TECHNO INDIA UNIVERSITY
WEST BENGAL

Department of Electronics and Communication Engineering

First Semester

Program: BTECH ECE	**Year, Semester:1st Year, 1st Sem**
Course Title: Career Advancement & Skill Development-I - Communication Skill	**Subject Code:**TIU-HSM-UEN-S11191
Contact Hours/Week: 2-0-0 (L-T-P)	**Credit:** 2

COURSE OBJECTIVE:

Enable the student to:

1. Develop English proficiency for clear, precise, and confident workplace communication.
2. Enhance practical skills in vocabulary, grammar, pronunciation, speaking, and writing.
3. Apply communication theories to improve professional and interpersonal interactions.

COURSE OUTCOME:

On completion of the course, the student will be able to:

CO-1:	Explain fundamental communication principles and their relevance in workplace interactions.	K2
CO-2:	Apply grammar and language skills to construct precise and coherent spoken and written communication.	K3
CO-3:	Demonstrate fluency in spoken English through pronunciation drills, vocabulary building, and interactive conversations.	K4
CO-4:	Construct well-organized sentences, paragraphs, and linked paragraphs to enhance professional writing	K3
CO-5:	Develop and revise written communication by employing strategies for drafting, editing, and proofreading.	K3

CO-6:	Assess and refine communication skills to ensure clarity, precision, and confidence in workplace interactions.	K4

COURSE CONTENT:

MODULE 1:	**INTRODUCTION TO COMMUNICATION**	**5 Hours**
Definition of Communication, Importance of Communication in the Workplace, Introduction to Communication Theory, Elements of Effective Communication, Barriers to Communication, Verbal and Non-Verbal Communication, Role of Culture in Communication.		
MODULE 2:	**LANGUAGE AND GRAMMAR SKILLS**	**5 Hours**
Fundamentals of English Grammar, Sentence Structure and Syntax, Parts of Speech, Tenses and their Usage, Common Errors in Grammar, Punctuation and Mechanics, Effective Use of Vocabulary, Word Formation and Usage, Formal vs. Informal Language.		
MODULE 3:	**SPEAKING SKILLS**	**5 Hours**
Principles of Effective Speaking, Pronunciation Drills, Sounds of English: Vowels and Consonants, Stress and Intonation, Developing Conversational Skills, Speaking with Clarity and Confidence, Public Speaking Basics, Expressing Opinions and Arguments, Active Listening and Response.		
MODULE 4:	**WRITING SKILLS**	**5 Hours**
The Writing Process: Planning, Drafting, Revising, Editing, Writing Effective Sentences and Paragraphs, Paragraph Development and Coherence, Formal and Informal Writing Styles, Writing Emails and Workplace Documents, Writing Reports and Memos, Common Writing Errors and How to Avoid Them		
MODULE 5:	**PRACTICAL LANGUAGE APPLICATION**	**5 Hours**
Building Vocabulary through Context, Word Choice and Precision, Constructing Grammatically Correct Sentences, Exercises in Sentence Formation, Pronunciation Drills and Accent Neutralization, Role-Plays and Dialogues, Group Discussions and Debates, Writing and Structuring Paragraphs, Linking Paragraphs for Coherent Writing.		
MODULE 6:	**PROFESSIONAL COMMUNICATION IN THE WORKPLACE**	**5 Hours**
Workplace Communication Etiquette, Business Correspondence, Writing Professional Emails, Preparing Presentations, Communicating in Meetings, Handling Workplace Conversations, Persuasive and Negotiation Skills, Overcoming Communication Barriers, Strategies for Effective Workplace		

Communication.	
TOTAL LECTURES	**30 Hours**

Books:

1. Sanjay Kumar, Pushp Lata, "Communication Skills", Oxford University Press, 2015, ISBN: 9780199457069

2. M Ashraf Rizvi, "Effective Technical Communication", McGraw Hill Education, 2017, ISBN 9352606108

3. Steven A. Beebe, Susan J. Beebe, and Mark V. Redmond, "Interpersonal Communication: Relating to Others", Pearson, 2013, ISBN-10: 020586273X, ISBN-13: 978-0205862733.

