Multidisciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CS001	Programming for Problem Solving Using C	FC	2		2	4	50	50	100	-
241EE001	Basic Electrical & Electronics Engineering	FC	2		2	4	50	50	100	-
241MB001	Engineering Economics & Management	FC	2			2	50	50	100	-
	Total		**6**		**4**	**10**				

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

	L	T	P	C
Course Code: 241CS001	**2**		**2**	**4**

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 and dynamics memory allocations using pointers.
CO5: Demonstrate 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
CO1	2	3	2	1	3	-	-	-	-	-	1
CO2	2	3	2	1	3	-	-	-	-	-	1
CO3	2	3	2	1	3	-	-	-	-	-	1
CO4	2	3	2	1	3	-	-	-	-	-	1
CO5	2	3	2	1	3	-	-	-	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2
CO1	2	2
CO2	2	2
CO3	2	2
CO4	2	2
CO5	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.
   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
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 e 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
   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.
   e. Distance travelled by an object.
   f. Calculate Simple interest and compound interest

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.
   d. Find the maximum of three numbers using conditional operator.
   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
   a. Conditional statements in C. Objective: Understand if and else. https://www.hackerrank.com/challenges/conditional-statements-in-c/problem?isFullScreen=true
   b. Roots of a Quadratic Equation.
   c. Generate electricity bill.
   d. Simulate a calculator using switch case.
   e. Find the given year is a leap year or not.
2. Loops

a. "for" Loop in C. Objective: Learn the usage of the for loop.
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
c. Given number is a prime or not. (Also Prime numbers between a given range.)
d. Armstrong Number or not.
e. Palindrome or not.
f. Printing patterns using Loops. Objective: Print a pattern of numbers.
https://www.hackerrank.com/challenges/printing-pattern-2/problem?isFullScreen=true
g. Construct a Pyramid pattern.

UNIT – III

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. Arrays
   a. 1D Arrays in C 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. Array reversal Objective: Working with indices in array
   https://www.hackerrank.com/challenges/reverse-array-c/problem?isFullScreen=true
   c. Search an element in array (Linear Search)
   d. Find min and max elements in array
   e. Insert an element into array
   f. Eliminate duplicate elements from array
   g. Sorting of elements in an array using Bubble sort
2. Arrays
   a) Sum of two 2-D arrays
   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) Printing Tokens Objective: print each word of the sentence in a new line
   https://www.hackerrank.com/challenges/printing-tokens- /problem?isFullScreen=true
   b) Count number of alphabets (lowercase, uppercase, consonants, vowels) and digits
   Objective:
   c) Lowercase to Uppercase, Uppercase to Lowercase, Toggle case, Sentential case
   Objective:
   d) Digit Frequency Objective: find the frequency of each digit in the given string.
   https://www.hackerrank.com/challenges/frequency-of-digits1/problem?isFullScreen=true

e) Find string length, concatenate 2 strings, reverse a string using built-in and without built-in string functions.

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 class, recursion, functions & pointers, 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. Fibonacci Numbers Objective: Complete the recursive function. https://www.hackerrank.com/challenges/ctci-fibonacci-numbers/problem
3. Factorial Objective: N! (N factorial) using recursion. https://www.hackerrank.com/contests/ccc-veltech-practice-setende/challenges/factorial-using-recursion-1
4. Digit Sum Objective: find the super digit of the integer. https://www.hackerrank.com/challenges/recursive-digit-sum/problem
5. LCM
6. Calculate the Nth term Objective: Find the Nth term. https://www.hackerrank.com/challenges/recursion-in-c/problem?isFullScreen=true

UNIT – V

Introduction to Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using 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) Pointers in C Objective: learn to implement the basic functionalities of pointers in C. https://www.hackerrank.com/challenges/pointer-in-c/problem?isFullScreen=true
   b) Students Marks Sum Objective: Learn using Pointers with Arrays and Functions https://www.hackerrank.com/challenges/students-markssum/problem?isFullScreen=true
   c) Sorting Array of Strings 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-ofstrings/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) Dynamic Array in C Objective: Handling requests by a Librarian to place the books in the shelves. https://www.hackerrank.com/challenges/dynamic-array-inc/problem?isFullScreen=true

2. File handle 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.

Additional Practice:

1. Variadic functions in C
   Objective: Understanding variable number of arguments
   https://www.hackerrank.com/challenges/variadic-functions-in-c/problem?isFullScreen=true
2. Small Triangles, Large Triangles
   Objective: Print sorted by their areas
   https://www.hackerrank.com/challenges/small-triangles-large-triangles/problem?isFullScreen=true
3. Permutations of Strings
   Objective: print all strings permutations in strict lexicographical order
   https://www.hackerrank.com/challenges/permutations-of-strings/problem?isFullScreen=true

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
3 https://archive.nptel.ac.in/courses/106/104/106104128/

Basic Electrical and Electronics Engineering

(Common to CE,EEE, ME, ECE,CSE, IT, AIML, CSE(DS), PT&Min.E)

	L	T	P	C
Course Code 241EE001	**2**	**0**	**2**	**4**

Course Outcomes:

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

CO 1: Analyze the concepts associated to AC and DC circuits.

