TECHNO INDIA UNIVERSITY
WEST BENGAL

Department of Electronics and Communication Engineering

Second Semester

Program: B. Tech. in ECE	**Year, Semester:** 1st Yr., 2nd Sem.
Course Title: Mathematics-IIA	**Subject Code:**TIU-BS-UMA-T12101A
Contact Hours/Week: 3–1–0 (L–T–P)	**Credit:** 4

COURSE OBJECTIVE:

Enable the student to:

1. understand the basics of complex analysis.
2. understand the set theory
3. familiarize about several applications of integral calculus like finding area and volume bounded by curves.
4. Construct some special functions like beta and gamma function.

COURSE OUTCOME:

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

CO-1:	Analyze complex functions based on analyticity, integrability along a contour, calculus of residue, etc. and its applications in engineering.	K4
CO-2:	Develop ideas on integration of complex valued functions and singularities.	K4
CO-3:	Develop a foundation of set theory and to explore a variety of various mathematical structures by focusing on mathematical objects, operations, and resulting properties.	K4
CO-4:	Develop an understanding of Integral calculus and familiarize with special functions toevaluate some proper and improper integrals using beta and gamma functions.	K4
CO-5:	Apply double and triple integration to find area and volume bounded by curves.	K4
CO-6:	Apply Gauss divergence theorem, Stoke's theorem and Green's integral theorem	K4

	invector calculus.	

COURSE CONTENT:

MODULE 1:	**Complex analysis**	**16 Hours**
Complex analysis: Limit, continuity, differentiability and analyticity of functions, Cauchy-Riemann equations, line integrals, Cauchy Goursat theorem (statement only), independence of path, Complex integration over a contour, Cauchy's integral formula, derivatives of analytic functions, Taylor's series, Laurent's series, Zeros and singularities, Residue theorem, evaluation of real integrals by contour integration.		
MODULE 2:	**Set Theory**	**Hours**
Set Theory: Sets, relations and functions: Operations on sets, relations and functions, binary relations, partial ordering relations, equivalence relations, principles of mathematical induction. Size of a set: Finite and infinite sets, countable and uncountable sets.		
MODULE 3:	**Integral calculus**	**15 Hours**
Integral Calculus: Riemann Integral, fundamental theorem of integral calculus, applications of definite integrals, improper integrals, Beta and Gamma functions, reduction formulae. Double and triple integration, change in order of integration, Jacobian and change of variables formula. Parametrization of curves and surfaces.		
MODULE 4:	**Vector calculus**	**7 Hours**
Vector fields, divergence and curl, Line integrals, Green's theorem, surface integral, Gauss and Stokes' theorems with applications.		
TOTAL LECTURES		**45 Hours**

Books:

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

Program: B. Tech. in CSE, CSE-AI, ECE	**Year, Semester:** 1st Yr., 2nd Sem.

Course Title: Mathematics for Data Science	**Subject Code:**TIU-BS-UMA-T12102
Contact Hours/Week: 3–0–0 (L–T–P)	**Credit:** 3

COURSE OBJECTIVE:

Enable the student to:

1. understand algebraic and geometric representations of vectors and vector spaces and various operations on vector spaces and inner product space.
2. learn the basics of probability and apply them to real time problems.
3. understand basic statistics, dispersion, regression and curve fitting technique

COURSE OUTCOME:

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

CO-1:	develop an understanding of vector spaces and inner product spaces.	K4
CO-2:	identify linear transformations on vector spaces and to determine the corresponding matrix representation.	K4
CO-3:	calculate the probability using basic knowledge and fundamental concepts of probability.	K4
CO-4:	illustrate conditional probability, Bayes' Theorem and understand their scope of application to real world problems	K4
CO-5:	To investigate data-based on measures of central tendency, measures of dispersion	K4
CO-6:	To analyze observations in terms of regression and curve fitting	K4

COURSE CONTENT:

MODULE 1:	**Linear algebra**	**20 Hours**
Linear Algebra: Vector spaces over any arbitrary field, linear combination, linear dependence and independence, basis and dimension, linear transformations, matrix representation of linear transformations, linear functional, dual spaces, Inner product spaces, norms, Gram-Schmidt process, orthonormal bases, projections and least squares approximation.		
MODULE 2:	**Basic Probability**	**10 Hours**
Classical, relative frequency and axiomatic definitions of probability, mutually exclusive events, independent events, conditional probability, Bayes' Theorem.		