4. Judee K. Burgoon, Laura K. Guerrero, and Kory Floyd, "Nonverbal Communication", Routledge, 2016, ISBN-10: 1138121348, ISBN-13: 978-1138121346.

5. Ronald B. Adler, Lawrence B. Rosenfeld, and Russell F. Proctor II, "Interplay: The Process of Interpersonal Communication", Oxford University Press, 2017, ISBN-10: 019064625X, ISBN-13: 978-0190646257.

6. Joseph A. DeVito, "The Interpersonal Communication Book", Pearson, 2015, ISBN-10: 0133753816, ISBN-13: 978-0133753813.

7. Sarah Trenholm and Arthur Jensen, "Interpersonal Communication", Oxford University Press, 2013, ISBN-10: 0199827504, ISBN-13: 978-0199827503.

8. John Stewart, "Bridges Not Walls: A Book About Interpersonal Communication", McGraw-Hill Education, 2011, ISBN-10: 0073534315, ISBN-13: 978-0073534312.

9. Pamela J. Kalbfleisch, "Interpersonal Communication: Evolving Interpersonal Relationships", Routledge, 2013, ISBN-10: 0805816611, ISBN-13: 978-0805816619.

10. Mark L. Knapp, John A. Daly, and Frederick P. M. Boster, "Interpersonal Communication Handbook", Sage Publications, 2011, ISBN-10: 1412974747, ISBN-13: 978-1412974745.

Program: B Tech in ECE	**Year, Semester:** 1st Yr., 1st
Course Title: Physics	**Subject Code:** TIU-BS-UPH-T11101
Contact Hours/Week: 3–1–0 (L–T–P)	**Credit:** 4

COURSE OBJECTIVE:

Enable the student to:

1. Provide a foundational understanding of basic concepts of physics.
2. Develop problem-solving skills and apply the basic concepts of physics in real-world phenomena.
3. Foster critical thinking and analytical skills in applying theoretical knowledge to practical physics problems.

COURSE OUTCOME :

On completion of the course, the student will be able to:

CO-1:	Apply basic concepts of mechanics and acoustics	K3
CO-2:	Interpret the concepts of physical optics and explain the principles of lasers along with their applications.	K2
CO-3:	Categorize di electric and magnetic properties of materials leading to Electromagnetic laws and to analyze crystal structure	K4
CO-4:	Identify the basic properties of conductors, semiconductors, and insulators based on their band structure, and demonstrate their behavior using fundamental band theory concepts.	K3
CO-5:	Apply the principles of wave-particle duality to analyze physical phenomena followed by basic quantum mechanical calculations	K3
CO-6:	Classify ensembles and differentiate between classical and Quantum statistical mechanics	K4

COURSE CONTENT :

MODULE 1:	**CLASSICAL MECHANICS**	**5 Hours**
Vector Calculus- gradient of a scaler field, divergence & curl of a vector field with their physical significance; Frame of references, Mechanics of a single particle - conservative and non-conservative forces, Conservation theorems of linear momentum & angular momentum, Conservation law of energy, Potential energy function F= -grad V		
MODULE 2:	**ACCOUSTICS**	**4 Hours**
Harmonic oscillator, Damped harmonic motion – over-damped, critically damped and lightly damped oscillators; Attenuation Coefficients of a vibrating system, Forced oscillations and resonance, Mechanical and electrical analogy of forced vibration.		
MODULE 3:	**OPTICS**	**8 Hours**

Interference: Interference of electromagnetic wave, condition for constructive and destructive interferences, position of maximum and minimum on the screen (no deduction), Thin film - conditions for thin film appears bright and dark (No deductions) - Newton's ring

Diffraction- Different types of diffraction, Fraunhofer diffraction at single slit (Intensity distribution curve),Diffraction pattern in a Multi Slits & plane diffraction grating (no deduction of the intensity for N slits is necessary), Resolving power of a grating (definition & formulae)

Polarization of light: Introduction, polarization by reflection - Brewster's law, Malus Law, double refraction, Nicol Prism and its uses, Detection of plane, elliptical and circularly polarized light

Lasers: Properties of laser, Spontaneous and Stimulated emission, working principle of laser production, amplification of light by population inversion, Einstein's theory of A and B coefficients; He - Ne laser , applications of lasers.

