

### Multidisciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS01	Programming for Problem Solving Using C	FC	2		2	4	50	50	100	-
2501CS03	Data Structures	IC	2		2	4	50	50	100	PPSC
2501MB01	Engineering Economics & Management	IC	2			2	50	50	100	-
	<b>Total</b>		<b>06</b>		<b>04</b>	<b>10</b>				

**Programming for Problem Solving using C**  
 (Common to CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS), PT & Min.E)

	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Course Code: 2501CS01</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>4</b>

**Course Outcomes: At the end of the Course, Student will be able to:**

- CO1:** Demonstrate basics of computer, algorithm and flow chart for problem solving.
- CO2:** Make use of an appropriate control structures to solve given problems.
- CO3:** Solve complex problems using arrays and strings.
- CO4:** Develop modular programming using functions.
- CO5:** Demonstrate dynamic memory allocations and file handling using file operations.

**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
<b>CO1</b>	2	3	2	1	3	-	-	2	-	-	1
<b>CO2</b>	2	3	2	1	3	-	-	2	-	-	1
<b>CO3</b>	2	3	2	1	3	-	1	2	-	-	1
<b>CO4</b>	2	3	2	1	3	-	1	2	-	-	1
<b>CO5</b>	2	3	2	1	3	-	1	2	-	-	1

**Mapping of Course Outcomes with Program Specific Outcomes:**

CO/PSO	PSO1	PSO2
<b>CO1</b>	2	2
<b>CO2</b>	2	2
<b>CO3</b>	2	2
<b>CO4</b>	2	2
<b>CO5</b>	2	2

**UNIT – I**

**Introduction to Programming and Problem Solving**

Introduction to Programming Languages, Basics of a Computer Program- Algorithms, Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms, flowcharts (Using Dia Tool), pseudo code. Structure of C Program, Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, operators, keywords, identifiers, Type Conversion, and Casting.

**Practice 1:**

1. Explore different platforms
  - a. Basic linux environment and its editors like Vi, Vim & Emacs etc.
  - b. Exposure to turbo C, gcc.
  - c. Explore to hacker rank or any other Online coding platform and compiler environment.
  - d. “Hello world” in C.  
<https://www.codechef.com/learn/course/c/CDEVINTRO/problems/CDEV004B>
  - e. Objective: Learn about the syntax of reading from stdin and writing to stdout.  
<https://www.hackerrank.com/challenges/hello-world-c/problem?isFullScreen=true>

- f. Write a simple program to read int, float, char and string using scanf() and display using printf() in all the above given platforms.
2. Basics and Operators
- a. Sum and Difference of 2 numbers.  
Objective: Learn int and float data types.  
<https://www.hackerrank.com/challenges/sum-numbers-c/problem?isFullScreen=true>  
<https://maya.technicalhub.io/owl-program-details/668b9ec2e069313510b0235a>
- b. Playing with Characters.  
Objective: Learn how to take a character, a string and a sentence as input in C.  
<https://www.hackerrank.com/challenges/playing-with-characters/problem?isFullScreen=true>
- c. Bitwise Operators  
Objective: Learn how to work with bits (0,1) and bitwise operators.  
<https://www.hackerrank.com/challenges/bitwise-operators-in-c/problem?isFullScreen=true>
- d. Conversion of Fahrenheit to Celsius and vice versa.  
<https://www.codechef.com/practice/course/c/LPCAS03/problems/LCAS30>  
<https://maya.technicalhub.io/owl-program-details/66a0c0dda7d31805366af641>
- e. Distance travelled by an object.  
<https://maya.technicalhub.io/owl-program-details/6687c4e9fd042085d9ec254a>
- f. Calculate Simple interest and compound interest.  
<https://maya.technicalhub.io/owl-program-details/6687b498dfe02cea4b53e0ab>
3. Operators and Expressions, Variables and Type conversions.
- a. Evaluate the following expressions
- i.  $a/b*c-b+a*d/3$
- ii.  $j = (i++) + (++i)$
- b. Square root of a given number.
- c. Find the area of circle, square, rectangle and triangle.  
<https://maya.technicalhub.io/owl-program-details/6686546930bfbd35127c869c>  
<https://maya.technicalhub.io/owl-program-details/6688cf91e467bfe336f8352f>  
[https://www.hackerrank.com/challenges/rectangle-area/problem?utm\\_source=chatgpt.com](https://www.hackerrank.com/challenges/rectangle-area/problem?utm_source=chatgpt.com)  
<https://maya.technicalhub.io/owl-program-details/6688ea3ce467bfe336f8ab9d>
- d. Find the maximum of three numbers using conditional operator.  
<https://maya.technicalhub.io/owl-program-details/668690d230bfbd35127c9bf5>
- e. Take marks of 5 subjects in integers, find the total in integer and average in float.

## UNIT – II

### Control Structures

Simple sequential programs, Conditional Statements (if, if-else, else if ladder, switch), Loops (for, nested for loop, while, do-while), break and continue, goto statement.