CO 2: Explain the operating principles of motors, generators and measuring instruments.

CO 3: Analyze the Different Energy Resources and Equipment Safety Measures.

CO 4: Explain the concept and the applications of semiconductor Diodes.

CO 5: Analyze the basic electronic circuits and interpret numeric information in different code formats.

Mapping of course outcomes with program outcomes:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	3	1		1				2	2	
CO2	2	3	1						2	2	
CO3	3	2	1						2	2	
CO4	3	2	1						2	2	
CO5	3	2	1						2	2	

Mapping of course outcomes with program Specific Outcomes:

CO\PSO	PSO1	PSO2
CO1	**1**	
CO2	**1**	
CO3	**1**	
CO4	**1**	
CO5	**1**	

UNIT-I:

DC and AC Circuits:

DC circuits: Ohm's and Kirchhoff's laws, analysis of series, parallel and series-parallel circuits excited by independent voltage sources for R, L, C parameters, current division, voltage division

AC circuits: Generation of sinusoidal voltage, frequency of generated voltage, average value, RMS value, form, and peak factors. Real power, reactive power, apparent power, and Power factor.

PRACTICE:

1. Verification of Ohm's Law.
2. Verification of KCL and KVL.
3. Verification of KCL, KVL and ohm's law using simulation.

UNIT-II:

Machines and Measuring Instruments:

Principles and operation of DC machines, Transformers – Synchronous Machines - three Phase and single phase induction motors - Moving coil and moving iron instruments, Wheatstone bridge and Megger.

PRACTICE:

1. To study Magnetisation Characteristics of DC shunt generator
2. Measurement of Power and Power factor using Single-phase wattmeter
3. Measurement of Resistance using Wheat stone bridge
4. MeasurementofEarthResistanceusingMegger.

UNIT-III:

Energy Resources, Electricity Bill and Safety Measures

Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Thermal,Solar and Wind power generation. Calculation of electricity bill for domestic appliances. Working principle of Fuse and Miniature circuit breaker (MCB). Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

PRACTICE:

1. Calculation of Electrical Energy for Domestic Premises

UNIT-IV:

SEMICONDUCTOR DEVICES

Intrinsic semiconductors – Extrinsic semiconductors - P type and N type - P-N junction characteristics of P N Junction Diode — Zener Effect — Zener Diode and its Characteristics. working of simple zener voltage regulator and amplifier- Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics.

PRACTICE:

1. Sketch the V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Sketch the V-I characteristics of Zener Diode and its application as voltage Regulator
3. Plot Input and Output characteristics of BJT in CE and CB configurations.
4. Obtain Frequency response of CE amplifier.

UNIT-V:

BASIC ELECTRONIC CIRCUITS

Block diagram description of a dc power supply, working of a half and full wave, bridge rectifier, filters.

DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders

PRACTICE:

1. Implementation of half wave and full wave rectifiers.
2. Design Half Adder and Full Adder circuits.
3. Verification of truth table for Logic gates using ICs.

Text Books:

1. "Basic Electrical and Electronics Engineering", Salivahanan S, Tata McGraw Hill Education (India) Private Limited, New Delhi (ISBN: 9789389691801).
2. "Principles of Electrical Engineering", V. K. Mehta, R. Mehta, S. Chand and Company Ltd., New Delhi (ISBN-13: 9788121930888).
3. "Digital Fundamentals", Thomas Floyd, Prentice Hall, 10th Edition (ISBN: 9780132737968).

Reference Books:

1. "Electronic Devices and Circuit Theory", Robert L. Boylestad and Louis Nashelsky, 11/e Pearson (ISBN: 9780135026496).
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai and Co (ISBN: 9788177000207).

Web Links:

1. https://nptel.ac.in/courses/108/101/108101091/ (NPTEL Video by Dr.Mahesh B. Patil from IIT Bombay)
2. https://nptel.ac.in/courses/117/106/117106108/ (NPTEL Video by Prof. Nagendra Krishnapura from IIT Madras)

Engineering Economics & Management

(Common to CE,EEE, ME, ECE,CSE, IT, AIML, CSE(DS), PT&Min.E)

	L	T	P	C
Course Code:241MB001	**2**	**0**	**0**	**2**

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 the production, cost behavior 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

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2
CO1		
CO2		
CO3		
CO4		
CO5		

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 Equillibrium-, 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, Dr. A. R. Aryasri, TMH, ISBN 978-0070078031
2. Managerial Economics and Financial Analysis, Dr. N. Appa Rao, Dr. P. Vijay Kumar, Cengage Publications, New Delhi, ISBN 978-8131515952

Reference Books:

1. Principles of Marketing: A South Asian Perspective by 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
3. Management Science, Aryasri, Tata McGraw Hill, ISBN 978-0070090279
4. Management, James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert Pearson Education/Prentice Hall, 6th Edition, ISBN 978-0131087477

Web Links:

1. https://nptel.ac.in/courses/110105067
2. https://archive.nptel.ac.in/courses/112/107/112107143/