MODULE 4:	**ELECTROMAGNETISM**	**5 Hours**

Concept of displacement current, Maxwell field equations and their physical significances, Maxwell field equations for different medium, Maxwell's wave equation & its solution for free space, Electromagnetic energy flow & pointing vector

MODULE 5:	**QUANTUM MECHANICS**	**6 Hours**

Introduction to quantum physics, Wave nature of particles, de Broglie hypothesis, Uncertainty principle, wave functions, concept of probability & probability density, operators, Expectation values. Applications of Schrödinger equation: Schrodinger equation, elementary concepts of particle in a 1D box, quantum harmonic oscillator and Hydrogen atom problem.

MODULE 6:	**SOLID STATE PHYSICS**	**6 Hours**

Elementary idea of crystal structure –lattice, basis,unit cell, cubic crystal system, co-ordination number& packing factor, Bragg's law and its importance.

Magnetisation- Magnetic permeability and susceptibility, Relation among B,H& M. Types of magnetic materials, Comparative study among them. Hysteresis& importance of hysteresis curve

MODULE 7:	**STATISTICAL MECHANICS**	**5 Hours**

Qualitative ideas about phase space, macrostates and microstates, density of states, , MB, FD & BE statistics (no deduction necessary), fermions, bosons, Fermi distribution at zero and non – zero temperature.

MODULE 8:	**SEMICONDUTOR PHYSICS**	**6 Hours**

Concept of Fermi gas & Free electron theory of metals, Effective mass of an electron & its importance: concept of hole, Classification of materials on the basis of band structure, Intrinsic and extrinsic semiconductors, Effect of temperature on an extrinsic semiconductor, Fermi energy level and its position for intrinsic and extrinsic semiconductors.

TOTAL LECTURES	45 Hours

Books:

1. Introduction to Electrodynamics, David J. Griffiths, Pearson Education India Learning Private Limited

2. Introduction to Classical Mechanics, R Takwale, P Puranik, McGraw Hill Education private limited

3. Engineering Physics ,Dattuprasad Ramanlal Joshi, McGraw Hill Education private limited

4. A text book on Basic Engineering Physics, A. Chakrabarti, Chhaya prakashani private Ltd.

5. A text book on Integrated Engg. Physics, A. Chakrabarti, Chhaya prakashani private Ltd.

6. A text book on Applied Engineering Physics, Chhaya prakashani private Ltd.

7. Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles,Robert Eisberg, Robert Resnick, Wiley

8. Statistical Physics, L.D. Landau, E M.Lifshitz, Butterworth-Heinemann

9. Optics,Ghatak, McGrawHill Education India Private Limited

10. Engineering Physics , Hitendra K Malik & A K Sing, McGraw Hill Education private limited

11. Advanced Acoustics, Dr. D.P. Raychaudhuri, The new bookstall, Revised Ninth Edition, 2009

12. Concepts of Modern Physics (Sixth Edition) by Arthur Beiser (Published by McGraw-Hill).

13. Introduction to Solid State Physics (January2019) by Charles Kittel (Published by Wiley)

Program: B. Tech. in ECE	**Year, Semester:** 1st Yr., 1st Sem.
Course Title: MATHEMATICS-I	**Subject Code:** TIU-BS-UMA-T11101
Contact Hours/Week: 3-1-0 (L-T-P)	**Credit:** 4

COURSE OBJECTIVE:

Enable the student to:

1. Analyze and describe the behavior of functions of single and multiple variables, understand sequences and series.
2. Solve systems of linear equations, evaluate eigenvalues and eigenvectors of square matrices.
3. Analyzing differential equations and finding their solutions.