**Practice:**

1. Conditional Statements
  1. Objective: Understand if and else Conditional statements in C.  
<https://www.hackerrank.com/challenges/conditional-statements-in-c/problem?isFullScreen=true>
  2. Roots of a Quadratic Equation.
  3. Generate electricity bill.  
<https://maya.technicalhub.io/owl-program-details/66868f6730bfbfd35127c9ba7>
  4. Simulate a calculator using switch case.
  5. Find the given year is a leap year or not.
2. Loops
  - a. Objective: Learn the usage of the for loop in C.  
<https://www.hackerrank.com/challenges/for-loop-in-c/problem?isFullScreen=true>
  - b. Sum of the digits of a 5-digit number.  
Objective: Learn the usage of while loop and usage of operators - % and /.  
<https://www.hackerrank.com/challenges/sum-of-digits-of-a-five-digit-number/problem?isFullScreen=true>  
<https://maya.technicalhub.io/owl-program-details/66864717f56afec5c0c917e1>
  - c. Given number is a prime or not. (Also Prime numbers between a given range.)  
<https://maya.technicalhub.io/owl-program-details/6687b69ddfe02cea4b5404a3>
  - d. Armstrong Number or not.
  - e. Palindrome or not.  
<https://maya.technicalhub.io/owl-program-details/6687af17dfe02cea4b5376ae>
  - f. Objective: Print a pattern of numbers using Loops.  
<https://www.hackerrank.com/challenges/printing-pattern-2/problem?isFullScreen=true>
  - g. Construct a Pyramid pattern.  
<https://www.codechef.com/practice/course/c/LPCAS02/problems/LCAS20>

**UNIT – III**

**Arrays:** Arrays indexing, Accessing programs with array of integers, two dimensional arrays, Introduction to Strings, string handling functions.

**Sorting Techniques:** bubble sort, selection sort.

**Searching Techniques:** linear, Binary search.

**Practice:**

1. 1-Dimensional Arrays
  - a. Objective: Print the sum and free the memory where the array is stored.  
<https://www.hackerrank.com/challenges/1d-arrays-in-c/problem?isFullScreen=true>
  - b. Objective: Working with indices in array.
  - c. Search an element in array (Linear Search).  
<https://maya.technicalhub.io/owl-program-details/6687c40ffd042085d9ec15d6>
  - d. Find min and max elements in array.  
<https://maya.technicalhub.io/owl-program-details/66879493dfe02cea4b529041>
  - e. Insert an element into array.

- f. Eliminate duplicate elements from array.  
<https://maya.technicalhub.io/owl-program-details/66e920a1aca93b27f3364b57>
- g. Sorting of elements in an array using Bubble sort.
2. 2-Demensional Arrays
  - a. Sum of two 2-D arrays.  
<https://maya.technicalhub.io/owl-program-details/66864fa9f56afec5c0c924f6>
  - b. Multiplication of two 2-D arrays.
  - c. Transpose of a Matrix.
  - d. Trace of a Matrix.
  - e. Lower Triangular Matrix.
3. Hacker Rank
  - a. Objective: print each word of the sentence in a new line.
  - b. Count number of alphabets (lowercase, uppercuse, consonants, vowels) and digits  
Lowercase to Uppercase, Uppercase to Lowercase, Toggle case, Sentential case  
<https://maya.technicalhub.io/owl-program-details/6698e2fbc6bd470f35b73d8>  
<https://maya.technicalhub.io/owl-program-details/6698ef03cb6bd470f35b7c3e>
  - c. find the frequency of each digit in the given string.  
<https://www.hackerrank.com/challenges/frequency-of-digits-1/problem?isFullScreen=true>
  - d. Find string length, concatenate 2 strings, reverse a string using built-in and without built-in string functions.  
<https://maya.technicalhub.io/owl-program-details/6698ed2dcb6bd470f35b7ae7>

#### UNIT – IV

**Functions:** Introduction to Functions, Function Declaration and Definition, Function call Return **Types and Arguments**, arrays as parameters, Scope and Lifetime of Variables, **storage classes**, **recursion**, functions and arrays.

**Practice:** Functions in C

1. Objective: Learn simple usage of functions.  
<https://www.hackerrank.com/challenges/functions-in-c/problem?isFullScreen=true>
2. Objective: Fibonacci Numbers using recursive function.  
<https://www.hackerrank.com/challenges/ctci-fibonacci-numbers/problem>
3. Objective: N<sup>th</sup> factorial using recursion.
4. Objective: Find the super digit of the integer.
5. Implement LCM
6. Objective: Calculate the Nth term of series.  
<https://www.hackerrank.com/challenges/recursion-in-c/problem?isFullScreen=true>

#### UNIT – V

**Pointer:** Introduction to Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, **functions & pointers** modifying parameters inside functions using pointers, Command line Arguments, Dynamic memory allocation, Null Pointer, generic pointer, dangling pointer.

**File Handling:-**Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

**Practice:**

1. Pointers

- a. Objective: learn to implement the basic functionalities of pointers in C.  
<https://www.hackerrank.com/challenges/pointer-in-c/problem?isFullScreen=true>
  - b. Objective: Learn using Pointers with Arrays and Functions.  
<https://www.hackerrank.com/challenges/students-marks-sum/problem?isFullScreen=true>
  - c. Objective: sort a given array of strings into lexicographically increasing order or into an order in which the string with the lowest length appears first.  
<https://www.hackerrank.com/challenges/sorting-array-of-strings/problem?isFullScreen=true>
  - d. Find the sum of a 1D array using malloc().
  - e. Swap two numbers using functions and pointers - call by value and reference.
  - f. Objective: Dynamic Handling requests by a Librarian to place the books in the shelves.  
<https://www.hackerrank.com/challenges/dynamic-array-in-c/problem?isFullScreen=true>
2. File handling concepts
- a) Write text into and read text from a file.
  - b) Write text into and read text from a binary file using fread() and fwrite().
  - c) Copy the contents of one file to another file.
  - d) Merge two files into the third file using command-line arguments
  - e) Find no. of lines, words and characters in a file.