MODULE 3:	Integral calculus	15Hours
Raw data, Histogram, Frequency polygon. Measures of central tendencies – Arithmetic mean, Geometric mean, Harmonic mean, Weighted A.M., G.M. and H.M.; Mode, Median, Empirical relation between mean, median and mode; Mean, median and mode for grouped and ungrouped data. Measures of dispersion- standard deviation and variance for grouped and ungrouped data. Correlation and Regression – Covariance, Spearman's coefficient of correlation for grouped and ungrouped data; regression and least square curve fitting		
TOTAL HOURS:		**45 Hours**

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal
2. Advanced Engineering Mathematics, E.Kreyszig
3. Linear Algebra, S. H. Friedberg, A. J. Insel, L. E. Spence
4. Engineering Mathematics, B. K. Pal, K. Das

Program: B. Tech. in ECE	**Year, Semester:** 1st Yr., 2nd Sem.
Course Title: Engineering Mechanics	**Subject Code:**TIU-ES-UME-T12101
Contact Hours/Week: 3–0–0 (L–T–P)	**Credit:** 3

COURSE OBJECTIVE:

Enable the student to:

5. understand the basics of vector mechanics and its applications in engineering mechanics
6. analyze problems in statics
7. analyze problems in dynamics of particles

COURSE OUTCOME:

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

CO-1:	To understand the basics of vector mechanics and its application in engineering	K2

	mechanics.	
CO-2:	To understand different force systems and the methods of finding their resultants and to be well-versed with the conditions of equilibrium in 2D.	K2
CO-3:	To be able to apply the laws of static equilibrium in solving problems and perform analysis of statically determinate trusses.	K4
CO-4:	To be able to compute centroids of plane areas, composite areas and to be able to compute area moments of inertias and radii of gyration of plane figures.	K3
CO-5:	To understand basic principles of kinematics of particles, plane, rectilinear and curvilinear coordinate systems and projectile motion	K3
CO-6:	To understand basic principles of kinetics of particles leading to Newton's laws and to be able to apply the work-energy and the linear impulse-linear momentum theorems in solving typical problems	K3

COURSE CONTENT:

MODULE 1:	**INTRODUCTION**	**4 Hours**
Introduction: Fundamentals of Mechanics: Introduction to mechanics; Basic concepts – mass, space, time and force; Particles and rigid bodies; Scalars and vectors; Free, sliding, fixed and unit vectors; Addition, subtraction and multiplication of two vectors; scalar triple product and vector product of 3 vectors.		
MODULE 2:	**FORCE SYSTEMS AND EQUILIBRIUM**	**9 Hours**
Force systems: Introduction to different force systems; Composition of forces – triangle, parallelogram and polygon law of forces, and addition of two parallel forces; Resolution of forces; Moment of a force, Varignon's theorem; Couples; Force-couple system; Resultant of a force system Equilibrium: Force Systems & Equilibrium: Free body diagram, equilibrium conditions in 2 dimensions, equilibrium of systems involving friction.		
MODULE 3:	**STRUCTURES**	**5 Hours**
Plane Truss: Statically determinate trusses; Force analysis of a truss - method of joints, method of sections		
MODULE 4:	**DISTRIBUTED FORCES**	**7 Hours**
Distributed Forces: Line, area and volume distributions of forces; Centre of gravity; Centre of mass; Centroids of plane figures; Centroids of composite areas. Moment of Inertia: Area moment of inertia; Perpendicular and Parallel axes theorems pertaining to moment of inertia; Radius of gyration.		
MODULE 5:	**KINEMATICS OF PARTICLES**	**8 Hours**