COURSE OUTCOME:

On completion of the course, the student will be able to:

CO-1:	Analyze the behavior and the nature of the curve with calculus of one variable.	K4
CO-2:	Develop a basic understanding of functions of several variables and their properties.	K4
CO-3:	Investigate the solutions of system of linear equations using Determinants and Matrices.	K4
CO-4:	Evaluate Eigen value and vectors of square matrices.	K4
CO-5:	Examine the nature (viz., convergence, divergence) of sequence and series.	K4
CO-6:	Analyze differential equations and investigate solutions.	K4

COURSE CONTENT:

MODULE 1:	**Differential Calculus**	**12 Hours**
Differential Calculus (Functions of one variable): Rolle's theorem (statement only), Cauchy's mean value theorem (Lagrange's mean value theorem as a special case), Taylor's and Maclaurin's theorems with remainders, indeterminate forms, concavity and convexity of a curve, points of inflexion, asymptotes and curvature. Differential Calculus (Functions of several variables): Limit, continuity and differentiability of functions of several variables, partial derivatives and their geometrical interpretation, differentials, derivatives of composite and implicit functions, derivatives of higher order and their commutatively, Euler's theorem on homogeneous functions, harmonic functions, Taylor's expansion of functions of several variables, maxima and minima of functions of several variables – Lagrange's method of multipliers.		
MODULE 2:	**Ordinary Differential Equations**	**10 Hours**
Ordinary Differential Equations: Formation of differential equation, First order differential equations - exact, linear and Bernoulli s form, second order differential equations with constant coefficients, method of variation of parameters, general linear differential equations with constant coefficients, Euler's equations, system of differential equations.		
MODULE 3:	**Sequences and Series**	**8 Hours**
Sequences and Series: Sequences and their limits, convergence of series, comparison test, Ratio test, Root test, Absolute and conditional convergence, alternating series, Power series.		
MODULE 4:	**Matrix and Determinant**	**15 Hours**

Matrix and Determinant: Revision of matrix and determinant, rank and nullity, solutions of system of linear equations using Determinants and Matrices; Eigenvalues and eigen vectors, Cayley-Hamilton Theorem, transformation of matrices, adjoint of an operator, normal, unitary, hermitian and skew-hermitian operators, quadratic forms.	
TOTAL LECTURES	**45 Hours**

Books:

1. Higher Engineering Mathematics, B. S. Grewal
2. Advanced Engineering Mathematics, Kreyszig
3. A TextBook of Engineering Mathematics, Rajesh Pandey
4. Engineering Mathematics, B. K. Pal, K. Das

Program: B. Tech ECE	**Year, Semester:** 1st , 1st
Course Title: Introduction to Programming	**Subject Code:** TIU-ES-UCS-T11101
Contact Hours/Week: 3–0–0 (L–T–P)	**Credit:** 3

COURSE OBJECTIVE :

Enable the student to:

1. develop algorithmic problem-solving skills and implement them in C programs.
2. apply modular programming, recursion, and data structures to create interactive C programs.
3. utilize advanced C concepts like structures, pointers, and linked lists for efficient programming.

COURSE OUTCOME :

The student will be able to:

CO1:	Analyze algorithmic solutions to problems.	K4
CO2:	Construct algorithms using C programming.	K3
CO3:	Apply interactive input/output, arithmetic expressions, repetitions, decision-making, and arrays in programs.	K3

CO4:	Organize modular C programs using functions, including recursion.	K3
CO5:	Categorize programs using structures, unions, pointers, and linked lists.	K4
CO6:	Utilize file input and output operations in programs.	K3

COURSE CONTENT :