**Text Books:**

- 1 Programming in C, Rema Theraja, Oxford, 2nd edition. ISBN 93-5497-9
- 2 "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall. ISBN 13: 9780131103627

**Reference Books:**

1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education. ISBN.No: 9352604172
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill. ISBN No. 0071367993
3. Let Us C Yashwanth, Kanetkar, Eighth edition, BPB Publications. ISBN No. 1934015253
4. Programming in C A-Practical Approach, Ajay Mittal. Pearson Education. ISBN No. 9788131729342
5. R G Dromey How to Solve It by Computer (Prentice-Hall International Series in Computer Science. ISBN-13 : 978-0134340012

**Web Links:**

- 1 <https://www.hackerrank.com/>
- 2 [https://onlinecourses.nptel.ac.in/noc22\\_cs40/preview](https://onlinecourses.nptel.ac.in/noc22_cs40/preview)
- 3 <https://archive.nptel.ac.in/courses/106/104/106104128/>

**Additional Practice:**

S.No	Difficulty	Problem Name	Link
1	Easy	Add Two Numbers	<a href="https://www.codechef.com/practice/course/cpp/PCPP05/problems/FLOW001">https://www.codechef.com/practice/course/cpp/PCPP05/problems/FLOW001</a>
2	Easy	Enormous Input Test	<a href="https://www.codechef.com/practice/course/basic-programming-concepts/DIFF500/problems/INTEST">https://www.codechef.com/practice/course/basic-programming-concepts/DIFF500/problems/INTEST</a>
3	Easy	ATM	<a href="https://www.codechef.com/practice/course/1-star-difficulty-problems/DIFF1200/problems/ATM2">https://www.codechef.com/practice/course/1-star-difficulty-problems/DIFF1200/problems/ATM2</a>
4	Easy	Number Mirror	<a href="https://www.codechef.com/practice/course/python/PPY01/problems/START01">https://www.codechef.com/practice/course/python/PPY01/problems/START01</a>
5	Easy	Sum of Digits	<a href="https://www.codechef.com/practice/course/basic-math/BASICMATH/problems/FLOW006">https://www.codechef.com/practice/course/basic-math/BASICMATH/problems/FLOW006</a>
6	Easy	Remainder	<a href="https://www.codechef.com/practice/course/basic-math/BASICMATH/problems/FLOW002">https://www.codechef.com/practice/course/basic-math/BASICMATH/problems/FLOW002</a>
7	Easy	First and Last Digit	<a href="https://www.codechef.com/practice/course/basic-programming-concepts/DIFF500/problems/FLOW004">https://www.codechef.com/practice/course/basic-programming-concepts/DIFF500/problems/FLOW004</a>
8	Easy	Reverse The Number	<a href="https://www.codechef.com/practice/course/logical-problems/DIFF800/problems/FLOW007">https://www.codechef.com/practice/course/logical-problems/DIFF800/problems/FLOW007</a>
9	Easy	Life, the Universe, and Everything	<a href="https://staging.codechef.com/practice/course/cpp/PRACTICECPP2/problems/TEST">https://staging.codechef.com/practice/course/cpp/PRACTICECPP2/problems/TEST</a>
10	Easy	Chef and Operators	<a href="https://www.codechef.com/practice/course/logical-problems/DIFF800/problems/CHOPRT">https://www.codechef.com/practice/course/logical-problems/DIFF800/problems/CHOPRT</a>
11	Easy	Difference and Sum	<a href="https://www.codechef.com/problems/DIFFSUM">https://www.codechef.com/problems/DIFFSUM</a>
12	Easy	Second Largest	<a href="https://www.codechef.com/practice/course/arrays/ARRAYS/problems/LARGESECOND">https://www.codechef.com/practice/course/arrays/ARRAYS/problems/LARGESECOND</a>
13	Easy	Two Sum	<a href="https://leetcode.com/problems/two-sum/">https://leetcode.com/problems/two-sum/</a>
14	Easy	Reverse Integer	<a href="https://leetcode.com/problems/reverse-integer/">https://leetcode.com/problems/reverse-integer/</a>
15	Easy	Palindrome Number	<a href="https://leetcode.com/problems/palindrome-number/">https://leetcode.com/problems/palindrome-number/</a>
16	Easy	Roman to Integer	<a href="https://leetcode.com/problems/roman-to-integer/">https://leetcode.com/problems/roman-to-integer/</a>
17	Easy	Remove Duplicates from Sorted Array	<a href="https://leetcode.com/problems/remove-duplicates-from-sorted-array/">https://leetcode.com/problems/remove-duplicates-from-sorted-array/</a>
18	Easy	Remove Element	<a href="https://leetcode.com/problems/remove-element/">https://leetcode.com/problems/remove-element/</a>
19	Easy	Find the Index of the First Occurrence in a String	<a href="https://leetcode.com/problems/find-the-index-of-the-first-occurrence-in-a-string/">https://leetcode.com/problems/find-the-index-of-the-first-occurrence-in-a-string/</a>
20	Easy	Length of Last Word	<a href="https://leetcode.com/problems/length-of-last-word/">https://leetcode.com/problems/length-of-last-word/</a>
21	Easy	Plus One	<a href="https://leetcode.com/problems/plus-one/">https://leetcode.com/problems/plus-one/</a>
22	Easy	Merge Sorted Array	<a href="https://leetcode.com/problems/merge-sorted-array/">https://leetcode.com/problems/merge-sorted-array/</a>
23	Easy	Majority Element	<a href="https://leetcode.com/problems/majority-element/">https://leetcode.com/problems/majority-element/</a>
24	Easy	Single Number	<a href="https://leetcode.com/problems/single-number/">https://leetcode.com/problems/single-number/</a>
25	Easy	Move Zeroes	<a href="https://leetcode.com/problems/move-zeroes/">https://leetcode.com/problems/move-zeroes/</a>