Kinematics of Particles: Differential equations of kinematics – plane, rectilinear and curvilinear motions; Cartesian co-ordinate system; Normal and tangent co-ordinate system, projectile motion.		
MODULE 6:	**KINETICS OF PARTICLES**	**12 Hours**
Kinetics of Particles: Newton's second law of motion; Work and energy principle – gravitational potential energy, elastic potential energy, kinetic energy, power, work-energy theorem, principle of impulse and momentum.		
TOTAL LECTURES		**45 Hours****

Books:

1. J. L. Meriam and L. G. Kraige, Engineering Mechanics (Vol.1 & 2), Wiley India 2017.
2. Shames I. H., Rao G. K. M., Engineering Mechanics, Pearson, 2005.
3. Khurmi R.S. ,A Textbook of Engineering Mechanics, S. Chand, 2018.
4. Bhavikatti S. S, Engineering Mechanics, New Age International Publishers, 2021.

Program:B.Tech in ECE	**Year, Semester:** 1st, 2nd
Course Title: Problem Solving using Data Structures	**Subject Code:** TIU-ES-UCS-T12101
Contact Hours/Week: 3–0–0 (L–T–P)	**Credit: 3**

COURSE OBJECTIVE:

Enable the student to:

1. Introduce fundamental data structures such as arrays, linked lists, stacks, queues, and trees, and their role in computational problem-solving.
2. Develop logical and analytical thinking by applying data structures to efficiently store, process, and manipulate data in various programming scenarios.
3. Enhance problem-solving abilities by selecting appropriate data structures based on efficiency, scalability, and real-world applicability.

COURSE OUTCOME:

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

CO-1	Recall and describe fundamental data structures, including arrays, linked lists, stacks, queues, and trees.	K1

CO-2	Explain searching and sorting techniques, along with their efficiency on different data structures.	K2
CO-3	Apply array and linked list operations to solve computational problems.	K3
CO-4	Implement stack and queue-based algorithms for expression evaluation and problem-solving scenarios.	K3
CO-5	Examine tree-based data structures (Binary Trees, BSTs) and their traversal techniques for problem-solving.	K4
CO-6	Compare different data structures based on their efficiency, scalability, and real-world applicability.	K4

COURSE CONTENT:

MODULE 1:	**BASIC CONCEPTS OF DATA REPRESENTATION**	**6 Hours**
Abstract Data Types, Fundamental and Derived Data Types, Representation, Primitive Data Structures.		
MODULE 2:	**ARRAYS**	**9 Hours**
Representation of Arrays, Single and Multidimensional Arrays, Address Calculation Using Column and Row Major Ordering, Various Operations on Arrays, Application of Arrays in Matrix Multiplication, Sparse Polynomial Representation and Addition. Solving different problems using Arrays: Find the missing number in an array, Rotate an array to the right by k steps by reversing the array and its sub-arrays, Move all zeros in the array to the end while maintaining the relative order of non-zero elements using a two-pointer approach.		
MODULE 3	**SEARCHING AND SORTING ON VARIOUS DATA STRUCTURES**	**6 Hours**
Sequential Search, Binary Search, Comparison-based sorting concepts, Bubble Sort, Insertion Sort, Selection Sort.		
MODULE 4	**STACKS AND QUEUES**	**9 Hours**
Representation of Stacks and Queues using Arrays and Linked List, Circular Queues. Applications of Stacks: Conversion from Infix to Postfix and Prefix Expressions, Evaluation of Postfix Expression Using Stacks. Solving different problems using stack and queue: Validates if parentheses are balanced, Finds the next greater element for each item in a stack, Implements stack operations using two queues, Reverses the elements of a queue, Implements queue operations using two stacks, Implements a circular queue, Implements queue operations using two stacks.		
Module 5	**Linked Lists**	**6 Hours**