MODULE 1:	**INTRODUCTION TO C LANGUAGE**	**4 Hours**
Character set, Variables and Identifiers, Built-in Data Types, Variable Definition, Arithmetic operators and Expressions, Constants and Literals, Simple assignment statement, Basic input/output statement, Simple 'C' programs.		
MODULE 2:	**CONDITIONAL STATEMENTS AND LOOPS**	**6 Hours**
Decision making within a program Conditions, Relational Operators, Logical Connectives, if statement, if-else statement. Loops: while loop, do while, for loop, Nested loops, Infinite loops, switch statement, Structured Programming.		
MODULE 3:	**ARRAYS**	**6 Hours**
One dimensional arrays: Array manipulation, Searching, Insertion, and Deletion of an element from an array, finding the largest / smallest element in an array; Two dimensional arrays, Addition/ multiplication of two matrices transpose of a square matrix, Null terminated strings as array of characters, Representation sparse matrice.		
MODULE 4:	**FUNCTIONS**	**7 Hours**
Top-down approach of problem solving; Modular programming and functions; Standard Library of C functions; Prototype of a function Formal parameter list, Return Type, Function call, Block structure; Passing arguments to a Function Call by reference, Call by value, Recursive Functions, Arrays as function arguments.		
MODULE 5:	**STRUCTURES AND UNIONS**	**5 Hours**
Structure variables, Initialization, Structure assignment, Nested structure, Structures and Functions, Structures and arrays: Arrays of structures, Structures containing arrays, Unions.		
MODULE 6:	**POINTERS**	**9 Hours**
Address operators, Pointers type declaration, Pointer assignment, Pointer initialization, Pointer arithmetic, Functions and pointers, Arrays and Pointers, Pointer arrays.		

MODULE 7:	**SELF-REFERENTIAL STRUCTURES AND LINKED LISTS**	**3 Hours**
Creation of a singly connected linked list, traversing a linked list, Insertion into a linked list, Deletion from a linked list.		
MODULE 8:	**FILE PROCESSING**	**5 Hours**
Concept of Files, File opening in various modes and closing of a file, Reading from a file, writing onto a file.		
TOTAL LECTURES		**45 Hours**

Books:

1. B W Kernighan and D.M. Ritchie, The C Programming Language, Prentice Hall of India.
2. K. Venugopal and Sudeep R Prasad, Programming with C, McGraw Hill
3. R G Dromey, How to solve it by Computer, Prentice Hall in India.
4. Jones, Robin and Stewart, The Art of C Programming, Narosa Publishing House
5. A Kenneth, C Problem solving and Programming, Prentice Hall International.
6. H.Scheldt, C: The Complete Reference, 4th Edition, McGraw Hill

Program: B.Tech. in ECE	**Year, Semester:** 1st Yr, 1st Sem.
Course Title: Basic Computing Lab	**Subject Code:** TIU-ES-UCS-L11191
Contact Hours/Week: 0–0–2	**Credit:** 1

COURSE OBJECTIVE :

Enable the student to:

1. To introduce students to the UNIX/Linux environment and familiarize them with fundamental system operations, commands, and file management techniques.
2. To develop proficiency in shell scripting and command-line utilities for automating tasks, managing processes, and handling files efficiently.
3. To provide hands-on experience with GitHub operations and debugging techniques while enhancing students' ability to work with text processing tools, redirection, and file compression in a UNIX/Linux environment.

COURSE OUTCOME :

CO-1	Be Familiar with the UNIX/Linux operating system	K2
CO-2	Develop proficiency in using shell commands and writing basic shell scripts.	K3
CO-3	Understand file systems, process management, and user permissions.	K2
CO-4	Understand basic github operations and debugging of programs	K3
CO-5	Apply fundamental text processing tools and commands such as grep, find, and text editors (vi/nano) for efficient file manipulation and searching.	K4
CO-6	Utilize redirection, piping, and file compression techniques to manage data effectively in a UNIX/Linux environment.	K4

COURSE CONTENT :