26	Easy	Missing Number	<a href="https://leetcode.com/problems/missing-number/">https://leetcode.com/problems/missing-number/</a>
27	Easy	Contains Duplicate	<a href="https://leetcode.com/problems/contains-duplicate/">https://leetcode.com/problems/contains-duplicate/</a>
28	Easy	Valid Anagram	<a href="https://leetcode.com/problems/valid-anagram/">https://leetcode.com/problems/valid-anagram/</a>
29	Easy	Valid Parentheses	<a href="https://leetcode.com/problems/valid-parentheses/">https://leetcode.com/problems/valid-parentheses/</a>
30	Easy	Fibonacci Number	<a href="https://leetcode.com/problems/fibonacci-number/">https://leetcode.com/problems/fibonacci-number/</a>
31	Easy	Climbing Stairs	<a href="https://leetcode.com/problems/climbing-stairs/">https://leetcode.com/problems/climbing-stairs/</a>
32	Easy	Binary Search	<a href="https://leetcode.com/problems/binary-search/">https://leetcode.com/problems/binary-search/</a>
33	Easy	Number of 1 Bits	<a href="https://leetcode.com/problems/number-of-1-bits/">https://leetcode.com/problems/number-of-1-bits/</a>
34	Easy	Hamming Weight	<a href="https://leetcode.com/problems/number-of-1-bits/description/">https://leetcode.com/problems/number-of-1-bits/description/</a>
35	Easy	Power of Two	<a href="https://leetcode.com/problems/power-of-two/">https://leetcode.com/problems/power-of-two/</a>
36	Easy	Power of Three	<a href="https://leetcode.com/problems/power-of-three/">https://leetcode.com/problems/power-of-three/</a>
37	Easy	Same Tree	<a href="https://leetcode.com/problems/same-tree/">https://leetcode.com/problems/same-tree/</a>
38	Easy	Maximum Subarray	<a href="https://leetcode.com/problems/maximum-subarray/">https://leetcode.com/problems/maximum-subarray/</a>
39	Medium	Chef and Notebooks	<a href="https://www.codechef.com/problems/CNOTE">https://www.codechef.com/problems/CNOTE</a>
40	Medium	Chef and Wildcard Matching	<a href="https://www.codechef.com/search?q=TWOSTR">https://www.codechef.com/search?q=TWOSTR</a>
41	Medium	Minimum Moves	<a href="https://www.codechef.com/search?q=SALARY">https://www.codechef.com/search?q=SALARY</a>
42	Medium	Lucky Four	<a href="https://www.codechef.com/search?q=LUCKFOUR">https://www.codechef.com/search?q=LUCKFOUR</a>
43	Medium	Maximum Difference	<a href="https://www.codechef.com/search?q=MAXDIFF">https://www.codechef.com/search?q=MAXDIFF</a>
44	Medium	Uncle Johny	<a href="https://www.codechef.com/search?q=JOHNY">https://www.codechef.com/search?q=JOHNY</a>
45	Medium	Chef and Strings	<a href="https://www.codechef.com/search?q=CHFSTLT">https://www.codechef.com/search?q=CHFSTLT</a>
46	Medium	Two vs Rib	<a href="https://www.codechef.com/search?q=TWOVRIB">https://www.codechef.com/search?q=TWOVRIB</a>
47	Medium	Chef and Array	<a href="https://www.codechef.com/search?q=CHFARRP">https://www.codechef.com/search?q=CHFARRP</a>
48	Medium	Add Two Numbers	<a href="https://leetcode.com/problems/add-two-numbers/">https://leetcode.com/problems/add-two-numbers/</a>
49	Medium	Longest Substring Without Repeating Characters	<a href="https://leetcode.com/problems/longest-substring-without-repeating-characters/">https://leetcode.com/problems/longest-substring-without-repeating-characters/</a>
50	Medium	Longest Palindromic Substring	<a href="https://leetcode.com/problems/longest-palindromic-substring/">https://leetcode.com/problems/longest-palindromic-substring/</a>
51	Medium	3Sum	<a href="https://leetcode.com/problems/3sum/">https://leetcode.com/problems/3sum/</a>
52	Medium	Container With Most Water	<a href="https://leetcode.com/problems/container-with-most-water/">https://leetcode.com/problems/container-with-most-water/</a>

