Multi-Disciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS03	Data Structures	FC	2		2	4	50	50	100	PPSC
2501MB02	Engineering Economics	FC	3			3	50	50	100	-
2501MB03	Management Science	FC	2			2	50	50	100	-
	Total		**7**		**2**	**9**				

Multidisciplinary Courses (MDC)

Data Structures

(Common to CE, EEE, ME, ECE, PT & Min.E)

	L	T	P	C
Course Code:2501CS03	**2**	**0**	**2**	**4**

Course Outcomes:

At the end of the course, student will be able to:

CO1: Utilize structure, union to handle heterogeneous data.
CO2: Illustrate Time and Space complexities for different sorting Algorithms
CO3: Demonstrate various operations on Linked Lists
CO4: Explain different operations on Stack and Queue with applications.
CO5: Demonstrate the importance and various operation on non-linear data structures

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	1	1	2					1	1		
CO2	1	1	2	2				1	1		
CO3	1	2	2	1				1	1		
CO4	1	1	2	1				1	1		
CO5	1	1	2	2				1	1		

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2
CO1	3	-
CO2	2	-
CO3	2	-
CO4	2	-
CO5	2	-

UNIT – I

Structures and Unions: Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type - enum variables, Using Typedef keyword, Bit Fields.

Data Structures: Introduction to Data Structures, Types of Data Structures.

Practice:

1. Write a C program to find the total, average of n students using structures
2. Copy one structure variable to another structure of the same type.
3. Read student name and marks from the command line and display the student details along with the total.

UNIT – II

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures.
Sorting Techniques: Quick sort, Merge sort, Radix sort

Practice:

1. Implement Merge sort using arrays.
   https://www.hackerrank.com/contests/hw1/challenges/merge-sort
2. Implement Quick sort using arrays
   https://www.hackerrank.com/challenges/quicksort1/problem
3. Implement Radix Sort using arrays
   https://www.hackerrank.com/contests/hw1/challenges/radix-sort?utm_source

UNIT – III

Linked Lists: Singly linked lists: representation and operations, doubly linked lists and its operations and circular linked lists and its operations, Comparing arrays and linked lists, Applications of linked lists.

Practice:

1. Single Linked List: Perform different operations in single linked list.
   https://leetcode.com/problems/design-linked-list/description/?utm_source
2. Perform different operations in double linked list
   https://leetcode.com/problems/design-linked-list/?utm_source
3. Circular Linked List
   https://www.codechef.com/practice/course/linked-lists/LINKLISTF/problems/PREP58?utm_source

UNIT – IV

Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, applications of stacks.
Queues: Introduction to queues: properties and operations, Types of Queues, implementing queues using arrays and linked lists, applications of queues.

Practice:

1. Stack and its operations using arrays and Linked List
   https://www.hackerrank.com/challenges/balanced-brackets/problem
   https://leetcode.com/problems/design-linked-list/description/?utm_source
2. Implement a program to evaluate a postfix expression.
   https://leetcode.com/problems/evaluate-reverse-polish-notation/description/
3. Queue and its operations using arrays and Linked List
   https://leetcode.com/problems/implement-queue-using-stacks/description/
   https://leetcode.com/problems/design-linked-list/description/?utm_source
4. Implement Circular Queue using Arrays
   https://leetcode.com/problems/design-circular-queue/description/

UNIT – V

Non-linear Data Structures:

Trees: Difinition of tree, Tree Terminology, types of trees, Binary tree traversals, Binary Search Tree – Insertion, Deletion.

Graphs: Definition and Terminology – Representation of Graphs-Adjacency Matrix and Linked list, Graph Traversals (BFT & DFT)

Practice:

1. Implement Binary search tree (BST).
   https://leetcode.com/problems/insert-into-a-binary-search-tree/description/
   https://leetcode.com/problems/delete-node-in-a-bst/description/
2. Implement Binary search Tree (BST) Traversals.
   https://www.hackerrank.com/challenges/tree-inorder-traversal/problem
   https://www.hackerrank.com/challenges/tree-preorder-traversal/problem
   https://www.hackerrank.com/challenges/tree-postorder-traversal/problem
3. Graph Traversal using Breadth First Search (BFS)
   https://www.hackerrank.com/challenges/bfsshortreach/problem
4. Graph Traversal using Depth First Search (DFS)
   https://leetcode.com/problems/number-of-islands/description/

Text Books:

1. Data Structures using C, Rema Theraja, Oxford University Press, 3rd Edition. ISBN: 978-9354979453
2. Data Structures, KV Sambasivarao, S Rama Sree, S.Chand. ISBN: 978-9358704730

Reference Books:

1. The Algorithm Design Manual, Steven S. Skiena, Springer Publication, Second Edition. ISBN: 978-1849967204
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, ISBN: 978-0716782506
3. Data Structures and Algorithms by Maganti Venkatesh, Naresh. ISBN: 9780929306407
4. Data Structures Using C, Reema Thareja, Oxford University Press, 2nd Edition. ISBN: 978-0198099307

Web Links:

1. https://nptel.ac.in/courses/106102064
2. https://archive.nptel.ac.in/courses/106/105/106105225/
3. https://www.udemy.com/topic/data-structures/
4. https://www.coursera.org/specializations/data-structures-algorithms
5. https://ds1-iiith.vlabs.ac.in/List%20of%20experiments.html

Additional Practice:

SNO	Difficulty	Problem Name	URL
1	Easy	Structs and enums	https://www.hackerrank.com/challenges/too-high-boxes/problem
2	Easy	Structs and enums	https://www.codechef.com/problems/HS08TEST?tab=statement
3	Medium	Structs and enums	https://www.hackerrank.com/challenges/small-triangles-large-triangles/problem
4	Easy	Arrays and Hashtables	https://leetcode.com/problems/two-sum/description/
5	Easy	Arrays and Pointers	https://leetcode.com/problems/remove-duplicates-from-sorted-array/description/?utm_source
6	Medium	Arrays and Pointers	https://leetcode.com/problems/two-sum-ii-input-array-is-sorted/description/?utm_source
7	Easy	Linked List	https://leetcode.com/problems/merge-two-sorted-lists/description/
8	Medium	Arrays and Matrix	https://leetcode.com/problems/diagonal-traverse/description/
9	Easy	Linked List	https://www.hackerrank.com/challenges/compare-two-linked-lists/problem
10	Medium	Stack applications	https://www.geeksforgeeks.org/problems/tower-of-hanoi-1587115621/1?utm
11	Medium	Binary Tree	https://leetcode.com/problems/binary-tree-right-side-view/description/
12	Medium	Stack applications	https://leetcode.com/problems/remove-k-digits/description/
13	Medium	Graph Theory	https://www.hackerrank.com/challenges/journey-to-the-moon/problem
14	Medium	Graph Traversals	https://leetcode.com/problems/number-of-provinces/description/
15	Medium	Graph Theory	https://www.hackerrank.com/challenges/torque-and-development/problem

	Basic Programs	Aditya's Internal coding Platform(Maya)	Code chef	Hacker rank	Leet code	Geek for Geeks
Unit-1	3	0	0	0	0	0
Unit-2	0	0	0	3	0	0
Unit-3	0	0	1	0	2	0
Unit-4	0	0	0	1	5	0
Unit-5	0	0	0	4	3	0
Additional Practice	0	0	1	5	8	1
Total	**3**	**0**	**2**	**13**	**18**	**1**

Engineering Economics

(Common to ECE,Min.E,PT)

	L	T	P	C
Course Code:2501MB02	**3**	**0**	**0**	**3**

Course Outcomes:

At the end of the course, student will be able to:

- **CO1:** Explain the Managerial Economic concepts and Illustrate the law of demand forecasting methods.
- **CO2:** Identify the production , cost behavior for managerial decision making and Break Even Point (BEP) of an enterprise.
- **CO3:** Differentiate types of market structures, business organizations along with basic knowledge on business cycle.
- **CO4:** Make use of the process & principles of accounting for the preparation of basic accounts.
- **CO5:** Utilize various techniques on investment project proposals with the help of capital budgeting techniques for decision making.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	-	-	1	-	1	-	-	2	-	-	-
CO2	-	-	-	-	-	-	-	-	2	-	-
CO3	1	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	1	1	-	-
CO5	-	-	-	-	-	-	-	3	1	**2**	-

UNIT – I

Introduction to Managerial Economics and demand Analysis: Definition and Scope of Managerial Economics, Concept and determinants of demand, Demand curve, Law of Demand and its limitations, Elasticity of demand and its types, Demand forecasting and its Methods.

UNIT – II

Production and Cost Analyses: Concept of production function – Law of variable proportions-Isoquants and Iso costs- cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable costs and total costs – Cost –Volume-Profit analysisDetermination of breakeven point (simple problems)- Managerial significance and limitations of breakeven point.