MODULE 1:	**INTRODUCTION TO UNIX/LINUX AND BASIC COMMANDS**	**9 Hours**
Overview of UNIX/Linux operating systems, Logging into UNIX/Linux systems, Basic system commands: ls, cd, pwd, cp, mv, rm, clear, man, who, date, cal, etc. Understanding the file system hierarchy: /, /home, /bin, /usr, /var, etc.		
MODULE 2:	**FILE AND PROCESS MANAGEMENT**	**9 Hours**
File and Directory Management: Creating, removing, and organizing files and directories, Commands: mkdir, rmdir, touch, chmod, chown, rm, find, etc. Understanding file permissions and ownership (rwx permissions, chmod command) Process Management: Viewing active processes (ps, top, htop), Controlling processes: kill, bg, fg, jobs, nice, and renice,Understanding process states: running, sleeping, zombie		
MODULE 3:	**TEXT PROCESSING AND BASIC SHELL SCRIPTING**	**9 Hours**
Text Editors (vi, nano): Creating, editing, saving, and existing files, Working with commands like grep, cat, more, less, sed, and awk Basic Shell Scripting: Writing simple shell scripts (bash), Understanding variables, loops (for, while), and conditional statements (if, elif, else), Creating automation scripts for file operations and system monitoring		
MODULE 4:	**REDIRECTION, PIPING, AND FILE COMPRESSION**	**9 Hours**
Redirection and Piping: Input/output redirection (>, >>, <) Piping (|) for command chaining File Compression and Archiving: Working with gzip, tar, zip, unzip,Creating and extracting archives for data backup		

MODULE 5:	GITHUB BASICS AND DEBUGGING TECHNIQUES	9 Hours
Using GitHub for Version Control: Setting up a GitHub repository, Basic commands: git init, git add, git commit, git push, git pull, git clone,Checking in and checking out files Debugging Techniques: Identifying and resolving errors in shell scripts, Using debugging tools (echo, set -x, gdb for C programs)		
TOTAL LAB HOURS		**45 Hours**

Books:

1. "UNIX and Linux System Administration Handbook" – Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley, and Dan Mackin
2. "The Linux Command Line: A Complete Introduction" – William E. Shotts Jr.
3. "Learning the bash Shell"– Cameron Newham.

Program:B.Tech In ECE	**Year, Semester:** 1st Yr, 1st
Course Title:: Physics Lab	**Subject Code:** TIU-BS-UPH-L11101
Contact Hours/Week: 0–0–3(L–T–P)	**Credit:** 1.5

COURSE OBJECTIVE:

Enable the student to:

1. Provide hands-on experience with experimental techniques in optics, electricity, and mechanics

2. Develop a strong understanding of the fundamental physical constants and properties of materials

3. Enhance students' problem-solving and analytical skills through real-world applications

COURSE OUTCOME:

On completion of the course, the student will be able to:

CO-1:	Develop hands-on skills in setting up experimental apparatus and accurately measuring physical quantities.	K3
CO-2:	Analyze experimental data using appropriate methods, interpret results, and assess the reliability and accuracy of measurements.	K4
CO-3:	Correlate theoretical physics principles with experimental observations to understand real-world applications.	K5

CO-4:	Demonstrate the ability to troubleshoot experimental issues and make informed decisions to optimize accuracy.	K5
CO-5:	Document experiments systematically and effectively present results, including calculations and error analysis.	K6
CO-6:	Work collaboratively in a lab environment, maintaining safety protocols and contributing to group discussions and analysis.	K6

COURSE CONTENT:

EXPERIMENT: 1	**NEWTON'S RING**	**3 Hours**
Determination of wavelength of a monochromatic light by Newton's ring		
EXPERIMENT: 2	**REFRACTIVE INDEX OF WATER**	**3 Hours**
Determination of refractive index of water using travelling microscope		
EXPERIMENT: 3	**HALL COEFFICIENT OF SEMICONDUCTOR**	**3 Hours**
Determination of Hall coefficient of semiconductor		
EXPERIMENT: 4	**CAREY-FOSTER BRIDGE FOR UNKNOWN RESISTANCE**	**3 Hours**
Determine of unknown resistance using Carey-Foster bridge		
EXPERIMENT: 5	**STEFAN'S BOLTZMAN CONSTANT**	**3 Hours**
Determination of Stefan-Boltzmann constant		
EXPERIMENT: 6	**BAND-GAP OF SEMICONDUCTOR**	**3 Hours**
Determination of Band gap of a given semiconductor by four probe method		
EXPERIMENT: 7	**YOUNG'S MODULUS BY FLEXURE METHOD**	**3 Hours**
Determination of Young's modulus of elasticity of the material of a bar by the method of flexure		
EXPERIMENT: 8	**MODULUS OF RIGIDITY BY DYNAMIC METHOD**	**3 Hours**

Determination of modulus of rigidity of the material of a wire by dynamic method		
EXPERIMENT: 9	**COEFFICIENT OF VISCOSITY**	**3 Hours**
Determination of coefficient of viscosity of water by Poiseulle's capillary flow method		
EXPERIMENT: 10	**PLANCK'S CONSTANT USING PHOTOELECTRIC EFFECT**	**3 Hours**
Determination of Plank's constant using photocell		
EXPERIMENT: 11	**THERMOELECTRIC POWER**	**3 Hours**
Determination of thermoelectric power of a given thermo-couple		
Total Hours (Any seven experiments to be performed)		**21 Hours**

Books:

1. Laboratory Manual

2. Advanced Practical Physics (Volume I and II) for BSc Physics Lab, B. Ghosh & K.G Mazumdar

3. An advanced course in practical physics by D . Chattopadhyay and P.C Rakshit, New central agency(P)Ltd.

Program: B.Tech. ECE	**Year, Semester:** 1st Yr, 1st Sem
Course Title: Introduction to Programming Lab	**Subject Code:**TIU-ES-UCS-L11101
Contact Hours/Week: 0–0–3	**Credit:** 1.5

COURSE OBJECTIVE:

Enable the student to:

1. Introduce students to the fundamentals of C programming, including syntax, data types, operators, and control structures, enabling them to write and execute basic programs.
2. Develop students' ability to analyze problems, apply algorithmic thinking, and implement solutions using decision-making constructs, loops, functions, and data structures.

3. Equip students with hands-on experience in using arrays, strings, pointers, structures, and unions, enabling them to develop efficient programs for mathematical computations, data processing, and real-world applications.

COURSE OUTCOME:

CO-1	Demonstrate the ability to write, compile, and execute simple C programs using basic input-output functions, arithmetic operations, and control statements.	K2
CO-2	Apply conditional statements (if-else, ternary operator, switch-case) and looping constructs (for, while, do-while) to solve mathematical and logical problems.	K3
CO-3	Solve mathematical problems such as factorial, permutations & combinations, series summation, and trigonometric computations using C programming.	K3
CO-4	Develop programs using arrays and strings to perform operations such as searching, sorting, frequency analysis, and string transformations.	K4
CO-5	Utilize pointers, structures, and unions in C to perform complex operations such as matrix manipulations, complex number arithmetic, and data organization.	K4
CO-6	Implement user-defined functions and demonstrate the ability to use memory management functions, pointers, and structures for efficient data handling.	K4

COURSE CONTENT:

MODULE 1:	**Introduction to C Programming & Basic Operations**	**6 Hours**
Writing and executing a basic C program (Hello World). Understanding Input/Output functions (printf(), scanf()). Variables, Data Types, and Memory Allocation. Arithmetic operations and simple mathematical computations		
MODULE 2:	**Control Structures & Decision Making**	**6 Hours**
Conditional statements (if-else, ternary operator, switch-case). Looping constructs (for, while, do-while). Nested control structures.		
MODULE 3:	**Functions, Recursion & Pattern Printing**	**6 Hours**
Defining and calling user-defined functions. Function parameters, return types, and recursion. Printing patterns using loops (*, numbers, alternating 0/1). Mathematical computations using recursion (Factorial, nCr).		
MODULE 4:	**Arrays & Strings**	**9 Hours**