53	Medium	Integer to Roman	<a href="https://leetcode.com/problems/integer-to-roman/">https://leetcode.com/problems/integer-to-roman/</a>
54	Medium	String to Integer (atoi)	<a href="https://leetcode.com/problems/string-to-integer-atoi/">https://leetcode.com/problems/string-to-integer-atoi/</a>
55	Medium	Divide Two Integers	<a href="https://leetcode.com/problems/divide-two-integers/">https://leetcode.com/problems/divide-two-integers/</a>
56	Medium	Rotate Image	<a href="https://leetcode.com/problems/rotate-image/">https://leetcode.com/problems/rotate-image/</a>
57	Medium	Set Matrix Zeroes	<a href="https://leetcode.com/problems/set-matrix-zeroes/">https://leetcode.com/problems/set-matrix-zeroes/</a>
58	Medium	Spiral Matrix	<a href="https://leetcode.com/problems/spiral-matrix/">https://leetcode.com/problems/spiral-matrix/</a>
59	Medium	Jump Game	<a href="https://leetcode.com/problems/jump-game/">https://leetcode.com/problems/jump-game/</a>
60	Medium	Permutations	<a href="https://leetcode.com/problems/permutations/">https://leetcode.com/problems/permutations/</a>
61	Medium	Combination Sum	<a href="https://leetcode.com/problems/combination-sum/">https://leetcode.com/problems/combination-sum/</a>
62	Medium	Search in Rotated Sorted Array	<a href="https://leetcode.com/problems/search-in-rotated-sorted-array/">https://leetcode.com/problems/search-in-rotated-sorted-array/</a>
63	Medium	Group Anagrams	<a href="https://leetcode.com/problems/group-anagrams/">https://leetcode.com/problems/group-anagrams/</a>
64	Medium	Sort Colors	<a href="https://leetcode.com/problems/sort-colors/">https://leetcode.com/problems/sort-colors/</a>
65	Medium	Subsets	<a href="https://leetcode.com/problems/subsets/">https://leetcode.com/problems/subsets/</a>
66	Medium	Reverse Linked List II	<a href="https://leetcode.com/problems/reverse-linked-list-ii/">https://leetcode.com/problems/reverse-linked-list-ii/</a>
67	Medium	Add Two Numbers II	<a href="https://leetcode.com/problems/add-two-numbers-ii/">https://leetcode.com/problems/add-two-numbers-ii/</a>
68	Medium	Reorder List	<a href="https://leetcode.com/problems/reorder-list/">https://leetcode.com/problems/reorder-list/</a>
69	Medium	Linked List Cycle II	<a href="https://leetcode.com/problems/linked-list-cycle-ii/">https://leetcode.com/problems/linked-list-cycle-ii/</a>
70	Medium	K-th Largest Element in an Array	<a href="https://leetcode.com/problems/kth-largest-element-in-an-array/">https://leetcode.com/problems/kth-largest-element-in-an-array/</a>
71	Medium	Product of Array Except Self	<a href="https://leetcode.com/problems/product-of-array-except-self/">https://leetcode.com/problems/product-of-array-except-self/</a>
72	Medium	Word Search	<a href="https://leetcode.com/problems/word-search/">https://leetcode.com/problems/word-search/</a>
73	Medium	Unique Paths	<a href="https://leetcode.com/problems/unique-paths/">https://leetcode.com/problems/unique-paths/</a>
74	Medium	Minimum Path Sum	<a href="https://leetcode.com/problems/minimum-path-sum/">https://leetcode.com/problems/minimum-path-sum/</a>
75	Medium	Temperature Converter - II	<a href="https://www.codechef.com/practice/course/c/LPCA_S03/problems/LCAS30B">https://www.codechef.com/practice/course/c/LPCA_S03/problems/LCAS30B</a>
76	Medium	Reverse	<a href="https://www.hackerrank.com/challenges/reverse-array-c/problem?isFullScreen=true">https://www.hackerrank.com/challenges/reverse-array-c/problem?isFullScreen=true</a>

77	Medium	Sentence in a new line	<a href="https://www.hackerrank.com/challenges/printing-tokens-/problem?isFullScreen=true">https://www.hackerrank.com/challenges/printing-tokens-/problem?isFullScreen=true</a>
78	Hard	Median of Two Sorted Arrays	<a href="https://leetcode.com/problems/median-of-two-sorted-arrays/">https://leetcode.com/problems/median-of-two-sorted-arrays/</a>
79	Hard	Regular Expression Matching	<a href="https://leetcode.com/problems/regular-expression-matching/">https://leetcode.com/problems/regular-expression-matching/</a>
80	Hard	Wildcard Matching	<a href="https://leetcode.com/problems/wildcard-matching/">https://leetcode.com/problems/wildcard-matching/</a>
81	Hard	Trapping Rain Water	<a href="https://leetcode.com/problems/trapping-rain-water/">https://leetcode.com/problems/trapping-rain-water/</a>
82	Hard	First Missing Positive	<a href="https://leetcode.com/problems/first-missing-positive/">https://leetcode.com/problems/first-missing-positive/</a>
83	Hard	Longest Valid Parentheses	<a href="https://leetcode.com/problems/longest-valid-parentheses/">https://leetcode.com/problems/longest-valid-parentheses/</a>
84	Hard	Merge k Sorted Lists	<a href="https://leetcode.com/problems/merge-k-sorted-lists/">https://leetcode.com/problems/merge-k-sorted-lists/</a>
85	Hard	Reverse Nodes in k-Group	<a href="https://leetcode.com/problems/reverse-nodes-in-k-group/description/">https://leetcode.com/problems/reverse-nodes-in-k-group/description/</a>
86	Hard	Sudoku Solver	<a href="https://leetcode.com/problems/sudoku-solver/">https://leetcode.com/problems/sudoku-solver/</a>
87	Hard	N-Queens	<a href="https://leetcode.com/problems/n-queens/description/">https://leetcode.com/problems/n-queens/description/</a>
88	Hard	Edit Distance	<a href="https://leetcode.com/problems/edit-distance/">https://leetcode.com/problems/edit-distance/</a>
89	Hard	Word Ladder II	<a href="https://leetcode.com/problems/word-ladder-ii/">https://leetcode.com/problems/word-ladder-ii/</a>
90	Hard	Maximal Rectangle	<a href="https://leetcode.com/problems/maximal-rectangle/">https://leetcode.com/problems/maximal-rectangle/</a>
91	Hard	Binary Tree Maximum Path Sum	<a href="https://leetcode.com/problems/binary-tree-maximum-path-sum/">https://leetcode.com/problems/binary-tree-maximum-path-sum/</a>
92	Hard	Serialize and Deserialize Binary Tree	<a href="https://leetcode.com/problems/serialize-and-deserialize-binary-tree/">https://leetcode.com/problems/serialize-and-deserialize-binary-tree/</a>
93	Hard	Variadic functions in C	<a href="https://www.hackerrank.com/challenges/variadic-functions-in-c/problem?isFullScreen=true">https://www.hackerrank.com/challenges/variadic-functions-in-c/problem?isFullScreen=true</a>
94	Hard	Small Triangles, Large Triangles	<a href="https://www.hackerrank.com/challenges/small-triangles-large-triangles/problem?isFullScreen=true">https://www.hackerrank.com/challenges/small-triangles-large-triangles/problem?isFullScreen=true</a>
95	Hard	Permutations of Strings	<a href="https://www.hackerrank.com/challenges/permutation-s-of-strings/problem?isFullScreen=true">https://www.hackerrank.com/challenges/permutation-s-of-strings/problem?isFullScreen=true</a>

