

Course Description Form

1. Course Name: Engineering Mathematics I

2. Course Code: ENG013

3. Semester / Year: First semester/2025

4. Description Preparation Date: 4/09/2025

5. Available Attendance Forms: Bologna system attendance form

6. Number of Credit Hours (Total) / Number of Units (Total): SSWL 63 + USSWL 62; ECTS 5

7. Course administrator's name (mention all, if more than one name)

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8. Course Objectives

Course Objectives

- Introduce students to fundamental concepts of matrices and determinants.

Develop the ability to solve systems of linear equations using different methods.

- Provide knowledge of vector algebra and analytic geometry applications.

- Understand the concept of functions and their role in engineering applications.

- Introduce differentiation techniques and their applications in civil engineering problems.

- Introduce integration techniques and applications in geometry and physics-related problems.

- Strengthen problem-solving skills required for advanced engineering courses

9. Teaching and Learning Strategies

Strategy	<p>This course offers different teaching and learning strategies:</p> <p>Teaching methodologies:</p> <ul style="list-style-type: none"> - Lectures presented with PowerPoint slides. - Oral discussions to encourage student participation. - Monthly handouts for additional exercises. - Short reviews at the beginning of classes and summaries at the end. <p>Learning methodologies:</p> <ul style="list-style-type: none"> - Solving exercises from textbooks and assignments. - Group work and peer discussions. - Writing short technical reports on applications of mathematics in civil engineering.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	1	Introduction, review of basic algebra	Lectures	NA
2	3	1	Understand matrices and operations	Lectures	Quizzes and
3	3	1	Understand determinants and properties	Lectures	HWs
4	3	1	Solve systems of linear equations	Lectures	Quizzes and
5	3	1	Apply Cramer's rule and matrix inverse	Lectures	HWs
6	3	1	Vector algebra basics	Lectures	HW
7	3	1	Analytic geometry: lines, planes	Lectures	Quizzes
8	3	1	Mid-term Exam	Lectures	and
9	3	1	Functions: types and properties	Lectures	HW
10	3	1	Limits and continuity	Lectures	Quizzes
11	3	1	Differentiation rules	Lectures	and
12	3	1	Applications of differentiation	Lectures	HW
13	3	1	Integration techniques		
14	3	1	Applications of integration		
15	3	1	Engineering applications		
16	3	1	Final Exam		

11. Course Evaluation

Mid-term exam	10%
HWs	10%
Quizzes	10%
Technical reports	10%
Attendance sheet	10%
Final Exam	50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, Wiley, 2011 2- Engineering Mathematics, K.A. Stroud, 7th Edition, Palgrave Macmillan, 2013
Main references (sources)	1- Advanced Engineering Mathematics, Erwin Kreyszig, Wiley. 2- Engineering Mathematics, Stroud & Booth, Palgrave Macmillan.
Recommended books and references	- MIT OpenCourseWare: Mathematics for Engineers - Khan Academy: Calculus and Linear Algebra
Electronic References, Websites	