One-dimensional and two-dimensional arrays. Searching & sorting algorithms. String operations (length, frequency analysis, conversion to uppercase/lowercase).		
MODULE 5:	**Pointers, Structures & Memory Management**	**9 Hours**
Pointer concepts and memory addresses. Pointer arithmetic and array manipulation using pointers. Structures and Unions for data organization. Dynamic memory allocation concepts.		
MODULE 6:	**Advanced Programming & Applications**	**9 Hours**
Matrix operations (Addition, Multiplication). Trigonometric function computations (sin, cos values at intervals). File handling concepts (basic read/write operations).		
TOTAL LAB HOURS		**45 Hours**

Books:

1. B W Kernighan and D.M. Ritchie, The C Programming Language, Prentice Hall of India.
2. K. Venugopal and Sudeep R Prasad, Programming with C, McGraw Hill
3. R G Dromey, How to solve it by Computer, Prentice Hall in India.

Program: B. Tech ECE	**Year, Semester:** 1st Yr., 1st
Course Title: Workshop Practice	**Subject Code:** TIU-ES-UME-L11192
Contact Hours/Week: 0–0–3 (L–T–P)	**Credit:** Lab.–1.5
Prerequisite Course: NA	

Course Objective:

Enable the students to

- Understand workshop safety and gain knowledge on different materials
- Develop proficiency in using carpentry and fitting shop
- Learn about sheet metal and welding techniques
- Understand the working principles and applications of conventional machines

Course Outcome:

CO1	Demonstrate knowledge of workshop safety and materials used in manufacturing processes.	K1
CO2	Explain the use of carpentry, fitting, and sheet metal tools, and perform basic operations.	K2

CO3	Apply various fitting and machining operations such as measuring, marking, drilling, and tapping.	K3
CO4	Analyze different welding techniques (gas, arc, soldering, brazing) and their applications.	K4
CO5	Evaluate the working principles of conventional machines like lathe, shaper, drilling, grinding, and milling.	K6
CO6	Create joints and structures using woodworking, sheet metal, and welding techniques.	K5

Laboratory Content:

Module-1	**Carpentry Shop:**	**6 hours**
	General safety precautions in workshop and introduction. Types of Indian wood used for engineering purposes; Application of timber as per their classification; Carpentry hand tools and machines; Different types of carpentry joints; Different wooden joint preparation.	
Module-2	**Fitting Shop:**	**6 hours**
	Introduction to fitter's tools, gauges, measuring instruments etc.;Job preparation involving the following operations: measuring and marking, filing, drilling, and tapping.	
Module-3	**Sheet metal shop:**	**3 hours**
	Introduction, metals used in sheet metal work, hand tools, Sheet metal joints; Soldering.	
Module-4	**Welding Shop:**	**3 hours**
	Introduction to gas and arc welding; Soldering and brazing etc.; Welding equipment and welding materials.	
Module-5	**Machine Shop:**	**6 hours**
	Demonstration and working principles of some conventional machines, like lathe, shaper, drilling, grinding, milling machines; General idea of cutting tools of the machines.	

TOTAL PRACTICALS **24 hours**

Recommended Books:

1. S. K. Hajra Choudhury, A. K. Hajra Choudhury, Nirjhar Roy, **Elements of Workshop Technology** (Vol. –I&II)
2. H S Bawa. ***Workshop Practice,*** McGraw Hill Education; 2nd edition, 2/e
3. Kannaiah, P. and K.L. Narayana (2009), **Workshop Manual**, Scitech Publishers
4. Begeman, M. L. and Amstead, B. H., **Manufacturing Process**, 8th Ed., 1987, Wiley