### Maya Programs

S.No.	Problem Name	Maya Program Link
1	Can Cross the Bridge	<a href="https://maya.technicalhub.io/owl-program-details/6686308df56afec5c0c8e2dd">https://maya.technicalhub.io/owl-program-details/6686308df56afec5c0c8e2dd</a>
2	Hypotenuse	<a href="https://maya.technicalhub.io/owl-program-details/6686404ef56afec5c0c90135">https://maya.technicalhub.io/owl-program-details/6686404ef56afec5c0c90135</a>
3	Heron's Formula	<a href="https://maya.technicalhub.io/owl-program-details/66864474f56afec5c0c911f5">https://maya.technicalhub.io/owl-program-details/66864474f56afec5c0c911f5</a>
4	Loss Percentage	<a href="https://maya.technicalhub.io/owl-program-details/66864868f56afec5c0c91a4a">https://maya.technicalhub.io/owl-program-details/66864868f56afec5c0c91a4a</a>
5	King Tours	<a href="https://maya.technicalhub.io/owl-program-details/66864c96f56afec5c0c921f1">https://maya.technicalhub.io/owl-program-details/66864c96f56afec5c0c921f1</a>

6	Profit Percentage	<a href="https://maya.technicalhub.io/owl-program-details/66865237f56afec5c0c92694">https://maya.technicalhub.io/owl-program-details/66865237f56afec5c0c92694</a>
7	Area and Perimeter of Square	<a href="https://maya.technicalhub.io/owl-program-details/6686546930bfd35127c869c">https://maya.technicalhub.io/owl-program-details/6686546930bfd35127c869c</a>
8	Volume of Sphere	<a href="https://maya.technicalhub.io/owl-program-details/6686565530bfd35127c8818">https://maya.technicalhub.io/owl-program-details/6686565530bfd35127c8818</a>
9	Required Points	<a href="https://maya.technicalhub.io/owl-program-details/66865b1130bfd35127c8a04">https://maya.technicalhub.io/owl-program-details/66865b1130bfd35127c8a04</a>
10	Instant Noodles	<a href="https://maya.technicalhub.io/owl-program-details/66865ddb30bfd35127c8c0a">https://maya.technicalhub.io/owl-program-details/66865ddb30bfd35127c8c0a</a>
11	Find Second Number	<a href="https://maya.technicalhub.io/owl-program-details/668660a530bfd35127c8cde">https://maya.technicalhub.io/owl-program-details/668660a530bfd35127c8cde</a>
12	Kmph to Mps	<a href="https://maya.technicalhub.io/owl-program-details/668663ce30bfd35127c8dfb">https://maya.technicalhub.io/owl-program-details/668663ce30bfd35127c8dfb</a>
13	Inches to Centimeters	<a href="https://maya.technicalhub.io/owl-program-details/6686665e30bfd35127c8f3a">https://maya.technicalhub.io/owl-program-details/6686665e30bfd35127c8f3a</a>
14	Capacity	<a href="https://maya.technicalhub.io/owl-program-details/668678aa30bfd35127c95b9">https://maya.technicalhub.io/owl-program-details/668678aa30bfd35127c95b9</a>
15	Average of Two Numbers	<a href="https://maya.technicalhub.io/owl-program-details/6687b002dfe02cea4b5389d6">https://maya.technicalhub.io/owl-program-details/6687b002dfe02cea4b5389d6</a>
16	Compound Interest	<a href="https://maya.technicalhub.io/owl-program-details/6687b498dfe02cea4b53e0ab">https://maya.technicalhub.io/owl-program-details/6687b498dfe02cea4b53e0ab</a>
17	Average Weight	<a href="https://maya.technicalhub.io/owl-program-details/6687b93edfe02cea4b54367a">https://maya.technicalhub.io/owl-program-details/6687b93edfe02cea4b54367a</a>
18	Arithmetic Operations	<a href="https://maya.technicalhub.io/owl-program-details/6687bda0dfe02cea4b5488a1">https://maya.technicalhub.io/owl-program-details/6687bda0dfe02cea4b5488a1</a>
