditional Constructs, Looping Statements, Arrays, Functions for problem solving.	2
6.	UNIX Administration	11. Performing Document handling through Shell Scripting – Performing Document Handling, Quoting, and Parsing text. 12. Working with UNIX Administration: Working with UNIX Administration, Login Process, Users & Permission and Process Management.	2
		Total number of Labs	**12**

Evaluation Criteria

Components	**Maximum Marks**
Mid	30
End	40
Day-to-Day	30 (Quiz + Evaluative Assignment + Class Test + Attendance)
Total	**100**

Project based learning: Each student in a group of 2 will apply the advanced programming concepts in UNIX Environment to solve practical problems.

Text Books

1.	Richards Stevens, Advanced Programming in the UNIX Environment, Pearson Education India, 2005
2.	Sumitabha Das, UNIX Concepts & Applications, 4th Edition, Tata McGraw-Hill Education, 2008

Reference Books

1.	Maurice J. Bach, Design of UNIX Operating System, Prentice-Hall, 1986
2.	Marc J. Rochkind, Advanced UNIX Programming, 2nd Edition, Pearson Education, 2004
3.	Evi Nemeth, Garth Snyder, Trent R. Hein, Unix and Linux System Administration Handbook, 4th Edition Pearson Education India, 2011
4.	Richards Stevens, Unix Network Programming, Addison-Wesley Professional, 2004

CO-PO-PSO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PSO-CS**	**PSO-IT**	**PSO-CP**
CO1	2	1	1	1			1	1	1	2	2	2
CO2	2	1	2	1			1	1	1	2	2	2

CO3	2	2	2	1			1	1	1	2	2	2
CO4	2	2	2	1			1	1	1	2	2	2
CO5	2	1	1	1			1	1	1	2	2	2
Avg	2	2	2	1			1	1	1	2	2	2