Title of the Course:	Mathematical Foundations, and Communication Skills	L	T	P	Credit
Course Code:	UILBC0396	2	-	-	2

Course Pre-Requisite:
Basic Mathematics and Basic English Language

Course Description:
This course is designed to provide Direct Second Year Engineering students with essential knowledge in basic mathematics and foundational communication skills necessary for academic and professional success. The mathematics component strengthens core concepts such as algebra, trigonometry, and calculus, forming the basis for advanced engineering subjects. The communication component focuses on enhancing students' proficiency in written and oral communication, including resume writing, professional correspondence, and presentation skills. The course aims to bridge educational gaps and prepare students for effective participation in engineering academics and industry environments.

Course Learning Objectives:

1. To bridge the gap in fundamental mathematics essential for core engineering subjects.
2. To develop clear and effective communication skills in academic and professional contexts.
3. To enhance problem-solving abilities and interpersonal communication relevant to industry expectations.

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive Level	Bloom's Cognitive Descriptor
CO1	Apply basic algebraic, trigonometric, and calculus concepts to solve engineering-related mathematical problems.	3	Apply (Cognitive)
CO2	Analyze mathematical functions and calculus-based models to interpret real-world engineering scenarios.	4	Analyze (Cognitive)
CO3	Create clear and professional written documents such as resumes, emails, and formal letters for academic and workplace communication.	6	Create (Cognitive)
CO4	Demonstrate effective verbal communication skills through structured presentations, group discussions, and mock interviews.	2	Set (Psychomotor)

Assessments:

Assessment	Marks
In Semester Evaluation (ISE)	100

- ISE are based on assignment/declared test/quiz/seminar/group discussions/ open book test etc.
- There should be at least 04 different tools (each having weightage of 25 marks) to be used by the Course Coordinator for the In Semester Evaluation (ISE).

Course Contents:

Unit: 1

Fundamental Concepts of Engineering Mathematics (7 hours) — **07 Hrs.**

- Algebraic operations: Simplification, Factorization, Surds and Indices
- Introduction to logarithms and their properties
- Functions and Graphs: Concept of function, domain and range, standard curves
- Partial Fraction, Vector Algebra
- Trigonometry review: Basic identities, solution of triangles, applications

Unit: 2

Calculus Essentials and Applications — **08 Hrs.**

- Limits and continuity (basic concepts and standard problems)
- Differentiation: Rules, standard derivatives, chain rule
- Applications of derivatives: Rate of change, maxima and minima, curve sketching
- Introduction to integration and simple problems of area under curves
- Partial Derivatives

Unit: 3	
Communication for Academic and Professional Success • Basics of effective communication: Verbal, Non-verbal, and Written • Listening skills and note-taking techniques • Formal letter and email writing (for internship, placement, official requests) • Resume and cover letter writing	**07 Hrs.**
Unit: 4	
Oral Communication and Presentation Skills • Group discussions and interpersonal skills • Public speaking: Structure, clarity, and confidence • Presentation strategies: Use of visual aids, audience engagement • Interview skills: Mock interviews, body language, and etiquette	**08 Hrs.**

Textbooks and Reference Books:

Mathematics:

1. "Higher Engineering Mathematics" by B.S. Grewal, Khanna Publishers
2. "Engineering Mathematics" by H.K. Dass and Er. Rajnish Verma, S. Chand Publishing
3. "A Textbook of Engineering Mathematics" by N.P. Bali and Manish Goyal, Laxmi Publications
4. "Differential Calculus & Integral Calculus" by Shanti Narayan and P.K. Mittal, S. Chand Publishing

Communication Skills:

1. "Technical Communication" by Meenakshi Raman & Sangeeta Sharma, Oxford University Press
2. "English for Engineers" by N. P. Sudharshana & C. Savitha, Cambridge University Press