19	Distance Between Two Points	<a href="https://maya.technicalhub.io/owl-program-details/6687c4e9fd042085d9ec254a">https://maya.technicalhub.io/owl-program-details/6687c4e9fd042085d9ec254a</a>
20	Days into Years, Weeks	<a href="https://maya.technicalhub.io/owl-program-details/6687cad1fd042085d9ec95a8">https://maya.technicalhub.io/owl-program-details/6687cad1fd042085d9ec95a8</a>
21	Convert Seconds to Hours, Minutes and Seconds	<a href="https://maya.technicalhub.io/owl-program-details/6688c926e467bfe336f8007b">https://maya.technicalhub.io/owl-program-details/6688c926e467bfe336f8007b</a>
22	Hours and Minutes	<a href="https://maya.technicalhub.io/owl-program-details/6688e4f0e467bfe336f89673">https://maya.technicalhub.io/owl-program-details/6688e4f0e467bfe336f89673</a>
23	Romeo and Juliet	<a href="https://maya.technicalhub.io/owl-program-details/6688e068e467bfe336f87a8b">https://maya.technicalhub.io/owl-program-details/6688e068e467bfe336f87a8b</a>
24	Gross Salary of an Employee	<a href="https://maya.technicalhub.io/owl-program-details/6688dd95e467bfe336f87682">https://maya.technicalhub.io/owl-program-details/6688dd95e467bfe336f87682</a>
25	Surface Area and Volume of a Cube	<a href="https://maya.technicalhub.io/owl-program-details/6688d909e467bfe336f872ca">https://maya.technicalhub.io/owl-program-details/6688d909e467bfe336f872ca</a>
26	Area of Trapezium	<a href="https://maya.technicalhub.io/owl-program-details/6688d637e467bfe336f86c5e">https://maya.technicalhub.io/owl-program-details/6688d637e467bfe336f86c5e</a>
27	Swap Two Numbers	<a href="https://maya.technicalhub.io/owl-program-details/6688d2d0e467bfe336f84f55">https://maya.technicalhub.io/owl-program-details/6688d2d0e467bfe336f84f55</a>
28	Last Two Digits of a Given Year	<a href="https://maya.technicalhub.io/owl-program-details/6688ccfae467bfe336f81f90">https://maya.technicalhub.io/owl-program-details/6688ccfae467bfe336f81f90</a>
29	Arithmetic Operations	<a href="https://maya.technicalhub.io/owl-program-details/6687bda0dfe02cea4b5488a1">https://maya.technicalhub.io/owl-program-details/6687bda0dfe02cea4b5488a1</a>
30	Uppercase Letters in a String	<a href="https://maya.technicalhub.io/owl-program-details/669a2453c03fc56b320b215c">https://maya.technicalhub.io/owl-program-details/669a2453c03fc56b320b215c</a>
31	Factors Finding	<a href="https://maya.technicalhub.io/owl-program-details/66866c4a30bfd35127c90b4">https://maya.technicalhub.io/owl-program-details/66866c4a30bfd35127c90b4</a>

32	String Copy	<a href="https://maya.technicalhub.io/owl-program-details/669a03ded62716a9c6d4fa9a">https://maya.technicalhub.io/owl-program-details/669a03ded62716a9c6d4fa9a</a>
33	Recursive Digit Sum	<a href="https://www.hackerrank.com/challenges/recursive-digit-sum/problem">https://www.hackerrank.com/challenges/recursive-digit-sum/problem</a>

	Basic Programs	Aditya's Internal Coding Platform (Maya)	Code chef	Hacker rank	Leet code	Total
<b>Unit-1</b>	4	8	2	5	0	<b>19</b>
<b>Unit-2</b>	4	4	1	4	0	<b>13</b>
<b>Unit-3</b>	8	7	0	2	0	<b>17</b>
<b>Unit-4</b>	3	0	0	3	0	<b>6</b>
<b>Unit-5</b>	7	0	4	4	0	<b>15</b>
<b>Additional Practice</b>	0	33	22	5	68	<b>128</b>
<b>Total</b>	<b>26</b>	<b>52</b>	<b>29</b>	<b>23</b>	<b>68</b>	<b>198</b>