Single Linked List, Operations on List, Polynomial Representation and Manipulation Using Linked Lists, Circular Linked Lists, Doubly Linked Lists. Solving different problems using Linked List: Reverse the order of elements in a singly linked list, Merge two linked lists into one list.		
Module 6	**Trees**	**9 Hours**
Binary Tree, Binary Search Tree, Traversal Methods: Preorder, In-Order, Post-Order Traversal (Recursive And Non-Recursive), Representation (Non-threaded and Threaded) of Trees and its Applications.		
	TOTAL LECTURE	**45 Hours**

Program: B. Tech. in ECE	**Year, Semester:** 1st Yr., 2nd Sem.
Course Title: Basic Electrical & Electronics Engineering	**Subject Code:TIU-ES-UEE-T12101**
Contact Hours/Week: 3-1-0 (L-T-P)	**Credit:** 4

COURSE OBJECTIVE:

Enable the student to:

1. Aanalyze and describe the basic electrical quantities, circuit elements, and their voltage-current relationships.
2. Design and analyze diode circuits, transistor biasing, and operational amplifier applications.
3. Understand the operation and characteristics of semiconductor devices like diodes, BJTs, JFETs, and MOSFETs.
4. Analyzing differential working principles of single-phase transformers, including voltage transformation and regulation.

COURSE OUTCOME:

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

CO-1:	Understand Basic Electrical Concepts	K2
CO-2:	Analyze DC Electrical Networks	K4
CO-3:	Analyze AC Circuits and Power Systems	K4

CO-4:	Understand Semiconductor Devices and Applications	K2
CO-5:	Design and Analyze Analog Circuits	K3
CO-6:	Understand Transformer Principles and Applications	K2

COURSE CONTENT:

MODULE 1:	Introduction	**4 Hours**
Basic electrical quantities, Voltage, Current, Power. Basic Electrical elements: Resistance, Inductance,Capacitance. Their voltage-current relationship.Voltage and current sources.		
MODULE 2:	DC Network Analysis	**5Hours**
KCL and KVL and their applications in purely resistive circuits.Concept of linear, bilateral networks.Sourceconversion, Star-Delta conversion.		
MODULE 3:	DC Network Theorems	**5 Hours**
Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem.		
MODULE 4:	Sinusoidal Steady State Analysis	**5 Hours**
Matrix and Determinant: Revision of matrix and determinant, rank and nullity, solutions ofsystem of linear equations using Determinants and Matrices; Eigenvalues and eigenvectors, Cayley-Hamilton Theorem, transformation of matrices, adjoint of an operator, normal, unitary, hermitian and skew-hermitian operators, quadratic forms.		
MODULE 5:	3-Ph circuits	**5 Hours**
Introduction to 3-Ph quantities.3-ph star and delta connection. Phasor diagram for 3-ph system, Balanced 3-phloads, measurement of 3-ph power.		
MODULE 6:	Semiconductor Devices	**5 Hours**
Energy bands in solids.Intrinsic and extrinsic semiconductors.P-N junctions. Semiconductor diodes: ZenerandVaractor diodes. Bipolar transistors (operation, characteristics).		
MODULE 7:		**4 Hours**

Diode Circuits, BJT biasing & Operation of JFET, MOSFET		
MODULE 8:	OPAMPs	**5 Hours**
Properties of an ideal and a practical OPAMP. Block diagram. Concept of Virtual Short, Inverting and Non-inverting amplifiers, Summing and Differencing amplifier, Differentiator and Integrator.		
MODULE 9:	1-Ph Transformers	**5 Hours**
Faraday's Law, EMF generation (dynamic and static), B-H curve, Construction and operation of single phasetransformer: voltage and current transformation, no-load operation, voltage regulation on resistive load.		
TOTAL LECTURES		**43Hours**

Books:

1. D. Chattopadhyay, P. C. Rakshit, Funndamentals of Electric Circuit Theory, S. Chand. Publications

2. D. Chattopadhyay, P.C. Rakshit, Electronics Fundamentals and Applications, New Age International Publisher

Supplementary Reading:

1. Salivahanan and P. Kumar**,** Circuit Theory, Vikas Publishing House

2. Kulshreshtha, Basic Electrical Engineering: Principles and Application, Tata McGraw-Hill.

Program: B.Tech. in ECE	**Year, Semester:** 1st , 2nd.
Course Title: Problem Solving using Data Structures Lab	**Subject Code:**TIU-ES-UCS-L12101
Contact Hours/Week: 0–0–3	**Credit:** 1.5

COURSE OBJECTIVE:

Enable the student to:

1. Develop a strong foundation in data structures and algorithms with a focus on both linear and non-linear structures.
2. Implement and analyze searching, sorting, and graph algorithms to optimize problem-solving efficiency.

3. Enhance programming skills by applying data structures in real-world applications and evaluating their complexity.
4. Understand and assess the time and space complexity of algorithms for efficient software development.

COURSE OUTCOME:

The student will be able to:

CO-1	Understand fundamental data structures such as arrays, linked lists, stacks, queues, trees, and graphs along with their applications.	K2
CO-2	Implement various data structures using programming techniques to efficiently store, manipulate, and retrieve data.	K3
CO-3	Analyze and apply different searching and sorting algorithms to optimize problem-solving.	K4
CO-4	Evaluate the time and space complexity of algorithms to improve computational efficiency.	K5
CO-5	Apply data structures and algorithms to solve real-world problems and develop efficient software solutions.	K3
CO-6	Explore advanced data structures and algorithmic techniques for tackling complex computing challenges.	K6

COURSE CONTENT:

MODULE 1:	**INTRODUCTION**	**6 Hours**
Basic Concepts of Data Representation: Abstract Data Types, Fundamental and Derived Data Types, Representation, Primitive Data Structures.		
MODULE 2:	**ARRAY REPRESENTATION**	**6 Hours**
Arrays: Representation of Arrays, Single and Multidimensional Arrays, Address Calculation Using Column and Row Major Ordering, Various Operations on Arrays, Application of Arrays Matrix Multiplication, Sparse Polynomial Representation and Addition. Solving different problems using Arrays such as the followings: Find the missing number in an array, Rotate an array to the right by k steps by reversing the array and its sub-arrays, Move all zeros in the array to the end while maintaining the relative order of non-zero elements using a two-pointer approach.		
MODULE 3:	**SEARCHING AND SORTING TECHNIQUES**	**6 Hours**
Searching and Sorting on Various Data Structures: Sequential Search, Binary Search, Comparison based sorting concept, Bubble sort, Insertion Sort, Selection Sort.		

MODULE 4:	STACK AND QUEUE	9 Hours
Stacks and Queues: Representation of Stacks and Queues using Arrays and Linked List, Circular Queues. Applications of Stacks, Conversion from Infix to Postfix and Prefix Expressions, Evaluation of Postfix Expression Using Stacks. Solving different problems using stack and queue such as Validates if parentheses are balanced, Finds the next greater element for each item in a stack, Implements stack operations using two queues, Reverses the elements of a queue, Implements queue operations using two stacks, Implements a circular queue, Implements queue operations using two stacks.		
MODULE 5:	**LINKED LISTS**	**9 Hours**
Linked Lists: Single Linked List, Operations on List, Polynomial Representation and Manipulation Using Linked Lists, Circular Linked Lists, Doubly Linked Lists. Solving different problems using Linked List such as Reverse the order of elements in a singly linked list, Merge two linked lists into one list.		
MODULE 6:	**TREE DATA STRUCTURES AND TRAVERSALS**	**9 Hours**
Trees: Binary Tree, Binary Search Tree, Traversal Methods: Preorder, In-Order, Post-Order Traversal (Recursive And Non-Recursive), Representation (Non-threaded and Threaded) of Trees and its Applications.		
TOTAL LAB HOURS		**45 Hours**

Books:

1. "Data Structures in C" by Tanenbaum, Moshe J. & Augenstein, PhilipC
2. Gilberg and Forouzan: “Data Structure- A Pseudocode approach with C” by Thomson publication
3. “Fundamentals of Data Structure” (Schaum's Series) Tata-McGraw-Hill.
4. “Fundamentals of data structure in C” Horowitz, Sahani & Freed, Computer Science Press.