UNIT – III

Introduction to Markets, Pricing Policies & Types of Business Organization and Business Cycles.

Market structures: Perfect competition, monopoly, monopolistic competition and oligopoly –Features – Methods of pricing: Average cost pricing, Limit pricing, Market skimming pricing. Features and evaluation of Sole Trader, Partnership, Joint Stock Company – Business cycles : Phases of business cycles.

UNIT – IV

Introduction to Accounting & Financing Analysis: Introduction to double entry systems – Journal entries – Ledger – Trail balance – Trading and Profit and Loss account-simple problem.

UNIT – V

Capital and Capital Budgeting:Capital Budgeting: Meaning of Capital- Methods of Capital Budgeting-Traditional Methods(pay back period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value. method, Internal Rate of Return Method and ProfitAbility Enhancement CoursesIndex)- Simple Problems.

Text Books:

1. Managerial Economics and Financial Analysis, A.R. Aryasri , McGrawHill Education, ISBN: 978-0070078031.
2. Managerial Economics and Financial Analysis, N.Appa Rao, P.Vijay Kumar, Cengage Publications, ISBN: 978-8131515952.

Reference Books:

1. Managerial Economics , V. Maheswari , Sultan Chand Publications, ISBN: 81-8054-914-4.
2. Managerial Economics, Suma Damodaran : Oxford University Press, ISBN: 978-0198061113.

Web Links:

1. https://www.udemy.com/course/introduction-to-managerial economics/?couponCode=LETSLEARNNOWPP
2. https://archive.nptel.ac.in/courses/110/101/110101149/

Management Science

(Common to ECE &PT)

	L	T	P	C
Course Code:2501MB03	**2**	**0**	**0**	**2**

Course Outcomes:

At the end of the course, student will be able to:

- **CO1:** Apply management and motivation theories to renovate the practice of management.
- **CO2:** Explain concepts of quality management and use process control charts, concepts and tools of quality engineering in the design of products and process controls.
- **CO3:** Appraise the functional management challenges associated with high levels of change in the organizations.
- **CO4:** Identify activities with their interdependency and use scheduling techniques of project management PERT/CPM.
- **CO5:** Develop global vision and management skills both at strategic level and interpersonal level.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	-	-	-	-	-	-	-	-	-	-	2
CO2	-	-	-	-	-	-	-	-	-	1	-
CO3	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	2	-	-	-
CO5	-	-	-	-	-	-	1	-	-	-	-

UNIT – I

Introduction to Management: Concept nature and importance of management, Generic functions, Principles and Types of Management, Theories of motivation, Decision making process, Designing organization structure.

UNIT – II

Operations Management: Work study, Statistical quality control, Control charts (P-chart, R-chart, and C-chart), Need for inventory control, EOQ, ABC analysis, and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

UNIT – III

Functional Management: Concept of HRM, HRD and PMIR, Functions of HR Manager, Job evaluation and merit rating, Marketing management, functions of marketing, channels of distributions.

UNIT – IV

Project Management: Development of Network, Difference between PERT and CPM, Identifying critical path, (Simple Problems).

UNIT – V

Strategic Management: Vision, Mission, Goals, Strategy, Elements of corporate planning process, SWOT analysis, Steps in strategy formulation and implementation.

Text Books:

1. Management Science, Aryasri, Tata McGraw Hill, ISBN: 9780070090279.
2. Management, James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R, Pearson Education/Prentice Hall, 6thEdition, ISBN: 9788131707043.

Reference Books:

1. Principles of Marketing, , Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshan ul Haque , Pearson Education/ Prentice Hall of India 13th Edition,ISBN: 9788131731017.
2. A Handbook of Human Resource Management Practice, Michael Armstrong, Kogan Page Publishers, ISBN: 978-1789661033.

Web Links:

1. https://archive.nptel.ac.in/courses/122/106/122106031/
2. https://www.google.com/search?sca_esv=680b12c94771f77f&sca_upv=1&rlz=1C1VDKB_enGBIN1079IN1079&tbm=vid&sxsrf=ADLYWIKvg0FuUABCxWsswlpWIfSE3hFy0A:1716531957118&q=management+science+online+video+lectures&sa=X&ved=2ahUKEwissbLs06WGAxVX2.wGHYpkDOMQ8ccDegQIExAF