**Data Structures**  
(Common to EEE, ECE, CSE, IT, AIML & CSE (DS))

**Course Code:** 2501CS03 **L** **T** **P** **C**  
**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](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](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](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](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](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](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: Definition 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	<a href="https://www.hackerrank.com/challenges/too-high-boxes/problem">https://www.hackerrank.com/challenges/too-high-boxes/problem</a>
2	Easy	Structs and enums	<a href="https://www.codechef.com/problems/HS08TEST?tab=statement">https://www.codechef.com/problems/HS08TEST?tab=statement</a>
3	Medium	Structs and enums	<a href="https://www.hackerrank.com/challenges/small-triangles-large-triangles/problem">https://www.hackerrank.com/challenges/small-triangles-large-triangles/problem</a>
4	Easy	Arrays and Hashtables	<a href="https://leetcode.com/problems/two-sum/description/">https://leetcode.com/problems/two-sum/description/</a>
5	Easy	Arrays and Pointers	<a href="https://leetcode.com/problems/remove-duplicates-from-sorted-array/description/?utm_source">https://leetcode.com/problems/remove-duplicates-from-sorted-array/description/?utm_source</a>
6	Medium	Arrays and Pointers	<a href="https://leetcode.com/problems/two-sum-ii-input-array-is-sorted/description/?utm_source">https://leetcode.com/problems/two-sum-ii-input-array-is-sorted/description/?utm_source</a>
7	Easy	Linked List	<a href="https://leetcode.com/problems/merge-two-sorted-lists/description/">https://leetcode.com/problems/merge-two-sorted-lists/description/</a>
8	Medium	Arrays and Matrix	<a href="https://leetcode.com/problems/diagonal-traverse/description/">https://leetcode.com/problems/diagonal-traverse/description/</a>
9	Easy	Linked List	<a href="https://www.hackerrank.com/challenges/compare-two-linked-lists/problem">https://www.hackerrank.com/challenges/compare-two-linked-lists/problem</a>
10	Medium	Stack applications	<a href="https://www.geeksforgeeks.org/problems/tower-of-hanoi-1587115621/1?utm">https://www.geeksforgeeks.org/problems/tower-of-hanoi-1587115621/1?utm</a>
11	Medium	Binary Tree	<a href="https://leetcode.com/problems/binary-tree-right-side-view/description/">https://leetcode.com/problems/binary-tree-right-side-view/description/</a>
12	Medium	Stack applications	<a href="https://leetcode.com/problems/remove-k-digits/description/">https://leetcode.com/problems/remove-k-digits/description/</a>
13	Medium	Graph Theory	<a href="https://www.hackerrank.com/challenges/journey-to-the-moon/problem">https://www.hackerrank.com/challenges/journey-to-the-moon/problem</a>
14	Medium	Graph Traversals	<a href="https://leetcode.com/problems/number-of-provinces/description/">https://leetcode.com/problems/number-of-provinces/description/</a>
15	Medium	Graph Theory	<a href="https://www.hackerrank.com/challenges/torque-and-development/problem">https://www.hackerrank.com/challenges/torque-and-development/problem</a>

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

**Engineering Economics & Management**  
 (Common to CE, EEE, ME, CSE, IT, AIML & CSE(DS))

<b>Course Code:</b> 2501MB01	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>

**Course Outcomes:**

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

- CO1:** Explain the Business Economic concepts, law of demand and forecasting methods.
- CO2:** Identify production and cost behaviour for managerial decision making with Break-Even Point (BEP).
- CO3:** Make use of financial accounting and capital budgeting techniques for decision making.
- CO4:** Summarize management and motivational theories to renovate the practice of Management.
- CO5:** Illustrate the functional management and project management using PERT and CPM.

**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	2		
CO2	1									2	
CO3										3	
CO4	1							1	1	2	
CO5										3	

**UNIT-I**

**Introduction to Managerial Economics and demand Analysis:**

Definition of Managerial Economics –Scope of Managerial Economics- Concept of Demand, Types of Demand, Determinants of Demand- Law of Demand and its limitations- Elasticity of Demand, Types- Demand forecasting and its Methods.

**UNIT-II**

**Production and Cost Analyses:**

Concept of Production function Law of Variable Proportions-Isoquants and Isocosts - Producer Equilibrium-, cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs – Cost –Volume-Profit Analysis-Determination of Breakeven point (simple problems).

**UNIT-III**

**Introduction to Markets and Financial Accounting:** Market Structures-Classification of markets, Introduction to Financial Accounting , Concepts and conventions, Accounting cycle, Journal entries and Ledger (Simple Problems), Methods of capital budgeting (Simple Problems).

## UNIT-IV

### **Operations Management :**

Concept nature and importance of Management, Generic Functions of Management, Theories of Motivation, Plant location and layout, Principles of organization, SWOT analysis.

**Material Management:** Need for Inventory control, EOQ, ABC analysis

## UNIT – V

### **Functional Management And Project Management**

Concept of HRM , HRD and PMIR, Functions of HR Manager , Job Evaluation and Merit Rating , Marketing Management, Functions of Marketing , Channels of distributions - Development of Network , Difference between PERT and CPM, Finding Critical Path (Simple Problems)

### **Text Books:**

- 1 Managerial Economics and Financial Analysis, A. R. Aryasri , McGraw Hill Education, ISBN: 978-07078031
- 2 Managerial Economics and Financial Analysis', N. Appa Rao, P. Vijay Kumar, Cengage Publications, New Delhi, ISBN: 978-8131515952
- 3 Management Science by Aryasri; Publisher: Tata McGraw Hill, 209, ISBN: 978-07090279
- 4 Management by James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; Publisher: Pearson Education/Prentice Hall, ISBN: 978-0131087477

### **Reference Books:**

- 1 Principles of Marketing: A South Asian Perspective by Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshanul Haque, 13th Edition, Publisher: Pearson Education/Prentice Hall of India, ISBN: 9788131731017
- 2 A Handbook of Human Resource Management Practice by Michael Armstrong, 210; Publisher: Kogan Page Publishers, ISBN: 978-1789661033

### **Web Links:**

- 1 [www.managementstudyguide.com](http://www.managementstudyguide.com)
- 2 [www.citehr.com](http://www.citehr.com)
- 3 [www.nptel.ac.in/courses/122106032](http://www.nptel.ac.in/courses/122106032)
- 4 [www.btechguru.com/courses--nptel--basic-course](http://www.btechguru.com/courses--nptel--basic-course)