"Data Structures Using C" by Reema Thareja

Program: B. Tech. in ECE	**Year, Semester:** 1st Yr., 2nd Sem.
Course Title: Basic Electrical Engineering Lab and Simulation	**Subject Code: TIU-ES-UEE-L12101**
Contact Hours/Week: 0–0–4 (L–T–P)	**Credit:** 2

COURSE OBJECTIVE:

Enable the student to:

1. introduce fundamental electrical and electronic circuit theorems and develop analytical skills for solving electrical networks.
2. familiarize students with essential circuit components, including R-L-C circuits, diodes, rectifiers, and fluorescent lamps, and their practical applications.

3. enhance hands-on laboratory skills by conducting experiments on circuit analysis, diode characteristics, and rectifier efficiency evaluation.

COURSE OUTCOME:

The student will be able to:

CO-1	Identify and understand fundamental electrical and electronic circuit theorems and their applications.	K1
CO-2	Explain the working principles of R-L-C circuits, diodes, rectifiers, and fluorescent lamps.	K2
CO-3	Apply circuit theorems such as Superposition and Thevenin's Theorem to analyze electrical networks.	K3
CO-4	Conduct experiments to measure and analyze V-I characteristics of P-N junction and Zener diodes.	K3
CO-5	Evaluate the efficiency and power factor of electrical circuits, rectifiers, and fluorescent lamps.	K4
CO-6	Compare different rectifier circuits and analyze their output waveforms and ripple factors.	K4

COURSE CONTENT:

Experiment 1	**Verification of Superposition Theorem**	**5 Hours**
Theoretical foundation of superposition theorem, Application in linear electrical circuits, Step-by-step circuit analysis with multiple voltage/current sources, Practical applications in circuit design, troubleshooting, and network analysis.		
Experiment 2	**Study of R-L-C Series Circuit**	**6 Hours**
Characteristics of resistance (R), inductance (L), and capacitance (C) in AC circuits, Impedance (Z) and phase angle, Voltage and current phase relationships, Leading and lagging power factor, Practical applications in circuit analysis and troubleshooting.		
Experiment 3	**Verification of Thevenin's Theorem**	**6 Hours**
Theoretical foundation of Thevenin's theorem, Converting complex circuits into Thevenin equivalent, Measuring Thevenin voltage (Vth) and resistance (Rth), Practical applications in circuit design and network analysis.		
Experiment 4	**Characteristics of Fluorescent Lamp**	**5 Hours**

Gas discharge and phosphor coating in light production, Role of starter, choke (ballast), and electrodes, Measuring voltage, current, and power consumption, Efficiency comparison with incandescent and LED lamps, Impact of inductive ballast on power factor and improvement methods, Performance comparison of electromagnetic vs. electronic ballasts, Energy savings, lifespan, and environmental concerns (mercury content).		
Experiment 5	**Familiarization with Basic Electronic Components**	**6 Hours**
Identification, specifications, and testing of R, L, and C components (Color codes), Potentiometers, switches (SPDT, DPDT, DIP), Breadboards and Printed Circuit Boards (PCBs), Active components: Diodes, BJTs, JFETs, MOSFETs, Power transistors, SCRs, LEDs.		
Experiment 6	**Study of V-I Characteristics of P-N Junction Diode in Forward Bias**	**5 Hours**
Depletion layer and barrier potential, Forward bias operation, Breakdown voltage and Peak Inverse Voltage (PIV), Knee voltage and ideal PN junction diode characteristics.		
Experiment 7	**V-I Characteristics of Zener Diode in Reverse Bias**	**6 Hours**
Depletion layer and barrier potential, Reverse bias operation, Breakdown voltage and Peak Inverse Voltage (PIV), Knee voltage and ideal Zener diode characteristics.		
Experiment 8	**Study of Half-Wave and Full-Wave Rectifier**	**6 Hours**
Half-wave and full-wave rectifiers (Center-tap and Bridge), Output waveforms and voltage regulation, Ripple factor and rectifier efficiency.		
	TOTAL LAB HOURS	**45 Hours**

Books:

1. Boylestad, R. L., &Nashelsky, L. (2015). Electronic devices and circuit theory (11th ed.). Pearson.
2. Hayt, W. H., Kemmerly, J. E., & Durbin, S. M. (2018). Engineering circuit analysis (9th ed.). McGraw-Hill Education.
3. Sedra, A. S., & Smith, K. C. (2016). Microelectronic circuits (7th ed.). Oxford University Press.
4. Malvino, A. P., & Bates, D. J. (2016). Electronic principles (8th ed.). McGraw-Hill Education.

Program: B.Tech in ECE	**Year,Semester:**2nd Semester

Course Title: Engineering Drawing and Graphics	**Subject Code:** TIU-ES-UME-L12191
Contact hours/week:0-0-3(L-T-P)	**Credit:**1.5

COURSE OBJECTIVE:

Enable the student to:

1. Develop an understanding of the fundamental concepts and significance of engineering drawing in various engineering disciplines.
2. Acquire skills to construct and analyze engineering curves, projections of points, lines, planes, and solids.
3. Learn to interpret and create orthographic and isometric projections using conventional and computer-aided drafting techniques.
4. Gain proficiency in using drafting software for preparing accurate engineering drawings.

COURSE OUTCOME:

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

CO-1:	Understand the fundamental principles and scope of engineering drawing across various engineering disciplines.	K2
CO-2:	Demonstrate proficiency in constructing and analyzing different engineering curves.	K3
CO-3:	Apply projection techniques for points, lines, planes, and solids in different orientations.	K3
CO-4:	Develop skills to create orthographic and isometric projections accurately.	K3
CO-5:	Interpret and convert between pictorial, orthographic, and isometric views of objects.	K2,K3,K6
CO-6:	Utilize computer-aided drafting tools to create precise engineering drawings.	K6

COURSE CONTENT:

MODULE 1:	**Introduction**	**6 Hours**
Scope of Engineering Drawing in all Branches of Engineering, Uses of Drawing Instruments and Accessories, Types of Arrowheads, Lines, Dimension System, Representative Fraction, Types of Scales (plain and Diagonal Scale).		
MODULE 2:	**Engineering Curves**	**6Hours**
Classification of Engineering Curves, Application of Engineering Curves, Constructions of Engineering Curves (Conics-ellipse; parabola; hyperbola with Tangent and Normal).		

MODULE 3:	**Projection of Points and Straight Lines**	**9 Hours**
Types of Projections - Oblique, Perspective, Orthographic and Isometric Projections; Introduction to Principal Planes of Projections, Projections of Points located in all four Quadrants; Projections of lines inclined to one of the Reference Plane and inclined to two Reference Planes.		
MODULE 4:	**Projections of Planes and Solids**	**9 Hours**
Projections of various planes (Polygonal, Circular, Elliptical shape inclined to one of the reference planes and two of the reference planes) and Projections of Solids (cube, prism, pyramid, cylinder, cone and sphere).		
MODULE 5:	**Orthographic Projections & Isometric View/Projections**	**8 Hours**
Projections on Principal Planes from Front, Top and Sides of the Pictorial view of an Object, First Angle Projection and Third Angle Projection system; Full Sectional Orthographic Views, Conversion of Orthographic Views into Isometric Projection, View or Drawing; Isometric Scale.		
MODULE 6:	**Overview of Computer Aided Drafting Tools**	**1 Hours**
Introduction to Computer Aided Drafting Software; Basic Tools; Preparation of Orthographic Projections and Isometric Views Using Drafting Software.		
TOTAL		**39 Hours**

Books:

Main Reading:

1. Jolhe, Dhananjay A, Engineering Drawing an introduction to AutoCAD, Tata McGraw-Hill.

Supplementary Reading:

N.D. Bhatt, Engineering Drawing, Charotar Publishing House Pvt. Ltd.

Online Content:

1. https://nptel.ac.in/courses/112103019

2. https://nptel.ac.in/courses/112104172

Program: BTech	**Year, Semester:1st Year, 2nd Sem**

Course Title: Career Advancement & Skill Development-II - Communication Skill	**Subject Code:**TIU-HSM-UEN-S12191
Contact Hours/Week: 0-0-2 (L-T-P)	**Credit:** 1

COURSE OBJECTIVE:

Enable the student to:

1. Develop fluency in spoken and written English for clear, precise, and confident communication.
2. Train in formal writing, reports, proposals, and multimedia presentations.
3. Strengthen people skills, time management, and analytical reading for workplace success.

COURSE OUTCOME:

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

CO-1:	**Explain** fundamental communication principles and **assess** 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 **practicing** pronunciation drills, **developing** vocabulary, and **engaging** in interactive conversations.	K4
CO-4:	**Construct** well-organized sentences and 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:	**COMMUNICATION THEORY AND WORKPLACE DYNAMICS**	**5 Hours**
Definition of Communication, Communication Models, Workplace Communication Strategies, Effective Messaging, Organizational Communication, Cultural Communication, Verbal and Non-Verbal Cues, Barriers to Communication, Interpersonal and Group Communication		
MODULE 2:	**ADVANCED LANGUAGE AND GRAMMAR PROFICIENCY**	**5 Hours**
Morphology and Syntax, Sentence Structuring, Advanced Grammar Rules, Tense Modulation, Phrasal		

Verbs, Modifiers, Cohesion and Coherence, Lexical Resource, Semantics, Formal vs. Informal Register		
MODULE 3:	**STRATEGIC SPEAKING AND ORAL PROFICIENCY**	**5 Hours**
Phonetics and Phonology, Pronunciation Refinement, Stress and Intonation, Articulation and Clarity, Persuasive Speaking, Argumentation and Debate, Spontaneous Speaking, Interview Techniques, Business Pitches, Active Listening Strategies		
MODULE 4:	**PROFESSIONAL AND TECHNICAL WRITING**	**5 Hours**
Writing Process Methodologies, Text Structuring, Precision in Writing, Report Writing, Business Proposals, Formal Correspondence, Executive Summaries, Editing and Proofreading, Technical Documentation, Press Releases, Persuasive and Analytical Writing		
MODULE 5:	**APPLIED LANGUAGE AND COMMUNICATION EXERCISES**	**5 Hours**
Lexical Expansion, Idiomatic Expressions, Context-Based Learning, Grammar in Context, Role-Plays and Simulations, Speech Analysis, Storytelling Techniques, Collaborative Writing, Dialogues, Workplace Case Studies		
MODULE 6:	**CORPORATE COMMUNICATION AND LEADERSHIP SKILLS**	**5 Hours**
Professional Etiquette, Negotiation Tactics, Conflict Resolution, Crisis Communication, Leadership and Persuasion, Presentation Design, Cross-Cultural Communication, Media and Public Relations, Digital Communication Ethics, High-Stakes Conversations		
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. Sarah Trenholm and Arthur Jensen, “Interpersonal Communication”, Oxford University Press, 2017, ISBN-10: 019064625X, ISBN-13: 978-0190646257
4. Claude G. Théoret, “Advanced Communication Skills: 7 Keys to Personal and Professional Growth”, Independently Published, 2020, ISBN-10: 1656945618, ISBN-13: 978-1656945615.
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. Mark L. Knapp and John A. Daly, “The SAGE Handbook of Interpersonal Communication”, SAGE Publications, 2011, ISBN-10: 1412974747, ISBN-13: 978-1412974745.3.
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.

Deborah Tannen, “Talking from 9 to 5: Women and Men at Work”, William Morrow Paperbacks, 2001, ISBN-10: 0060959622, ISBN-13: 978-0060959623.